Manufacturing Learning Australia

PMB 01
Volume 3 – Competency Standards: Production Competencies

for the

plastics, rubber and cablemaking industry

Volume 3 of a three volume set which comprises the Endorsed Component of the Training Package.

Volume 1 – Structure & Guidance
Volume 2 – Competency Standards: Core & Support Competencies
Volume 3 – Competency Standards: Production Competencies

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Please refer to the National Training Information Service for the latest version of Units of Competency and Qualification information (http://www.ntis.gov.au).			
PMB01 Plastics, Rubber & Cablemaking Training Package			**Sheet: 1 of 1**
Version	**Date of Release**	**Authorisation:**	**Comments**
1.00	21/03/2002	NTQC	Primary Release (note Fully revised version of PMB98)
1.01	22/10/2002	NTQC	Inclusion of omitted details in the packaging rules of two qualifications (PMB20401 and PMB30401)to ensure that the selection of units is made at or above the appropriate level.
			Correction of typographical errors in the codes of the following units throughout the Qualifications Framework: PMBENV100A PMBENV200A PMBENV300A TDTD1097A
			Inclusion of omitted details in the performance criteria and range of variables in PMBPROD305B.
			Correction to the list of competencies available for PMB60101. During the review, the unit PMBSUP480A was removed (on the basis that it unnecessary with the unit BSXFMI404A) and had been deleted elsewhere in the Training Package.
1.02	13/11/2003	ANTA	Expansion of PMBPROD241A Lay up rubber lining to include pulley lagging, resulting in PMBPROD241B Lay up rubber lining or lag pulleys.

Forms control: All endorsed training packages will have a version number displayed on the imprint page of every volume constituting that training package. Every training package will display an up-to-date copy of this modification history form, to be placed immediately after the contents page of the first volume of the training package. Comments on changes will only show sufficient detail to enable a user to identify the nature and location of the change. Changes to training packages will generally be batched at quarterly intervals. This modification history form will be included within any displayed sample of that training package and will constitute all detail available to identify changes.

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PMBPROD354A - Compound materials using an open mill blender
PMBPROD355A - Make pattern/plug for composites moulds

PMBPROD356B - Construct composite moulds
PMBPROD357B - Construct jigs and fixtures
PMBPROD358B - Develop patterns
PMBPROD360A - Produce centrifugally cast polyurethane products
PMBPROD362A - Produce gravity cast polyurethane products
PMBPROD363A - Splice conveyor belts on site
PMBPROD367A - Remove and replace belts
PMBPROD368A - Repair conveyor belt carcass
PMBPROD369A - Repair conveyor belt covers

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UNIT TITLE

PMBPROD101A - Use equipment

UNIT DESCRIPTOR

This competency covers the use of any item of equipment which is operated with limited application of knowledge.

This competency is typically performed by operators new to the job or operators at any level using equipment where significant understanding of the equipment or process is not required.

This competency in practice

This competency applies to operators at the entry level who operate equipment without significant understanding of the equipment or process, and to all operators who operate equipment where they are not required to have any significant understanding of the equipment or the process. It includes:

- following procedures
- turning the equipment on and off when appropriate
- 'operation' is confined to 'machine minding' and identification and reporting only of obvious problems
- recognising common problems and reporting them, or performing an emergency shutdown as appropriate
- working within appropriate codes and regulations.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Follow workplace procedures.	1.1. Access and follow appropriate procedures/work instructions 1.2. Complete all reporting (written, verbal and electronic) according to procedure 1.3. Recognise and report non-conformance to procedure.
2. Monitor and use the equipment/process.	2.1. Turn the equipment on and off as required by procedure 2.2. Monitor operation of equipment/process as per procedure 2.3. Recognise deviations from standard/desired conditions 2.4. Take corrective action/report problems as specified in procedures.

RANGE OF VARIABLES:

This competency applies to all plastics, rubber and cablemaking sectors.

This unit does not cover the operation of 'plant' where there may be specific regulations covering the knowledge and skills needed for the operation of that plant, eg, gas heaters.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency unit includes items of equipment such as:

- routine production equipment operated under close supervision
- routine equipment
  - fans
  - blowers, etc
- 'packaged' plant which does not require any special knowledge or skills to operate such as:
  - portable equipment
  - mobile compressors
  - package boilers/heaters
  - air conditioning plant.

The equipment itself may be quite complicated and sophisticated and may include computer control, however, the knowledge and understanding required to operate it is limited. Where knowledge and understanding of the process and/or equipment is required, a series 200 production competency should be used.

All operations are performed in accordance with standard procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Minimal knowledge of the equipment and procedures but sufficient to recognise abnormal operating conditions and alert the appropriate individuals.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- describe:
  - appropriate safety procedures concerning the operation of the equipment
  - procedures relating to the reporting of hazardous conditions
  - appropriate shutdown procedures
- recognise a situation requiring action and:
  - take the action specified in the procedures
  - report the situation as specified in the procedures.

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Critical aspects:

Consistent performance should be demonstrated. In particular look to see that:

- standard procedures are followed
- deviations from desired conditions are recognised
- action specified in the standard procedures is carried out
- work is carried out safely.

Language, literacy and numeracy requirements:

This unit has minimal literacy and numeracy requirements other than those required to start and stop the equipment and recognise common problems (eg, reading gauges).

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
1	1	1	1	1	1	1

UNIT TITLE

PMBPROD102A - Perform tasks to support production

UNIT DESCRIPTOR

This competency covers the performance of largely manual tasks that are performed in support of the production process working under close supervision. It applies to all sectors of the industry.

This competency is typically performed by all operators working either independently or as part of a work team. This competency is based on LMTPRGN08A - *Perform tasks to support production*.

This competency in practice

This competency applies to operators who are not operating equipment but are making product and contributing to the production process. It might also apply to a more experienced operator working outside their field of expertise and under close supervision. It includes:

- 'fetch and carry' type tasks
- making product under close supervision but not operating process equipment (see PROD 200 *Operate equipment*), following safe working procedures and using personal protective equipment.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Perform general cleaning duties.	1.1. Clarify cleaning duties 1.2. Select and use personal safety equipment, where needed, in accordance with enterprise procedures 1.3. Determine, prepare and mix appropriate cleaning equipment and chemicals/detergents for specific tasks 1.4. Follow procedures for handling and storage of cleaning liquids in accordance with enterprise or manufacturer's specifications 1.5. Use cleaning to meet enterprise requirements.
2. Perform general duties and tasks.	2.1. Perform tasks as directed and clarify, where required, to establish requirements 2.2. Organise relevant equipment and tools and check to confirm good working condition.
3. Transfer, remove or supply materials/ product where required.	3.1. Organise, confirm and record requests and tasks according to specified procedures 3.2. Identify and organise appropriate equipment for transferring material where relevant 3.3. Load and unload material using suitable equipment (other than by forklift) in accordance with materials handling requirements, safe work practices and manual handling techniques, and workplace procedures 3.4. Transfer/move material to the correct destination in a safe manner.

ELEMENT	PERFORMANCE CRITERIA
4. Complete documentation accurately.	4.1. Complete documentation for tasks, where relevant, accurately in accordance with required enterprise procedures.

RANGE OF VARIABLES:

Work involves manual tasks in support of production processes. Work is performed within defined procedures and/or under direct supervision. Work may be performed either individually or within a team environment. Work is assessed in accordance with statutory requirements, enterprise insurance requirements, OH&S legislation, manual handling procedures and relevant health regulations.

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry.

Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Worksite environment and practices may include work conducted in a variety of environments, such as:

- operational workplace activities
- restricted space
- hazardous, controlled or exposed conditions.

Use of the following materials, hand tools and equipment in accordance with established procedures:

- cleaning equipment
- detergents and other chemicals
- hand and power tools
- hand trolleys
- pallet trucks

but not more complex equipment such as forklifts, overhead cranes, or front end loaders.

Production support tasks such as:

- cleaning and housekeeping
- loading, unloading, transporting and transferring products, materials and equipment
- storing products, materials and equipment
- completion of records and documents
- operator maintenance of handling equipment
- interaction with other workplace personnel
- data recording, either using keyboard or manual recording applications.

Sources of information and documents may include:

- enterprise work orders and instructions
- dockets, tags or other identification
- enterprise or external personnel
- work scheduling documentation
- job procedures.

All operations are performed in accordance with standard procedures and work instructions.

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EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Required knowledge and skills include:

- machine and equipment operation
- procedures to handle products and materials
- use of products and materials
- quality requirements
- relevant OH&S legislation, codes of practice, policies and procedures
- maintenance planning and workplace procedures
- reporting procedures
- loading and unloading materials
- applying all relevant safety practices
- use and disposal of a range of chemical cleaning agents, sealants and lubricants, where required
- communicating effectively within the workplace
- interpreting and applying established procedures
- documenting and transferring information.

Critical aspects:

Competence includes the ability for the practical completion of the job to:

- undertake basic production tasks
- handle material and products
- locate and transport materials and products
- clean equipment, machines and work environment
- document work and maintain records as required
- apply workplace heath and safety policies in work operations.

Consistent performance should be demonstrated. In particular look to see that production standards are met consistently.

Language, literacy and numeracy requirements:

This unit has minimal literacy and numeracy requirements other than those required to carry out the job (eg, recognise labels and signs).

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
1	1	1	1	1	1	1

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UNIT TITLE

PMBFIN201B - Finish products and components

UNIT DESCRIPTOR

This competency covers a range of processes subsequent to the actual making of the product which have been grouped together under the heading of 'finishing'. It applies to the finishing of products for customer use, and the finishing of components for use by a subsequent process or organisation which may then further process or assemble these components into a finished product, and similar activities. It applies across all sectors of the industry.

This competency is typically performed by personnel working either independently or as part of a work team.

This competency in practice

This competency applies to production support or moulding operators who are required to apply knowledge of product quality standards, and product defect classification, and operate value adding secondary processing units such as trimming and assembly, and, other personnel who perform initial finishing processes to products after the production process. The key factors are the removal of waste/excess material from the product and preparing the product for either further processing or customer delivery. It includes:

- checking job sheets for work to be done
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- inspecting the product for routine and non-routine finishing processes
- discussing finishing requirements with other workers
- applying finishing process to product
- inspecting finished product and sorting in accordance with job specifications
- identifying and taking action on routine product imperfections
- discussing non-routine product imperfections with designated person.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Establish requirements for the finishing process.	1.1. Identify work requirements from procedures 1.2. Assemble equipment and consumables for the finishing process 1.3. Consult workplace procedures and materials safety data sheets to confirm the work planning process 1.4. Ensure safety equipment is available and in sound condition 1.5. Remove products from equipment if required using enterprise standard handling methods. 1.6. Recognise end-of-product run.

ELEMENT	PERFORMANCE CRITERIA
2. Check quality of product.	2.1. Inspect product to identify routine and non-routine finishing requirements 2.2. Identify significant finning, flash or other quality problems and report to appropriate person for investigation of mould/die closure/alignment 2.3. Check with appropriate personnel regarding modifications to finishing process 2.4. Identify and process non-conforming products in accordance with workplace procedures.
3. Undertake the finishing operation.	3.1. Trim product as required 3.2. Apply procedures to other finishing processes 3.3. Undertake other secondary process operations required 3.4. Follow waste and recycling procedures 3.5. Inspect finished product and compare to specifications for suitability for further processing or for customer delivery 3.6. Assemble finished products and sort in accordance with procedures 3.7. Pack as required 3.8. Record product data as required 3.9. Clean up work area and perform housekeeping.
4. Identify and rectify routine product imperfections.	4.1. Identify the range of routine imperfections that can occur during the production process 4.2. Determine and rectify routine product imperfections in accordance with procedures 4.3. Ensure appropriate records and log books are maintained to meet procedures/work instructions 4.4. Identify non-routine product imperfections and report to designated person.

RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It includes the operation of all relevant additional equipment where that equipment is integral to the finishing process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes the use of equipment and tools such as:

- electric and/or air powered routers, saws, drills, drivers and sanders
- knives, files and scrapers
- hand carts and trolleys
- hoists/jigs/lifting equipment not requiring any special permits or licences
- knives and knife sharpeners
- band saws, hand saws
- personal safety equipment such as gloves and goggles or face shields
- handling aids such as jigs and gantries.

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Typical hazards include:
- manual handling hazards
- knife hazards
- humidity, air temperature, radiant heat
- stationary and moving machinery, parts and components.

Typical process problems include:
- movement of jigs or fixtures
- power failures
- non-supply of materials
- broken cords
- damaged or inoperable equipment.

Typical product problems include:
- variations in materials
- temperature of product to be finished
- movement of inserts, reinforcements or fittings
- size of some products.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification product imperfections and techniques necessary to finish products for customer use.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:
- apply and/or explain:
  - selection and application of appropriate processes
  - selection of appropriate tools for the process
- locate, interpret and apply relevant information to the finishing process
- identify and safely handle products
- select and apply appropriate finishing process
- meet waste and recycling requirements
- distinguish between causes of faults such as:
  - product defects such as: flashing; distortions; stress marks; sinks, voids; short shots; poor colour distribution; moisture marks; gassing; burn marks
  - inappropriate selection and use of finishing equipment/processes
  - poor surface finish
  - fining or shuts
  - variations in section thickness.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise potential situations requiring action
- implement appropriate action
- understand procedures.

Consistent performance should be demonstrated. In particular look to see that:

- production standards are met consistently
- the importance of critical material properties and quantities to the finishing process is recognised
- safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg, counting numbers of products and percentage of rejects.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

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UNIT TITLE

PMBFIN202B - Fit attachments to products

UNIT DESCRIPTOR

This competency covers the attachment of parts to products. It applies to all sectors of the industry.

This competency is typically performed by all operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who attach parts to products as part of the finishing processes of the product. The key factors are the planning of the attachment process and following of the work plan. It includes:

- checking job sheets for work to be done
- identifying hazards and appropriate measures to minimise risks
- planning sequence of tasks
- testing attachments and product
- inspecting finished product
- identifying and rectifying routine product imperfections
- discussing non-routine product imperfections with designated person.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Establish requirements for the finishing process.	1.1. Interpret product specifications 1.2. Identify availability of attachments, required materials and tools 1.3. Identify final use and any special characteristics of the product to be assembled in relation to the impact of the assembly process on product quality.
2. Plan fitting process.	2.1. Identify hazards connected with materials and process from observation of equipment and workplace reference materials 2.2. Identify appropriate measures to minimise risks from the identified hazards 2.3. Locate manufacturer's information and safety advice on products and use to plan work 2.4. Plan attachment process to conform to quality specifications, minimise time and economically use materials 2.5. Plan task sequences 2.6. Assemble required materials, tools and facilities and check for suitability of purpose.

ELEMENT	PERFORMANCE CRITERIA
3. Undertake finishing.	3.1. Follow work plan ensuring compliance with procedures 3.2. Test attachments and product for conformity with quality requirements when required 3.3. Inspect finished product and compare to specifications for suitability for further processing or for customer delivery 3.4. Assemble finished products and sort in accordance with procedures 3.5. Follow waste and recycling procedures 3.6. Clean up work area and perform housekeeping.
4. Identify and rectify routine product imperfections.	4.1. Identify the range of routine imperfections that can occur during the process 4.2. Determine and rectify routine product imperfections in accordance with procedures. 4.3. Make sure appropriate records and log books are maintained to meet procedures 4.4. Identify non-routine product imperfections and report to designated person.

RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It includes the operation of all relevant additional equipment.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes the use of equipment and tools such as:

- jigs and gantries
- powered equipment such as drills, drivers,
- plastic welding equipment as appropriate
- hand carts and trolleys
- hoists/jigs/lifting equipment not requiring any special permits or licences
- transfers, bolts, nuts, inserts, seals, screens and reinforcement
- relevant personal protective equipment.

Typical hazards include:

- manual handling hazards
- humidity, air temperature, radiant heat
- stationary and moving machinery, parts and components
- component size and weight.

Typical process problems include:

- movement of jigs or fixtures
- power failures
- non-supply of materials.

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Typical product problems include:
- variations in materials
- temperature of product to be finished
- movement of inserts, reinforcements or fittings.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise routine and non-routine product imperfections and techniques necessary to fit attachments as part of the finishing process for products.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:
- apply and/or explain:
  - selection and application of appropriate fitting of attachment processes
  - selection of appropriate tools for the process
  - waste and recycling requirements
- distinguish between causes of faults such as:
  - misaligned or obstructed inserts
  - selection and use of inappropriate finishing equipment/processes.

Critical aspects:

It is essential that competence is demonstrated in the ability to:
- recognise potential situations requiring action
- implement appropriate action
- understand procedures
- recognise the importance of critical material properties and quantities.

Consistent performance should be demonstrated. In particular look to see that:
- production standards are met consistently
- safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg, counting numbers of products and percentage of rejects.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

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UNIT TITLE

PMBFIN203B - Repair product imperfections

UNIT DESCRIPTOR

This competency covers the repair of product imperfections during or after production.

This competency is typically performed by all operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who conduct repairs to products following the manufacturing process. The key factors are the identification of the fault and its repairability, selecting an appropriate repair product or process and making the necessary repairs. It includes:

- checking job sheets for work requirements
- identifying the priority in which jobs/product will be completed
- ensuring appropriate repair materials and equipment are available
- ensuring the equipment and materials are appropriate for the job
- carrying out the repair process
- checking the repair for conformance with specification.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Identify damage, and select materials and repair process.	1.1. Interpret product specifications and work order documentation 1.2. Identify product faults and make decisions as to the feasibility of the repair in terms of the intended use of the product and the quality specifications 1.3. Select technology appropriate for the repair 1.4. Identify appropriate repair materials and match to fault and repair method 1.5. Assemble materials and tools and check for suitability for purpose 1.6. Locate and use manufacturer's information and safety advice on products to plan work 1.7. Plan order of work to identify required work sequences, times, work process stages, engineering controls and personal protection equipment 1.8. Design repairs to conform to quality specification, minimise time and economically use consumable materials.
2. Conduct repairs.	2.1. Identify and eliminate sources of contamination 2.2. Prepare surfaces in accordance with manufacturer's instructions and workplace requirements 2.3. Conduct repairs in the appropriate locations and check for conformity with job specification.

ELEMENT	PERFORMANCE CRITERIA
3. Clean work area and prepare products for the next process.	3.1. Clean and inspect used equipment for serviceable condition and store appropriately 3.2. Tag unserviceable equipment, identify faults and inform appropriate personnel 3.3. Inspect and approve repaired products for suitability for further processing or for customer delivery 3.4. Tag products which do not meet quality specifications for further repair or treatment 3.5. Clean work area and return to approved condition.
4. Follow workplace procedures to finish product.	4.1. Follow waste and recycling procedures 4.2. Assemble and sort repaired products for delivery to other work sections in accordance with workplace procedures 4.3. Complete appropriate documentation.

RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It includes the operation of all relevant additional equipment.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency unit includes equipment and tools such as:

- hand carts and trolleys
- hoists/lifting equipment not requiring any special permits or licences
- plastic or other filling compounds
- basic hand tools required for cosmetic repairs of products
- relevant personal protective equipment.

Typical hazards include:

- spills
- dusts/vapours
- hazardous materials
- manual handling hazards.

Typical process problems include:

- inappropriate filling materials being selected and used
- equipment failures
- effect of weather on curing times.

Typical product problems include:

- variations in materials
- contamination of materials
- separation of filling and parent materials.

All operations are performed in accordance with procedures.

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EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and material faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - impact of incorrect or faulty materials
  - focus of operation of work systems and equipment
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures
- distinguish between causes of routine finishing faults such as:
  - wrong raw materials/additives
  - incorrect quantity of materials/additives/catalyst
  - contaminated materials/additives/catalyst
  - equipment malfunctions
  - tool slips and mould or product inclusions.

Critical aspects:

It is essential that the competence is demonstrated in the ability to:

- recognise the importance of critical material properties and quantities
- maintain tools in a manner that promotes cleanliness and safety
- identify problems and take appropriate action.

Consistent performance should be demonstrated. In particular look to see that:

- production standards are met consistently
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg, to determine that 16 units and 46 units are equal to a total of 62 units.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

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UNIT TITLE

PMBFIN205B - Hand decorate products

UNIT DESCRIPTOR

This competency covers the hand decorating of products as part of the finishing process of products for customer use. It applies to all sectors of the industry.

This competency is typically performed by all operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who perform hand decorating techniques to products as part of the finishing process. The key factors are identifying appropriate materials, correct positioning, alignment and cleanliness. It includes:

- checking job sheets for work to be done
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- inspecting the product for routine and non-routine finishing processes
- discussing finishing requirements with other workers
- product surface cleanliness
- applying decorating materials to product
- inspecting finished product and sorting in accordance with job specifications
- identifying and rectifying routine product imperfections
- discussing non-routine product imperfections with designated person.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Establish requirements for the finishing process.	1.1. Interpret customer order or product specifications 1.2. Check availability of materials and equipment 1.3. Identify and inspect products to be decorated for suitability of process 1.4. Report unsuitable products to designated person 1.5. Assemble materials, tools and facilities and check for suitability 1.6. Locate manufacturer's information and safety advice on products and use to plan work 1.7. Identify required work sequences, times, work process stages, engineering controls and personal protective equipment, and plan order of work.
2. Prepare surfaces.	2.1. Inspect product surfaces for contamination or damage 2.2. Identify and eliminate sources of contamination 2.3. Prepare surfaces in accordance with manufacturer's instructions and workplace requirements.

ELEMENT	PERFORMANCE CRITERIA
3. Hand decorate products.	3.1. Identify required decorations to meet job order requirements 3.2. Ensure decorations are fit for use and return those damaged or unusable 3.3. Apply decorations in the appropriate locations 3.4. Inspect finished product and compare specifications for suitability for further processing or for customer delivery 3.5. Assemble finished products and sort in accordance with procedures 3.6. Clean up work area and perform housekeeping.
4. Identify and rectify routine hand decorating problems.	4.1. Identify the range of routine problems that can occur during the hand decorating process 4.2. Determine and rectify routine hand decorating imperfections in accordance with procedures 4.3. Identify faults in equipment, tag unserviceable equipment and report to designated person 4.4. Ensure appropriate records and logbooks are maintained to meet procedures.

RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It includes the operation of all relevant additional equipment where that equipment is integral to the decorating process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- hand carts and trolleys
- hoists, jigs and gantries
- lifting equipment not requiring any special permits or licences
- relevant personal protective equipment.

Typical hazards include:

- manual handling hazards
- solvents and cleaning agents
- humidity, air temperature, radiant heat
- stationary and moving machinery, parts and components.

'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:

- non-supply of product
- incorrect selection or supply of materials
- misalignment of decals, transfers or other decorative materials.

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Typical product problems include:
- variations in materials
- temperature of product to be finished
- contamination of surfaces
- decals/transfers or stamps not within specification or not fit for use.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise problems that can occur during the hand decorating process.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:
- locate, interpret and apply relevant information to finishing process
- identify and safely handle products
- select and apply appropriate finishing process
- apply and/or explain:
  - waste and recycling requirements
  - non-adherence of transfers, decals or stamps.

Critical aspects:

It is essential that competence is demonstrated in the ability to:
- understand the importance of critical material properties and quantities
- recognise potential situations requiring action and then implement appropriate action.

Consistent performance should be demonstrated. In particular look to see that:
- production standards are met consistently
- decorations are applied consistently and at an appropriate rate.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg, counting numbers of products and percentage of rejects.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

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UNIT TITLE

PMBMAINT202B - Undertake basic maintenance

UNIT DESCRIPTOR

This unit applies to equipment operators who are involved in basic maintenance and the resolving of routine problems to procedure. It applies to all sectors of the industry.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake basic maintenance of equipment. The key factors are the performance of basic maintenance tasks to procedures. It includes:

- inspecting and checking equipment for faults
- following approved hazard minimisation procedures for any hazards connected with equipment, in accordance with occupational health and safety legislative responsibilities
- performing basic equipment maintenance
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Inspect equipment and work area.	1.1. Read tags, service records and equipment manufacturer's information prior to commencing maintenance, noting operator identified faults or difficulties and manufacturer's recommendations 1.2. Read maintenance schedules and note required maintenance tasks 1.3. Identify isolation mechanisms and activate when required 1.4. Check equipment prior to and after start up and maintenance, following procedures and specifications to ensure it is free from damage, leaks and obstructions 1.5. Check work area to ensure that it is safe and appropriate for the required tasks.
2. Prepare for maintenance activity.	2.1. Turn off and isolate equipment as required 2.2. Clear the area of obstructions and hazards 2.3. Identify step by step procedure to minimise time delays and to sequence maintenance processes consistent with manufacturer's recommendations 2.4. Identify and assemble required tools, consumables and equipment. 2.5. Identify any work permits and take appropriate action in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Undertake basic maintenance activity.	3.1. Follow procedures for the maintenance tasks and where required make appropriate adjustments to the plan to deal with unexpected events 3.2. Check work to ensure that the operational condition is to the required specifications 3.3. Return tools, equipment and unused consumables to the appropriate location and dispose of waste within procedures 3.4. Leave work area in a clean and safe condition 3.5. Ensure all permits are signed off.
4. Identify and assess faults.	4.1. Conduct visual inspections and check for any equipment faults 4.2. Identify and note conditions which may cause difficulties in the future and make assessments of the potential effect on the safe and efficient operation of the equipment 4.3. Report potential fault conditions to the appropriate personnel.
5. Complete maintenance records.	5.1. Report and complete accurate results of the maintenance and file in accordance with procedures 5.2. Make clear reference to any items which may not yet require maintenance but may affect the future working condition or safety of the equipment.

RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It does not include maintenance that would require trade level skills. It is not intended that this competency would cover maintenance that is carried out in a workshop.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include:

- routine predictive and preventative operational maintenance
- minor reactive maintenance
- removal and replacement of minor operational equipment

in accordance with workplace requirements and procedures.

Typical information sources, observed data and plant records may include:

- plant data
- log sheets
- operational and performance results
- condition monitoring information
- planned maintenance schedules
- standard operating procedures
- manufacturer's instructions
- plant description manuals.

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Typical tools and equipment may include:
- hand tools specific for the task
- measuring and aligning equipment.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:
- apply and/or explain:
  - principles of the operation of the equipment to be maintained
  - functions and trouble shooting of major internal components and their problems
  - typical causes of equipment failures and the service conditions which may increase maintenance
  - urgency and timeliness factors in maintenance
- identify tools, materials and spare parts
- apply basic techniques for using and handling tools
- apply physical measurement, alignment and clearance principles
- conduct visual inspections and checks and take appropriate action, eg, pressure over/under specification, fluid leaks and levels, tightness of bolts, fixtures, and fittings within specifications, temperature under/over specification, cracks, surface or structural faults or damage
- undertake routine maintenance tasks as per work instructions.

Critical aspects:

It is essential that competence is demonstrated in the ability to:
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :
- early warning signs of equipment in need of attention/with potential problems are recognised
- action is taken to ensure equipment is returned to full performance in a timely manner
- items initiated are followed through until final resolution has occurred
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical manufacturer's specifications, job sheets, procedures and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required to interpret plant data and maintenance schedules.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	1	1	1

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UNIT TITLE

PMBPREP201A - Prepare moulds for composites production

UNIT DESCRIPTOR

This competency covers the demoulding and preparation of composites moulds for the application by hand or machine of gelcoating, or other first coat, in preparation for composites production. It also covers the inspection and temporary repair of minor mould surface defects.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are involved in the preparation of mould surfaces and to the application of mould-release systems.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare surfaces.	1.1. Prepare surfaces to procedures 1.2. Make temporary repairs as needed 1.3. Clean up equipment and work area when surface preparation is completed.
2. Apply mould release system.	2.1. Select the correct system for the job 2.2. Apply to mould surfaces as per manufacturer's specifications 2.3. Tape-test the surface release system.
3. Mask-up mould	3.1. Select suitable masking tape 3.2. Apply masking tape and other materials.

RANGE OF VARIABLES:

This competency unit includes the processes required to prepare surfaces for application of mould release systems to specification. It includes the operation of all relevant additional equipment where that equipment is integral to the surface preparation process. It includes the demoulding of a previous product or protective surface to procedures where relevant.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- hand finishing tools, plastic scrapers, buffs and polishes
- relevant personal protective equipment.

Typical hazards include:

- hazardous materials and vapours
- moving equipment
- manual handling hazards.

Typical problems include:
- ν equipment wear and breakage
- ν overuse of tools, requiring rework.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to apply mould release system to specification.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:
- ν apply and/or explain:
  - effects of contamination on surface quality
- ν identify:
  - equipment, tools and consumables required to deliver the specified mould surface
  - different mould release systems
- ν list and describe:
  - appropriate application techniques for the mould release systems used
  - typical problems with each mould release system
- ν distinguish between causes of faults such as:
  - materials
  - contaminants
  - equipment
- ν correct selection and use of equipment, materials, processes and procedures
- ν plan own work including predicting consequences and identifying improvements
- ν monitor equipment operation and surface quality
- ν identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- ν identify and describe own role and role of others involved directly in the application process
- ν use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task.

Critical aspects:

It is essential that competence is demonstrated in the ability to:
- ν finished product will release from mould successfully.

Consistent performance should be demonstrated. In particular look to see that:
- ν surface standards are met consistently
- ν upstream and downstream communication is timely and effective
- ν application procedures and work instructions are read and interpreted correctly
- ν repairs are identified and appropriate action is taken (ie, the problem is fixed or reported)
- ν all safety procedures are followed.

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Language, literacy and numeracy requirements:

Operators need to be able to interpret job specifications and recognise containers for different mould releases. They also need to be able to communicate work requirements with other operators.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to a range of mould release systems and equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

UNIT TITLE

PMBPREP205B - Assemble materials and equipment for production

UNIT DESCRIPTOR

This competency covers the interpretation of product specifications, selection of required materials and equipment, organising delivery and confirmation of material/equipment delivery to the production area in preparation for production.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who collect and prepare materials for the production process. The key factors are the delivery of the right material to the right place at the right time and ensuring there is no contamination of the materials. It includes:

- checking job sheets for work requirements
- discussing work progress with other workers
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- collecting a range of materials and assembling them close to the start of the process and in the same sequence as the jobs are to be done
- moving the correct number of bags, drums, etc, into the assembly area
- checking materials to ensure no contamination
- moving required materials into the right place by the right time.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Identify required materials and equipment.	1.1. Interpret product specifications 1.2. Identify required materials including additives 1.3. Identify trade names for required product 1.4. Determine quantity of materials required for product 1.5. Identify required equipment including handling, control and material preparation equipment.
2. Locate materials and equipment.	2.1. Locate required materials, equipment and machinery 2.2. Mark items off on check list as required 2.3. Identify non-conformances and report as required 2.4. Identify and prepare appropriate holding area.

ELEMENT	PERFORMANCE CRITERIA
3. Assemble materials and equipment.	3.1. Use good manual handling practices 3.2. Follow required procedures, particularly OHSW procedures, codes and practices 3.3. Collect and organise materials in a manner that ensures storage compatibility 3.4. Visually check materials according to enterprise requirements. 3.5. Collect holding sample according to enterprise requirements. 3.6. Record details of specification and sample as required.
4. Organise internal workplace delivery of materials/ equipment as required.	4.1. Organise placement of material to required locations using enterprise procedures. 4.2. Notify and confirm delivery as per enterprise requirements/procedures 4.3. Follow workplace procedures as required by enterprise.
5. Store materials for production as required.	5.1. Identify storage requirements 5.2. Check holding area conditions meet material requirements 5.3. Store materials as required for production and to meet health and safety needs 5.4. Complete required workplace documentation/records.

RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It includes the operation of all relevant additional equipment where that equipment is integral to the preparation process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- hand carts and trolleys
- knives and other bag opening equipment
- hoists/lifting equipment not requiring any special permits or licences
- bung spanners and similar
- basic hand tools required for opening of material packaging
- relevant personal protective equipment.

Typical hazards include:

- spills
- dusts/vapours
- slip and fall, particularly due to spilt granules
- temperature
- hazardous substances
- moving equipment
- manual handling hazards
- knife hazards.

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'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:

- equipment malfunction
- non-supply or incorrect supply of materials
- misreading labels or instructions.

Typical product problems include:

- variations in materials
- contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, processes and material faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - basic units of measurements such as additions, subtractions, divisions, fractions, percentages
  - dial, scale and digital read-outs
  - materials safety data sheets
  - a limited knowledge and application of polymer materials
  - definitions of thermoplastics and thermosetting materials
  - trade names of common plastic materials
  - formulas of common plastics
  - end use examples of plastics by type and common family names
  - hazard and safety precautions for common polymer family characteristics
  - dangerous goods Act, regulations, as relevant
  - Hazchem requirements as relevant to the job
  - safe working practices in handling polymers
  - PPE equipment requirements
  - impact of incorrect or faulty materials
  - production workflow sequences and materials demand
  - focus of operation of work systems and equipment
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures
- distinguish between causes of faults such as:
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - contaminated materials/additives.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- identify trade names and grades of polymers and arrange workplace delivery as required for the production operator
- understand the procedures
- recognise the importance of critical material properties and quantities
- recognise potential situations requiring action and then in implementing appropriate action.

Consistent performance should be demonstrated. In particular look to see that

- production standards are met consistently
- correct materials are being assembled.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

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UNIT TITLE

PMBPREP206B - Prepare materials to formulae

UNIT DESCRIPTOR

This competency covers preparing materials to formulae for production or product finishing.

This competency is typically performed by operators working either independently or as part of a work team.

This unit of competency may be designated for a stream – see the range of variables.

This competency in practice

This competency applies to operators who assemble materials to formulae for production or production finishing. The key factors are identifying handling requirements for materials, preparing for the combination of ingredients and collecting and assembling ingredients. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- collecting a range of materials and assembling them close to the start of the process and in the same sequence as the jobs are to be done
- checking materials to ensure no contamination
- combining materials to a formulae
- moving required materials into the right place by the right time.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Identify requirements to handle materials.	1.1. Read and interpret specifications for materials and identify materials 1.2. Identify units of measurement and matching measuring equipment 1.3. Know the tolerances of measuring equipment and relate them to the impact of over/under measurement of ingredients on production process and quality 1.4. Follow procedures to identify and control hazards 1.5. Read workplace procedures and use them to plan work sequence.
2. Prepare for assembly of ingredients.	2.1. Calibrate or zero equipment for measurement and/or identify appropriate measurement scales 2.2. Set up and fit required personal protection equipment and engineering controls 2.3. Assemble equipment for dealing with emergencies 2.4. Check work area for cleanliness 2.5. Identify sources of potential contamination and take steps to minimise/eliminate contamination risk.

ELEMENT	PERFORMANCE CRITERIA
3. Assemble ingredients.	3.1. Collect ingredients 3.2. Weigh/measure ingredients according to procedure 3.3. Follow appropriate workplace approved sequence for combination of materials 3.4. Follow standard operating procedures and observe appropriate safety measures when conducting work 3.5. Check for correctness of colour to standard 3.6. Take action specified in procedures if materials/assembled ingredients do not appear to meet requirements 3.7. Complete workplace records 3.8. Store unused ingredients, and clean and store equipment.

RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This unit of competency may be designated for one of the following streams where workers use that unit substantially only in that stream area:

- cablemaking
- blow moulding
- blown film
- calendering
- composites
- compounding
- extrusion
- fabrication
- injection moulding
- polystyrene
- expanded foam polyurethane
- rotational moulding
- thermoforming
- belt splicing
- rubber Lining
- tyre manufacture
- tyre retreading
- surface coating.

This competency includes equipment and tools such as:

- measurement equipment
- knives and other bag opening equipment
- hoists/lifting equipment not requiring any special permits or licences
- basic hand tools required for opening of material packaging
- relevant personal protective equipment.

Typical hazards include:

- spills
- dusts/vapours
- hazardous materials
- manual handling hazards
- knife hazards.

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'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:

- inappropriate selection of raw materials
- contamination of raw materials
- incorrect formulae being selected
- combining inappropriate materials.

Typical product problems include:

- variations in materials
- contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- use measuring systems, scales and calculating devices
- observe storage and mixing requirements for materials to be mixed
- assess production workflow in relation to materials supply requirements
- recognise the focus of operation of work systems and equipment
- identify and correctly use equipment, processes and procedures
- plan own work including predicting consequences and identifying improvements.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- use measuring scales and equipment
- locate, use, interpret and apply relevant formulae and information
- maintain workplace records for materials used and mixes produced
- identify and safely handle products and materials applying safety precautions appropriate to the task, including safe storage of materials.

Consistent performance should be demonstrated. In particular look to see that:

- critical material properties and quantities are known
- potential situations requiring action result in implementing appropriate action.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is also required, eg, to interpret specifications and measure accurately and perform simple addition and subtraction.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

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UNIT TITLE

PMBPROD200A - Operate equipment

UNIT DESCRIPTOR

This competency covers the operation of equipment and the resolving of routine problems to procedure in the production process. This competency is for enterprise specific equipment items which are not otherwise covered in this Training Package.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake the routine operation of equipment in the production process. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- monitoring equipment operation and reporting process variations
- checking product for quality and conformity to specifications
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check raw materials are correct 2.3. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Start machine safely and correctly when required 3.2. Check process is within required limits 3.3. Collect products and store as required 3.4. Check product/process is in specification/to required quality standard 3.5. Maintain supply of material(s) as required 3.6. Complete logs and records when required 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean up equipment and work area in accordance with procedures. 3.9. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to the operation of enterprise specific equipment within the plastics, rubber and cablemaking sectors not covered by more specific units of competency. It includes the operation of all relevant additional equipment where that equipment is integral to the process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- process equipment and its major components
- hand tools used in the this process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

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Typical hazards include:
- spills
- dusts/vapours
- slip and fall
- temperature
- hazardous substances
- moving equipment
- manual handling hazards.

'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:
- equipment malfunction
- variations in process conditions
- variations in materials or contamination of materials
- equipment, tool, die or mould damage.

Typical product problems include:
- routine product faults
- machine malfunction
- mould/tooling problems
- variations in materials and/or contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:
- apply and/or explain:
  - operation of process equipment and components
  - production workflow sequences and materials demand
  - reasons for checking process control panels and reporting readings which do not conform to the work instructions
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures

- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine faults such as:
  - incorrect quantity of materials
  - contaminated materials/additives
  - equipment faults
  - mould/die/tool damage
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - machine failure.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

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Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	1	1	1	1

UNIT TITLE

PMBPROD206A - Operate ancillary equipment

UNIT DESCRIPTOR

This competency covers the operation of ancillary equipment which supports production operations. It applies to stand-alone items of equipment which require separate operation/ knowledge skills to the operation of the main production unit. This unit does not apply where the relevant ancillary equipment is minor and is integral to the main process (see relevant process specific unit).

This competency is typically performed by all operators working either independently or as part of a work team.

This competency in practice

This competency applies to operation of equipment which enables the production process and is either remote from the main production unit, or is in close proximity or attached but is not a part of the main functions.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from standard procedures 1.2. Identify equipment requirements from job specifications and from verbal instructions by main machine operator 1.3. Carry out pre-start checks in accordance with procedures.
2. Start/stop and monitor equipment.	2.1. Start/stop each machine safely as required by production units and as specified by standard working procedures 2.2. Monitor the operation of each ancillary unit to support the moulding production program 2.3. Pause or stop units of equipment as required, clean up units and make ready for restart.
3. Control standard equipment variables.	3.1. Resolve equipment functioning problems within standard expected variation limits 3.2. Report non-standard equipment variations.

RANGE OF VARIABLES:

This competency applies to the:

- blow moulding,
- blown film,
- cablemaking
- extrusion,
- injection moulding,
- polystyrene
- rotational moulding and
- thermoforming

sectors within the plastics and rubber industries.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Ancillary equipment units include:

- chilled water temperature control units
- chilled water units
- corrugator units
- haul-off units
- hot water or hot oil temperature control units
- in-process granulating machines
- polymer feedstock desiccant drying units
- pressurised air supply units
- product handling robotic units
- product take-off conveyors
- proportional polymer feed mixing hoppers/units
- reinforcement filament braiding units
- run-out tables
- slotting units
- vacuum and/or mechanical polymer loading units
- vacuum calibration/sizing units
- wind-up units.

Typical hazards may include:

- spills
- dusts/vapours
- slip and fall, particularly due to spilt polymer granules
- temperature
- hazardous materials
- manual handling hazards
- equipment operations

Typical problems include:

- machine malfunction
- variations in materials and/or contamination of materials.

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EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification process problems and equipment.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - operation of relevant ancillary equipment
  - production workflow sequences
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - correct selection and use of equipment, materials, processes and procedures
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- pause equipment, or shut down equipment in abnormal circumstances.

Critical aspects:

It is essential that the ancillary units operate so as to support the requirements of the main production process.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	1	1	2

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UNIT TITLE

PMBPROD207A - Operate calender

UNIT DESCRIPTOR

This competency covers the operation of calendering equipment and the resolving of routine problems to procedure.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake the routine operation of calender equipment to process compounded, green rubber into semi-finished rubber sheets or plastics compounds into finished or semi-finished plastic sheets. The calendered material may or may not contain materials such as fabrics and/or surface patterns. The key factor is obtaining a uniform finish and thickness and physical properties to the product. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- monitoring calender equipment operation and reporting process variations
- checking product for quality and conformity to specifications
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check raw materials are correct 2.3. Check nip settings and temperature adjustments for conformity to procedures 2.4. Undertake other pre-start checks in accordance with procedures 2.5. Check surface condition of calender rolls.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Start machine safely and correctly when required 3.2. Strip pelt, cut and fold and feed through rollers until required pigment blend, textures and consistency is achieved 3.3. Check product/process is within required limits 3.4. Collect products and store as required 3.5. Check product is in specification/to required quality standard 3.6. Maintain supply of material(s) as required 3.7. Complete logs and records when required 3.8. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.9. Clean up equipment and work area in accordance with procedures 3.10. Interrupt or shut down equipment in an emergency, following workplace and emergency procedures 3.11. Operate down stream equipment in accordance with calender procedure.
4. Resolve routine problems.	4.1. Identify likely faults and process variations that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency includes the use of manual handling, material feed and product take-up equipment. It also includes the operation of all relevant ancillary equipment.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- mill knives
- thickness gauges
- profiling gauges/tools/jigs
- nip adjusting bars
- relevant personal protective equipment
- strainers and metal detectors.

Typical hazards include:

- cuts
- nip hazards
- material hazards
- burn hazards
- manual handling hazards
- power failures.

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'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:

- variations in materials
- contamination of materials
- short scorch products (if rubber)
- initial feeding of pelt
- uneven profiles
- uneven colours
- uneven surface appearance
- variation in compound grain and nerve
- making a homogeneous product
- lay flat and curvature standards.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or describe:
  - the function of calendering equipment, machine components and guides
  - changes to materials at the stages of production conducted by the employee
  - the impact of calendering machine nip settings, speed, pressure, time, temperature and tension on product quality and production output
  - the potential effects of foreign objects on nip area on the compounded materials
  - own role and the role of others involved directly in the calendering process
  - ability of the operator to rectify the fault or if assistance is required
  - the effect of unauthorised or emergency shutdown of equipment on the calendering production process
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the calendering process
- identify factors which may affect product quality or production output and appropriate remedies

- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine faults such as:
  - incorrect quantity of materials
  - wrong raw materials
  - equipment setup
  - machine failure
  - scorch.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- calendering production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

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Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

UNIT TITLE

PMBPROD209B - Operate cable winding equipment

UNIT DESCRIPTOR

This competency covers the operation of cable winding equipment for storing of products on reels and spools and the resolving of routine problems to procedure. It applies to the cable making industry.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who organise the storage of finished products and/or raw materials for production, post production and despatch. The key factors are identifying of products, storing of products/materials on reels and spools and keeping appropriate records. It includes:

- checking job sheets for work requirements
- checking winding equipment setup
- operating winding equipment and reporting process variations
- moving and storing products correctly and safely
- following approved hazard minimisation procedures for any hazards connected with materials and process, using procedures
- checking product for quality and conformity to specifications
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with procedures
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates, guards and emergency stops are in position and working 2.2. Check raw materials are correct 2.3. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Check winding equipment setup.	3.1. Observe spool condition and tag and return non-conforming spools to procedures 3.2. Check winding equipment settings and adjustments, spool size and length settings to procedures 3.3. Ensure product is checked for conformity with quality requirements 3.4. Tag and deal with non-conforming product to procedures 3.5. Thread product through the equipment and feed on to the spool 3.6. Use appropriate fixing devices, methods or materials 3.7. Adjust tensions and check laying pattern to procedures 3.8. Check emergency cutoff switches and other safety devices to procedures.
4. Operate equipment.	4.1. Start machine safely and correctly when required 4.2. Check product/process is within required limits 4.3. Check product is in specification 4.4. Maintain supply of material(s) as required 4.5. Complete logs and records when required 4.6. Clean up equipment and work area to procedures 4.7. Pause equipment, or stop equipment in an emergency, to procedures.
5. Monitor winding machine operation.	5.1. Monitor winding machine equipment operations noting cooling line temperatures, amperages, tensions, colour, thickness and product integrity compared to product specification 5.2. Identify sections of product requiring repair and follow procedures to remedy the fault 5.3. Make adjustments to remedy faults and non-conformity to specifications where applicable 5.4. Collect material for reprocessing and reuse where possible, and deal with waste and scrap to procedures 5.5. Complete equipment cleanup, lubrications, adjustments and waste management to procedures.
6. Complete work process.	6.1. Cut product and secure free ends 6.2. Remove and set down reel using appropriate manual handling techniques 6.3. Relocate reel and transport without damage to materials, personnel or equipment 6.4. Fit new spool and recommence product winding operations.
7. Resolve routine problems.	7.1. Identify likely faults that occur during the operation 7.2. Identify and take action on causes of routine faults in accordance with procedures 7.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 7.4. Identify non-routine problems and report to designated person.

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RANGE OF VARIABLES:

This competency applies to all cable winding operations within the plastics, rubber and cablemaking sectors. It includes the operation of all relevant additional equipment where that equipment is integral to the cable winding process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and storage facilities such as:

- reels and spools used in storing cable
- mechanical handling equipment
- computers
- hand tools and safety equipment
- mechanical and computerised measuring devices.
- relevant personal protective equipment.

Products may include:

- power cable
- single cable
- multi-core cable
- other relevant winding/cables/products.

Typical hazards include:

- moving equipment, cable and reels
- manual handling hazards.

Typical problems include:

- incorrect reel/spool size and winding speed
- quality problems
- equipment failure.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or describe:
  - the function of winding equipment machine components and the materials used
  - the impact of winding machine cooling temperatures, tension, wind off speed on product quality and product output
  - own role and the roles of others involved directly in the winding process
  - the effect of unauthorised shutdown of equipment on the winding process
- plan own work sequence including identification of key checkpoints for equipment monitoring, product quality checks and monitoring of supplies and downstream operations
- monitor equipment operation and product quality
- identify factors which may influence product quality and production output and appropriate remedies
- make appropriate authorised alterations to own work plan and equipment to maintain both product quality and required production output
- locate, interpret and apply relevant information and maintain workplace records
- identify and safely handle products and materials: read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - equipment (electrical, mechanical and manual)
  - contamination
  - process faults.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- cable winding production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

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Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

UNIT TITLE

PMBPROD210A - Operate injection moulding equipment

UNIT DESCRIPTOR

This competency covers the operation of injection moulding equipment and the resolving of routine problems to procedure.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake the routine operation of injection moulding equipment. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- monitoring injection moulding equipment operation and reporting process variations
- checking product for quality and conformity to specifications
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check raw materials are correct 2.3. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Start machine safely and correctly when required 3.2. Check process is within required limits 3.3. Collect products and store as required 3.4. Check product/process is in specification/to required quality standard 3.5. Maintain supply of material(s) as required 3.6. Complete logs and records when required 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean up equipment and work area in accordance with procedures 3.9. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to all injection moulding operations within the plastics and rubber sectors. It includes the operation of all relevant additional equipment where that equipment is integral to the injection moulding process.

This unit of competency relates to primary equipment only and if the role includes the operation of major stand alone ancillary equipment then PMBPROD206A *Operate ancillary equipment* should also be chosen. If the role includes finishing, then PMBFIN201B *Finish products and components* should be chosen.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- electrical, pneumatic, mechanical, electromechanical and hydraulic injection moulding machines and components such as base, frame, feed hoppers and material supply mechanisms, barrel and screw plastification unit, injection units, die/tool
- additional equipment including chillers/cooling towers, die heating equipment, hopper driers, mixing hoppers, dehumidifying driers, air compressors, dosing machines, brushing machines, colour blending equipment and conveyors
- hand tools used in the injection moulding process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

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Typical hazards include:

- spills
- dusts/vapours
- slip and fall, particularly due to spilt granules
- temperature
- hazardous substances
- moving equipment
- manual handling hazards.

'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:

- equipment malfunction
- variations in temperature, pressure, speed, injection dwell and clamp times
- variations in materials or contamination of materials
- die damage.

Typical product problems include:

- routine injection moulding faults
- machine malfunction
- die/tooling problems
- splits, scorch, lack of bond
- variations in materials and/or contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - operation of injection moulding equipment and components
  - production workflow sequences and materials demand
  - reasons for checking process control panels and reporting readings which do not conform to the work instructions
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the injection moulding process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine injection moulding faults such as:
  - incorrect quantity of materials
  - contaminated materials/additives
  - equipment faults
  - die damage
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - machine failure.

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Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- injection moulding production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES						
1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

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UNIT TITLE

PMBPROD211A - Operate blow moulding equipment

UNIT DESCRIPTOR

This competency covers the operation of blow moulding equipment and the resolving of routine problems to procedure.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake the routine operation of blow moulding equipment. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- monitoring blow moulding equipment operation and reporting process variations
- checking product for quality and conformity to specifications
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check raw materials are correct 2.3. Undertake other pre-start checks in accordance with procedures 2.4. Start up equipment safely and 'dry run' to warm hydraulics and components to operating temperature before production, as required.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Check condition of equipment and introduce raw materials as required by procedures 3.2. Check product/process is within required limits 3.3. Collect products and store as required 3.4. Check product is in specification/to required quality standard 3.5. Maintain supply of material(s) as required 3.6. Complete logs and records when required 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean up equipment and work area in accordance with procedures. 3.9. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to all blow moulding operations within the plastics and rubber sectors. It includes the operation of all relevant additional equipment where that equipment is integral to the blow moulding process.

This Unit of Competency relates to primary equipment only and if the role includes the operation of major stand alone ancillary equipment then PMBPROD206A *Operate ancillary equipment* should also be chosen. If the role includes finishing, then PMBFIN201B *Finish products and components* should be chosen.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- bottom blow, top blow, needle blow, tail to tail blow, parison pre-blow and pre-squeeze, parison stretching and parison orientation type machines.
- additional equipment including chillers/cooling towers, die heating equipment, hopper driers, mixing hoppers, dehumidifying driers, air compressors, dosing machines, colour blending equipment and conveyors
- hand tools used in the blow moulding process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

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Typical hazards include:
- νspills
- νdusts/vapours
- νslip and fall, particularly due to spilt granules
- νtemperature
- νhazardous substances
- νmoving equipment
- νmanual handling hazards.

'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:
- νequipment malfunction
- νvariations in temperature, pressure, speed, inflation
- νvariations in materials or contamination of materials
- νdie damage.

Typical product problems include:
- νroutine blow moulding faults – wall thinning, holes, poor surface finish, warping, poor colour dispersion, ejection damage, colour contamination, black spots and other defects
- νmachine malfunction
- νdie/tooling problems
- νvariations in materials and/or contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:
- νapply and/or explain:
  - operation of blow moulding equipment and components
  - production workflow sequences and materials demand
  - reasons for checking process control panels and reporting readings which do not conform to the work instructions
  - purpose and requirements of 'dry running' before starting production
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures

- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the blow moulding process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine blow moulding faults such as:
  - contaminated materials/additives
  - equipment faults
  - mould damage
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - machine failure.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- blow moulding production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed for a requirement for 50 kg.

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Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

UNIT TITLE

PMBPROD212A - Operate thermoforming equipment

UNIT DESCRIPTOR

This competency covers the operation of thermoforming equipment and the resolving of routine problems to procedure.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake the routine operation of thermoforming equipment. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- monitoring thermoforming equipment operation and reporting process variations
- checking product for quality and conformity to specifications
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check materials/sheet are correct 2.3. Undertake other pre-start checks in accordance with procedures 2.4. Start up equipment safely.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Check condition of equipment and feed sheet as required by procedures 3.2. Check process is within required limits 3.3. Collect products and store as required 3.4. Check product/process is in specification/to required quality standard 3.5. Maintain supply of material(s) as required 3.6. Change rolls as required 3.7. Complete logs and records when required 3.8. Collect scrap/process trim and feed into granulator in accordance with procedures 3.9. Clean up equipment and work area in accordance with procedures 3.10. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to all thermoforming operations within the plastics and rubber sectors. It includes the operation of all relevant additional equipment where that equipment is integral to the thermoforming process.

This unit of competency relates to primary equipment only and if the role includes the operation of major stand alone ancillary equipment then PMBPROD206A *Operate ancillary equipment* should also be chosen. If the role includes finishing, then PMBFIN201B *Finish products and components* should be chosen.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes operations such as:

- clearing rubbish from tool
- packaging and labeling
- adjusting heaters, forming air, stackers and blow off air
- monitoring sheet quality
- inching the sheet and opening the tool/mould cavity.

This competency includes equipment and tools such as:

- heaters, mould, stacker, winder and granulator
- conveyors and chutes
- hand tools used in the thermoforming process
- relevant personal protective equipment.

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Typical hazards include:
- spills
- dusts/vapours
- slip and fall, particularly due to leaks
- temperature
- hazardous substances
- moving equipment
- manual handling hazards.

'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:
- equipment malfunction
- variations in temperature, pressure, speed
- variations in sheet or contamination of sheet or product
- tool damage.

Typical product problems include:
- routine thermoforming faults - wall thinning, pin holes, poor surface finish, poor colour dispersion, stacking damage, colour contamination, black spots and other defects
- machine malfunction
- mould/tooling problems
- variations in materials and/or contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:
- apply and/or explain:
  - operation of thermoforming equipment and components
  - forming process and parts of the thermoforming machine
  - reasons for checking process control panels and reporting readings which do not conform to the work instructions
  - principles behind tool/mould cavity for thermoforming
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures

- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the thermoforming process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine thermoforming faults such as:
  - contaminated materials/additives
  - equipment faults
  - mould/tool damage
  - incorrect sheet
  - incorrect sheet feeding
  - incorrect quantity of materials/additives
  - machine failure.

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Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- thermoforming production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to read and interpret temperature and pressure gauges, add weights and interpret graphs.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

UNIT TITLE

PMBPROD213A - Operate extruders

UNIT DESCRIPTOR

This competency covers the routine operation of extrusion equipment. It applies to extrusion processes for pipe, sheet, profile, film, cable and rod and the extrusion of both plastics and rubber.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purposes and processes to the operation of extrusion equipment. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- identifying and minimising any hazards connected with materials and process from materials safety data sheets and work instructions
- checking settings and adjustments of preset equipment
- checking extruder operation and reporting process variations
- checking materials for quality and conformity to product requirements
- shutting down equipment
- purging line/cleaning line after product, grade or colour change
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check raw materials are correct 2.3. Set up in line printing equipment as required 2.4. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Start machine safely and correctly when required 3.2. Check process is within required limits 3.3. Collect products and store as required 3.4. Check product/process is in specification/to required quality standard 3.5. Maintain supply of material(s) as required 3.6. Monitor in line printing 3.7. Complete logs and records when required 3.8. Minimise scrap/wastage from process 3.9. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.10. Clean up equipment and work area in accordance with procedures 3.11. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Change product/grade while operating as required.	4.1. Run down/purge outgoing grade/product to procedures 4.2. Make changes specified in procedures for oncoming product/grade 4.3. Introduce oncoming materials/grade and check oncoming product 4.4. Undertake other actions as specified in procedures.
5. Resolve routine problems.	5.1. Identify likely faults that occur during the operation 5.2. Identify and take action on causes of routine faults in accordance with procedures 5.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 5.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking sectors. It includes the operation of all relevant ancillary equipment where that equipment is integral to the extrusion process.

This Unit of Competency relates to primary equipment only and if the role includes the operation of major stand alone ancillary equipment then PMBPROD206A *Operate ancillary equipment* should also be chosen. If the role includes finishing, then PMBFIN201B *Finish products and components* should be chosen.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

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The processes covered by this unit include, but are not limited to:

- rod
- sheet
- film
- profile
- tread profile
- cable.

Competence under this competency unit is only required in one process.

This competency includes equipment and tools such as:

- extruder equipment and components such as main drive, gearbox, thrust assembly, adapter, gate, breaker plate, screen pack, doser, screw/s, barrel, heaters, thermocouples
- extrusion dies – rod, sheet, film, pipe, profile, tread profile and cable
- auxiliary equipment – water pump, feeders, hopper loader, pellitiser, dehumidifiers, etc
- tools for taking samples
- relevant personal protective equipment.

Typical hazards include:

- vapours
- burns
- moving equipment
- hazardous materials
- manual handling hazards.

Typical problems include:

- equipment malfunction
- variations in materials
- contamination of materials
- temperature/speed variations.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - function of extruder components, extrusion dies and auxiliary equipment
  - function of downstream equipment – stackers, haul off, saw/cutter, printing, embossing, coil winder, packaging, etc
  - impact of temperature, pressure and time on product quality and production output
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - impact of variations in raw materials and equipment operation in relation to final product
  - waste management and importance of reusing non conforming materials
- planning own work including predicting consequences and identifying improvements
- correct selection and use of equipment, materials, processes and procedures
- monitor equipment operation and product quality
- check extrusion equipment for correct set up to job specifications
- identify when the operator is able to rectify faults and when assistance is required
- make adjustments within scope of role/level of authorisation
- shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the extrusion process
- identify factors which may affect product quality or production output and appropriate remedies
- identify hazards of the materials and process and follow appropriate hazard control procedures
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine faults such as:
  - routine product extrusion faults – dimensions, surface appearance, colour, deformations
  - incorrect quantity of materials
  - contaminated materials/additives
  - equipment faults.

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Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- extrusion production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

UNIT TITLE

PMBPROD216A - Operate blown film equipment

UNIT DESCRIPTOR

This competency covers the operation of blown film equipment and the resolving of routine problems to procedure in the production process.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake the routine operation of blown film equipment in the production process. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- monitoring equipment operation and reporting process variations
- checking product for quality and conformity to specifications
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check raw materials are correct 2.3. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Start blown film equipment safely and correctly when required 3.2. Check process is within required limits 3.3. Collect products and store as required 3.4. Check product/process is in specification/to required quality standard 3.5. Maintain supply of material(s) as required 3.6. Complete logs and records when required 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean up equipment and work area in accordance with procedures 3.9. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to the operation of blown film equipment within the plastics, rubber and cablemaking sectors. It includes the operation of all relevant additional equipment where that equipment is integral to the process.

This Unit of Competency relates to primary equipment only and if the role includes the operation of major stand alone ancillary equipment then PMBPROD206A *Operate ancillary equipment* should also be chosen. If the role includes finishing, then PMBFIN201B *Finish products and components* should be chosen.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- extruder
- bubble guides and rollers
- film rollers, slitting, trimming and winding gear
- coolers, heaters and ancillary equipment
- hand tools, knives, adjustment tools
- relevant personal protective equipment
- treatment unit.

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Typical hazards include:

- high air velocities
- high voltage corona treatment systems
- sharp knives
- high towers
- manual handling
- fumes, humidity, air temperatures, radiant heat, hot moulds
- stationary and moving machinery, parts and components.

Typical process and product problems include:

- extruder control
- contamination
- alignment and control of trimming and winding gear
- raw material contamination, wrong grade, variations of polymer properties.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - operation of blown film equipment and components
  - production workflow sequences and materials demand
  - reasons for checking process control panels and reporting readings which do not conform to the work instructions
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances

- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine faults such as:
  - incorrect quantity of materials
  - contaminated materials/additives
  - equipment faults
  - die/tool damage
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - machine failure.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- identify critical materials properties and blown film process characteristics in relation to the process requirements and the end product
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

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Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	1	1	1	1

UNIT TITLE

PMBPROD217A - Operate printing equipment

UNIT DESCRIPTOR

This competency covers the operation of printing equipment and the resolving of routine problems to procedure in the production process.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake the routine printing on products. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- monitoring equipment operation and reporting process variations
- checking product for quality and conformity to specifications
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check inks and other raw materials are correct 2.3. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate printer.	3.1. Start printer safely and correctly when required 3.2. Check process is within required limits 3.3. Collect products and store as required 3.4. Check product/process is in specification/to required quality standard 3.5. Maintain supply of material(s) as required 3.6. Complete logs and records when required 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean up printer and work area in accordance with procedures. 3.9. Pause printer, or stop printer in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to the operation of printing equipment within the plastics, rubber and cablemaking industry. It includes the operation of all relevant additional equipment where that equipment is integral to the process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- process equipment and its major components
- hand tools used in the this process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

Typical hazards include:

- spills
- dusts/vapours
- slip and fall
- hazardous substances particularly solvents and flammables
- moving equipment
- manual handling hazards.

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'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'

Typical process problems include:

- printing equipment malfunction
- variations in process conditions such as temperature, humidity
- variations in materials or surface preparation/condition or contamination of materials/surface to be printed
- printing equipment damage
- print register.

Typical product problems include:

- routine product faults such as unclear/incomplete printing, colour variation, drying time variation
- printing machine malfunction
- variations in materials/surface to be printed and/or contamination of materials/surface.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - operation of process equipment and components
  - production workflow sequences and materials demand
  - reasons for checking process control panels and reporting readings which do not conform to the work instructions
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures

- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine faults such as:
  - incorrect printing ink
  - incorrect quantity of ink
  - variations in/contamination of ink and or surface to be printed
  - equipment faults
  - mould/die/tool damage
  - variations in ambient conditions such as temperature and humidity
  - machine failure.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

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Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	1	1	1	1

UNIT TITLE

PMBPROD221A - Operate rotational moulding equipment

UNIT DESCRIPTOR

This competency covers the operation of equipment, including both rotating and 'rock and roll' modes, and the resolving of routine problems to procedure. It does not cover open flame equipment (see PMBPROD284A - *Operate open flame moulding equipment*).

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake the routine operation of rotational moulding equipment. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- monitoring rotational moulding equipment operation and reporting process variations
- checking product for quality and conformity to specifications
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check raw materials are correct 2.3. Verify equipment, raw material and mould all match job requirements 2.4. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate rotational moulding equipment.	3.1. Start machine safely and correctly when required 3.2. Check mould to ensure it is rotating/rocking on axes at correct speed/ manner 3.3. Charge mould with materials as required 3.4. Check process is within required limits 3.5. Demould products and store as required 3.6. Check product/process is in specification/to required quality standard 3.7. Maintain supply of material(s) as required 3.8. Complete logs and records when required 3.9. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.10. Clean up equipment and work area in accordance with procedures 3.11. Pause or shutdown equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults and variations of product from normal that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency unit includes the use of shuttle, swing and carousel type machines.

This competency applies to all rotomoulding systems including fixed spindle, single spindle, multiple spindle and shuttle. It also includes the operation of all relevant ancillary equipment.

This unit of competency relates to primary equipment only and if the role includes the operation of major stand alone ancillary equipment then PMBPROD206A *Operate ancillary equipment* should also be chosen. If the role includes finishing, then PMBFIN201B *Finish products and components* should be chosen.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

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This competency includes equipment and tools such as:

- hand tools
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

Typical hazards include:

- spills
- noise, light, energy sources
- humidity, air temperature, radiant heat, hot moulds
- hazardous substances
- stationary and moving machinery, parts and components
- manual handling hazards.

'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:

- equipment malfunction
- variations in temperature, pressure, rotation
- variations in materials or contamination of materials
- mould damage.

Typical product problems include:

- routine rotational moulding faults
- machine malfunction
- mould/tooling problems
- variations in materials and/or contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or describe:
  - operation of rotational moulding equipment and components
  - effects of shrinkage on material colour
  - production workflow sequences and materials demand
  - reasons for checking process control panels and reporting readings which do not conform to the work instructions
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the rotational moulding process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine rotational moulding faults such as:
  - incorrect quantity of materials
  - contaminated materials/additives
  - equipment faults
  - mould damage
  - temperature/time faults
  - rotation speed/motion problems
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - machine failure.

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Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- rotational moulding production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

UNIT TITLE

PMBPROD229A - Operate polystyrene shape moulding equipment

UNIT DESCRIPTOR

This competency covers the operation of polystyrene shape moulding equipment and the resolving of routine problems to procedure.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake the routine operation of polystyrene shape moulding equipment. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- monitoring polystyrene shape moulding equipment operation and reporting process variations
- checking product for quality and conformity to specifications
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check raw materials are correct 2.3. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Start machine safely and correctly when required 3.2. Check process is within required limits 3.3. Collect products and store as required 3.4. Check product/process is in specification/to required quality standard 3.5. Maintain supply of material(s) as required 3.6. Complete logs and records when required 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean up equipment and work area in accordance with procedures 3.9. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to all polystyrene shape moulding operations within the plastics and rubber sectors. It includes the operation of all relevant additional equipment where that equipment is integral to the polystyrene shape moulding process.

This unit of competency relates to primary equipment only and if the role includes the operation of major stand alone ancillary equipment then PMBPROD206A *Operate ancillary equipment* should also be chosen. If the role includes finishing, then PMBFIN201B *Finish products and components* should be chosen.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- manual handling aids
- hand tools used in the polystyrene shape moulding process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

Typical hazards include:

- spills
- dusts/vapours
- slip and fall
- temperature
- hazardous substances
- moving equipment
- manual handling hazards.

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'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:

- equipment malfunction
- variations in temperature, pressure, speed
- variations in materials or contamination of materials
- mould damage.

Typical product problems include:

- routine polystyrene shape moulding faults
- machine malfunction
- mould/tooling problems
- variations in materials and/or contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - operation of polystyrene shape moulding equipment and components
  - production workflow sequences and materials demand
  - reasons for checking process control panels and reporting readings which do not conform to the work instructions
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the polystyrene shape moulding process

- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine polystyrene shape moulding faults such as:
  - incorrect quantity of materials
  - contaminated materials/additives
  - equipment faults
  - mould damage
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - machine failure.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- polystyrene shape moulding production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

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Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

UNIT TITLE

PMBPROD230B - Monitor process operations

UNIT DESCRIPTOR

This competency covers the use of production processing equipment.

This competency is typically performed by all operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who use production processing equipment. Work involves the removal of products from equipment in strict conformity with standard operating procedures and routine quality inspection processes. The key factors are the successful operation of the equipment and the ability to recognise when the process is not working as intended. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- discussing work progress with other workers
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- identifying production problems
- collecting and observing products from the production process
- collecting and disposing of waste materials
- checking materials to ensure no contamination
- identifying and taking action on routine process problems.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Identify equipment controls and procedures.	1.1. Identify work requirements from workplace approved operating procedures 1.2. Check operating procedures and controls to identify approved adjustments and operating parameters 1.3. Establish actions to be used in the event of faulty production from operating procedures 1.4. Identify procedures for obtaining materials for the process 1.5. Identify hazards and environmental issue that might surround the operation.

ELEMENT	PERFORMANCE CRITERIA
2. Get ready for work/job.	2.1. Assemble ancillary tools and equipment 2.2. Identify inspection procedures 2.3. Identify any finishing activities 2.4. Plan to avoid any hazards connected with materials and process by observation of the equipment, workplace reference materials including materials safety data sheets and equipment instructions 2.5. Take appropriate measures to minimise risks from the identified hazards 2.6. Establish the location and function of equipment emergency stops and ensure guards are in place 2.7. Identify and note requirements for checking 2.7.1. materials inputs and outputs 2.8. ancillary supplies and equipment 2.9. product quality requirements for the relevant process stage(s) 2.10. Obtain or arrange access to any required supplementary equipment for product quality testing or routine lubrication and adjustment.
3. Maintain operations.	3.1. Check process operations, noting product quality, production outputs and waste, in accordance with workplace practices 3.2. Collect product outputs, check for conformity, make adjustments to the equipment (where appropriate) and store product 3.3. Collect material which is able to be reprocessed and reused, and deal with waste and scrap in accordance with workplace procedures (where applicable) 3.4. Check readouts against standard statistical process information and enter production data into the control system 3.5. Clean up equipment and work area and manage waste in accordance with workplace procedures.
4. Identify product quality requirements.	4.1. Monitor process and note conditions which may affect product quality standards 4.2. Report process variations within workplace procedures 4.3. Note and implement authorised changes in standard operating procedures and specifications.

RANGE OF VARIABLES:

This competency applies to the operation of various forms of production equipment in all work environments and sectors within the plastics, rubber and cablemaking industry. It includes the operation of all relevant additional equipment.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

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This competency includes equipment and tools such as:

- ν hand carts and trolleys
- ν knives and other bag opening equipment
- ν hoists/lifting equipment not requiring any special permits or licences
- ν basic hand tools required for opening of material packaging
- ν relevant personal protective equipment.

Typical hazards include:

- ν automated or rotating equipment
- ν dusts/vapours
- ν hazardous materials
- ν manual handling hazards
- ν knife hazards.

'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:

- ν equipment malfunctions
- ν product jamming or sticking
- ν power failures
- ν air, oil or lubricant difficulties.

Typical product problems include:

- ν variations in materials
- ν contamination of materials
- ν malformed or incomplete products.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- ν apply and/or explain:
  - impact of incorrect or faulty materials
  - production workflow sequences and materials demand
  - focus of operation of work systems and equipment
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures

- distinguish between causes of faults such as:
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - contaminated materials/additives
  - product variations from specification.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- understand the importance of critical material properties and quantities
- recognise potential situations requiring action and implement appropriate action.

Consistent performance should be demonstrated. In particular look to see that production standards are met consistently.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

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UNIT TITLE

PMBPROD233A - Operate film conversion equipment

UNIT DESCRIPTOR

This competency covers the operation of plastic film conversion equipment and the resolving of routine problems to procedure.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake the routine operation of plastic film rewinding, cutting and sealing equipment. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- monitoring film conversion equipment operation and reporting process variations
- checking product for quality and conformity to specifications
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check raw materials are correct 2.3. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Start machine safely and correctly when required 3.2. Check process is within required limits 3.3. Wind/collect products and store as required 3.4. Check product/process is in specification/to required quality standard 3.5. Maintain supply of material(s) as required 3.6. Complete logs and records when required 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean up equipment and work area in accordance with procedures 3.9. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to all film conversion operations within the plastics and rubber sectors. It includes the operation of all relevant additional equipment where that equipment is integral to the film converting process. It does not include film printing (see PMB PROD 331 *Print and decorate film*).

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- hand tools used in the film conversion process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

Typical products include:

- bags - taped, loose, gusseted, perforated-on-reel
- seals - bottom, side, mixed, longitudinal, running, square bottom, angle seal, pouch.

Typical hazards include:

- cut hazards
- nip hazards
- compressed air
- vapours
- slip and fall
- temperature
- hazardous substances
- moving equipment
- manual handling hazards.

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'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:

- equipment malfunction
- registration
- blocking
- seal bar temperature or wear/damage.

Typical product problems include:

- contamination
- seal appearance
- seal strength
- bag dimensions
- variations in materials and/or contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - sealing pressure
  - sealing temperature
  - sealing time
  - production workflow sequences and materials demand
  - reasons for checking process control panels and reporting readings which do not conform to the work instructions
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance

- identify and describe own role and role of others involved directly in the film converting process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine conversion faults such as:
  - incorrect materials
  - contaminated materials
  - equipment faults
  - seal bar damage
  - machine failure.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- conversion production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

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Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

UNIT TITLE

PMBPROD235B - Use materials and process knowledge to complete work operations

UNIT DESCRIPTOR

This competency covers the application of materials and process knowledge to the operation of the equipment, processes, materials and end product so that work procedures and quality requirements can be met. It applies to workers in any sector of the industry.

This competency is typically performed by all operators working either independently or as part of a work team.

This unit of competency may be designated for a stream - see the range of variables.

This competency in practice

This competency applies to operators who maintain an oversight of the production process, collect and prepare materials for the production process and observe and make judgements about the end product. The key factors are the delivery of the right material to the right place at the right time and ensuring there is no contamination of the materials. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/ product will be made/completed
- discussing work progress with other workers
- planning which jobs have the higher priority
- utilising raw materials to produce products through a production process
- inspecting the products of the process and identifying routine production faults
- employing appropriate shutdown procedures.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Locate materials, equipment and workplace documentation for production process.	1.1. Follow workplace documentation requirements relating to production processes 1.2. Identify and locate the range of materials used and their physical forms 1.3. Acquire necessary equipment and tools and identify appropriate work checking procedures 1.4. Identify and follow safety requirements for the materials and process to be employed.
2. Follow production process.	2.1. Follow procedures for the production process 2.2. Identify those parts of the production process where extra care and attention is required 2.3. Identify and apply the operating principles behind the equipment to be used.
3. Identify product features.	3.1. Inspect products for compliance with quality specifications 3.2. Identify products in terms of end purpose and relationship to workplace production output and economic value 3.3. Relate features of products to the production process.

ELEMENT	PERFORMANCE CRITERIA
4. Locate required equipment, materials and product storage.	4.1. Follow the correct workplace procedures and safety precautions for the storage of equipment, materials and products 4.2. Identify and separate incompatible materials in accordance with workplace procedures and practices 4.3. Ensure equipment is cleaned prior to return to storage 4.4. Dispose of waste materials through approved means or product recycling.
5. Identify routine production and product faults.	5.1. Identify the causes of production faults and take appropriate restorative or reporting action 5.2. Establish the basis for product faults and report or address (as appropriate) potential causes due to inappropriate production methods and materials quality.
6. Follow shutdown procedures.	6.1. Differentiate between routine and emergency shutdown situations and procedures 6.2. Demonstrate the procedures to be followed in an emergency shutdown of the process and the alert procedures that accompany that process 6.3. Follow the appropriate procedures for routine shutdowns for breaks and other routine short term discontinuances 6.4. Notify appropriate personnel of shutdowns and complete any workplace documentation.

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RANGE OF VARIABLES:

This competency unit includes the use of manual handling aids such as handcarts. It does not include the use of powered equipment/aids.

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry.

Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This unit of competency may be designated for one of the following streams where workers use that unit substantially only in that stream area:

- cablemaking
- blow moulding
- blown film
- calendering
- composites
- compounding
- extrusion
- fabrication
- injection moulding
- polystyrene
- expanded foam polyurethane
- rotational moulding
- thermoforming
- belt splicing
- rubber Lining
- tyre manufacture
- tyre retreading
- surface coating.

The processes covered by this unit include, but are not limited to:

- movement of raw materials
- opening of bags, drums, etc
- making judgements about product anomalies
- identifying the cause of product faults
- appropriate waste disposal or recycling.

It includes all materials which are relevant to the job.

This competency includes tools and equipment such as:

- hand carts and trolleys
- basic hand tools required for opening of material packaging
- hoists/lifting equipment not requiring any special permits or licences
- rules or calipers
- relevant personal protective equipment
- inventory and workplace records systems.

Typical hazards include:

- material spills
- fumes, dusts/vapours
- hazardous materials
- manual handling hazards
- machinery hazards.

Typical problems include:
- variations in materials
- contamination of materials
- variations in equipment operations
- product faults
- equipment breakdowns.

Operating principles include the effect of:
- temperature
- materials manipulation
- chemical bonding
- other process characteristics.

All operations are performed in accordance with standard procedures and work instructions.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:
- apply and/or explain:
  - impact of incorrect or faulty materials
  - types of products made with different processes
  - the changes to raw materials during the process
  - production workflow sequences and materials demand
  - focus of operation of work systems and equipment
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures

- distinguish between causes of faults such as:
  - wrong raw materials/additives/catalyst
  - incorrect quantity of materials/additives/catalyst
  - contaminated materials/additives/catalyst
  - equipment malfunctions
  - incorrect process condition (eg, temperature) operating ranges.

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Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- recognise the importance of process conditions
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Consistent performance should be demonstrated. In particular look to see that production standards are met consistently.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES						
1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	2	1	1	1	2	2

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UNIT TITLE

PMBPROD236B - Operate hand held air/power equipment for production processes

UNIT DESCRIPTOR

This competency covers the operation of hand held air and power equipment to contribute to the production process and the assembly of materials and equipment in preparation for production.

This competency is typically performed by all operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators of hand held equipment used in the assembly and finishing of components as part of the production process. The key factors are the safe and effective utilisation of the equipment and conformance with workplace safety requirements. It includes:

- checking the equipment for cleanliness and possible hazards, frayed cables or hoses, loose components or other difficulties
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- prioritising work and maintaining production throughput
- bringing together different components for assembly or disassembly
- drilling, grinding, cutting or otherwise dealing with products
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Identify equipment and power requirements.	1.1. Match appropriate equipment for drilling, cutting and grinding to work applications 1.2. Choose correct power and air sources, identifying and selecting correct voltage, amperage and air pressure 1.3. Select correct lubrication and water separation equipment 1.4. Inspect equipment for signs of damage or faults 1.5. Identify and select correct accessories in terms of suitability for purpose and operable condition.
2. Describe emergency shutdown procedures.	2.1. Identify and describe the circumstances which would justify an emergency shutdown of equipment 2.2. Identify appropriate switches and/or other shutoff apparatus 2.3. Demonstrate agreed workplace procedures for shutting down equipment or a process, including the shutdown procedure 2.4. Demonstrate the reporting actions to be taken following an emergency shutdown.

ELEMENT	PERFORMANCE CRITERIA
3. Identify hazards associated with using the equipment.	3.1. Identify potential hazards arising from power sources and/or compressed air and identify appropriate safety procedures 3.2. Identify and recognise process by-products which may cause damage to the operator, environment, products, raw materials, other equipment or personnel 3.3. Follow appropriate workplace procedures to manage these risks.
4. Set up equipment and complete pre-use checks.	4.1. Check equipment settings, accessories and consumables for acceptable condition 4.2. Check tool for sharpness/wear as appropriate 4.3. Use manufacturer's or workplace instructions for equipment as the basis of work practices 4.4. Correctly set up equipment for the required production process 4.5. Check equipment through the full operating range required for the task.
5. Use equipment for production processes.	5.1. Operate equipment within the parameters of the manufacturer's or workplace instructions 5.2. Ensure the use of appropriate consumables including cooling and lubricating fluids where required 5.3. Make provision to deal with dust, swarf, offcuts and other production by-products.
6. Shut down equipment correctly.	6.1. Ensure process is concluded 6.2. Shut down equipment in the sequence described in the manufacturer's instructions or workplace procedure 6.3. Clean down machine correctly disposing of any dust, swarf, offcuts and other production by-products.
7. Store equipment appropriately.	7.1. Clean equipment prior to storage 7.2. Tag or take appropriate steps to arrange repair of equipment which is damaged, unserviceable or requiring servicing 7.3. Maintain storage areas to workplace standards.

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RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It includes the operation of all relevant additional equipment where that equipment is integral to hand held air/power equipment.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- work stands, clamps, vices, braces
- portable air or power operated drills, grinders, cutters or saws
- impact wrenches
- hoists/lifting equipment not requiring any special permits or licences
- bolts, screws, rivets, etc
- vices, clamps and braces
- relevant personal protective equipment.

Typical hazards include:

- frayed cables/hoses
- dusts/swarf
- metal and other shavings
- manual handling hazards
- equipment failures.

'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:

- tool malfunctions
- damaged leads or hoses
- incorrect tool selected
- worn or blunt tools/tool bits
- damaged tools.

Typical product problems include:

- non-supply of components or fittings
- incorrect supply of components or fittings
- material failures
- out of specification products.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - impact of incorrect or faulty materials or tools
  - production workflow sequences and materials demand
  - focus of operation of work systems and equipment
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures
- distinguish between causes of faults such as:
  - wrong materials
  - incorrect quantity of materials
  - contaminated materials
  - blunt or worn tools
  - tool or power failures.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of critical material properties and quantities
- recognise potential situations requiring action and then implement appropriate action.

Consistent performance should be demonstrated. In particular look to see that:

- production standards are met consistently
- tools are handled correctly
- tools are correctly cleaned and stored
- faulty tools are identified and handed in for repair.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg, to determine that 20 components having 2 attachments each means that 40 attachments are required.

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Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

UNIT TITLE

PMBPROD237B - Splice cables

UNIT DESCRIPTOR

This competency covers the operation of splicing of power and telecommunications cable. It applies to the cablemaking sector of the industry.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake the splicing of cable in the production process. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- monitoring equipment operation and reporting process variations
- checking product for quality and conformity to specifications
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Identify the materials and process.	1.1. Identify the process and materials to be used 1.2. Explain the effect of the joining process on the materials in terms of chemical reactions and extent of the effect of the process on the materials 1.3. Check allowances for joining overlaps in workplace documentation and manufacturer's instructions 1.4. Identify curing/cooling times for the materials and the process.
2. Plan the joining process.	2.1. Read and use manufacturer's instructions and workplace procedures for the joining task in the planning process 2.2. Identify safety precautions for self, equipment and work areas appropriate for the tasks 2.3. Plan work sequence noting appropriate curing/cooling times, efficient work sequence and quality specification requirements.

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ELEMENT	PERFORMANCE CRITERIA
3. Set up equipment and materials for the process.	3.1. Assemble equipment and consumables 3.2. Check equipment and site for safety 3.3. Make adjustments and settings to suit materials, manufacturer's instructions and workplace procedures 3.4. Set up safety screens, engineering controls and personal protective equipment.
4. Follow workplace procedures to complete the joining process.	4.1. Follow workplace procedures in conjunction with the planned work sequence 4.2. Make checks and tests of the process and the finished product 4.3. Made appropriate adjustments when required to the process to maintain the quality of the finished product 4.4. Complete workplace documentation and records as required.

RANGE OF VARIABLES:

This competency applies to the cablemaking sector.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Typical hazards may include:

- spills
- chemical hazards
- fumes/vapours
- slip and fall
- temperature
- hazardous materials
- manual handling hazards
- equipment operations.

Typical problems include:

- machine malfunction
- variations in materials and/or contamination of materials.

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EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Display of the following knowledge and skills in terms of job role or function:

- nature of the changes in materials arising from the chemical process
- effects of the fumes, heat and other radiations
- effective and efficient use of materials equipment and consumables
- production workflow
- focus of operation of work systems and equipment
- identification and correct use of equipment, processes and procedures
- planning own work including predicting consequences and identifying improvements.

Consistent performance should be judged by their ability to:

- establish effective working relationships with colleagues
- modify activities to cater for variations in workplace contexts and environment
- make joints conforming to quality specifications
- minimise waste
- handle materials suitable for recycling appropriately
- systematically complete work in accordance with safe operating procedures to minimise the risk of injury to self or others or damage to goods, equipment or products in production.

Critical aspects:

Assessment must confirm appropriate knowledge and skills to:

- select appropriate materials and joining process
- plan and conduct joining process within workplace quality parameters
- maintain effective work station within appropriate environmental and safety regulations and procedures
- locate, interpret and apply relevant information
- maintain workplace records
- identify and safely handle products and materials
- apply safety precautions appropriate to the task.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	1	2	2	2

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UNIT TITLE

PMBPROD240B - Cut materials

UNIT DESCRIPTOR

This competency covers preparation and operation of specialised equipment or procedures to cut materials to size, shape or to a pattern, and the resolving of routine problems to procedure.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are involved in the use of specialised equipment or processes to cut material. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- setting up equipment
- preparing materials as required
- ensuring that safety procedures are applied to reduce the risks
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check raw materials are correct 2.3. Undertake other pre-start checks in accordance with procedures.
3. Operate equipment.	3.1. Operate cutting equipment to cut materials to procedures 3.2. Monitor dimensions, quality and quantity of cuts 3.3. Remedy faults and non-conformances by correcting operation or adjusting equipment as required 3.4. Collect material which is able to be recycled or reused, separate and dispose of waste and scrap.

ELEMENT	PERFORMANCE CRITERIA
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency unit includes the use of specialty equipment for cutting materials.

Materials may be any plastic, polymer, composite, rubber or combination. The material may be in any form: sheet, tubular, solid section, formed profile, etc.

It includes the operation of all relevant additional equipment where that equipment is integral to the material cutting process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- guillotines, power saws, jig saws, band saws, thermal cutting devices
- controller, such as PLC if fitted
- hand tools as required
- relevant personal protective equipment.

Typical hazards include:

- fibres and dusts, airborne and handled
- manual handling hazards
- power tools, leads and power supplies
- stationary and moving machinery, parts and components.

Routine problems include:

- pattern
  - pattern incorrect
  - marking errors
- equipment
  - wear and breakage
  - temperature variations
  - loss of power or drives
  - controller sequence, timer issues
- process
  - sequencing problems.

All operations are performed in accordance with procedures.

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EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - different types of materials and their behaviour when cut
  - different cutting equipment and suitability for materials
- identify:
  - controls of cutting equipment
- list and describe:
  - routine faults in products
  - routine problems in process
- distinguish between causes of faults such as:
  - materials
  - heat
  - changes to materials during the cutting process
  - equipment - adjustments/setup
  - equipment - maintenance requirements.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- material cutting production standards are met consistently
- upstream and downstream communication is timely and effective
- procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

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UNIT TITLE

PMBPROD241B - Lay up rubber lining or lag pulleys

UNIT DESCRIPTOR

This competency covers the laying-up of rubber and similar materials to line a variety of components or vessels of varying sizes, including the lagging of pulleys.

This competency is typically performed by all operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who prepare materials and rubber line a variety of components and larger vessels to retard abrasion, impact or corrosion. The key factors are the preparation of the surfaces to be lined and the successful application of the rubber to the walls of the components or vessels without contaminating the materials. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- planning the way in which the linings will be applied and the sequencing of the lining process
- collecting the appropriate materials and assembling them close to the start of the process and in the same sequence as the jobs are to be done
- applying adhesives to the surface of the rubber lining material and/or the surface to be lined
- applying the lining materials
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites. However, some enterprises may require the achievement of certain other competency units in accordance with workplace safety requirements – see the evidence guide.

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ELEMENT	PERFORMANCE CRITERIA
1. Identify required materials and equipment.	1.1. Interpret component specifications or lining instructions 1.2. Identify required lining materials including additives and catalysts 1.3. Identify required equipment including handling, control and material preparation equipment 1.4. Recognise hazards and adopt steps required to ensure safety from adhesives, solvents and other chemical compounds 1.5. Determine the need for and obtain scaffolding equipment as necessary.
2. Assemble materials and equipment.	2.1. Correctly select pre-cut lining materials and check that all material has been provided 2.2. Use good manual handling practices 2.3. Follow required procedures, particularly OHSW procedures, codes and practices 2.4. Collect and organise materials in a manner that ensures storage compatibility 2.5. Ensure provision is made for adequate ventilation of the work area, including breathing apparatus for work in confined spaces.
3. Prepare surfaces for rubber lining.	3.1. Lay out lining materials in an appropriate contamination free area 3.2. Ensure material edges are clean and free of debris and damage 3.3. Identify lining materials which do not conform to specification and report as required 3.4. Examine component or vessel and ensure the surfaces to be lined are free of defects and contaminants 3.5. Establish a proposed sequence for adherence of the lining material and apply appropriate adhesive 3.6. Select lining material as needed and prepare surface 3.7. Monitor surface coatings for setting time and manage the provision of lining materials to avoid non-adherence, where appropriate.
4. Lay up rubber lining.	4.1. Ensure adequate ventilation is provided and monitored during the laying up process 4.2. Position lining segments in accordance with lay-up plan 4.3. Exclude entrapped air and ensure complete contact between the lining and containment surface is obtained 4.4. Ensure joins are sealed and adhered properly and that there are no gaps or overlaps 4.5. Check for slips, sagging or other separation of the lining from the containment wall 4.6. Remove laying up equipment and tools (and dismantle scaffolding where appropriate) 4.7. Closely monitor any confined space activity and conform with regulations and procedures 4.8. Complete required workplace documentation/records at the conclusion of the laying up process.

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ELEMENT	PERFORMANCE CRITERIA
5. Cure rubber lining where appropriate.	5.1. Monitor movement of, or move, component into autoclave for rubber curing as required 5.2. Set equipment controls according to specification or work instructions and activate autoclave cycle ensuring pressure and temperature are monitored 5.3. For larger components or stationary vessels, ensure provision of access and egress for open steam pipes or hoses to promote curing 5.4. Connect pipes or hoses to steam generator or boiler as appropriate within the range prescribed in the procedures 5.5. Monitor the curing process 5.6. Monitor removal of, or remove, component from autoclave 5.7. Monitor removal of, or remove, steam pipes or hoses from vessel after curing 5.8. Clean up work area and equipment and complete workplace documentation.

RANGE OF VARIABLES:

This competency applies to a variety of internal and external work environments served by the rubber industry and includes work done in a production facility and on site. The use of scaffolding may be a requirement associated with this competency.

This competency unit includes the use of manual handling of lining materials and can involve activities within the definition of 'confined space'.

Lining materials includes all rubber compounds which will normally be in green sheets. It may be used to include precured rubber sheets and other polymer sheets requiring similar skills for lining. Lining will generally be of metal items, but may include rubber lining of composites, concrete and other non-metallic structures, vessels or plant items.

Lining includes the lagging of pulleys which does not require a curing process. Element 5 of this unit does not apply in this circumstance.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- spanners, wrenches and hammers
- knives and other trimming devices
- hoists/lifting equipment not requiring any special permits or licences
- rollers and other surface compression tools
- ventilation equipment such as fans
- relevant personal protective equipment, including 'breathers' as required.

Typical hazards include:
- √ spills
- √ dusts/vapours
- √ hazardous materials
- √ manual handling hazards
- √ knife hazards
- √ noxious, toxic fumes or inflammable fumes
- √ confined spaces.

'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:
- √ variations in materials
- √ incorrectly cut material shapes
- √ contamination of materials
- √ contamination of the surfaces to be lined
- √ physical size and complexity of some components.

Typical product problems include:
- √ variations in materials
- √ contamination of materials
- √ entrapped air
- √ gaps between lining segments
- √ inappropriate laps or joins.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Where rubber lining is to be carried out in a confined space, this unit also requires the achievement of:
- √ PMA PER 200 A Work in accordance with an issued permit.

Where work is carried out in confined spaces, some members of the rubber lining team will also need competence in:
- √ PMA PER 301 A Monitor and control permits
- √ PMA PER 301 A Issue work permits.

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

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Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - impact of incorrect or faulty materials
  - production workflow sequences and materials demand
  - focus of operation of work systems and equipment
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures
- distinguish between causes of faults such as:
  - wrong raw materials/additives/catalyst
  - incorrect quantity of materials/additives/catalyst
  - contaminated materials/additives/catalyst.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency evacuation procedures.

Consistent performance should be demonstrated. In particular look to see that:

- rubber layup production standards are met consistently
- communication is timely and effective
- work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg, to interpret specifications and make and interpret measurements and shapes.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

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UNIT TITLE

PMBPROD245B - Fabricate materials

UNIT DESCRIPTOR

This competency covers the fabrication of materials to shape and the resolving of routine problems to procedure. It applies to materials from the plastics, rubber and cablemaking industry.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are involved in the fabrication of materials into specified shapes. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- setting up equipment
- preparing materials as required
- ensuring that safety procedures are applied to reduce the risks
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Interpret plans, patterns, designs or specifications 1.4. Recognise hazards and adopt steps required to ensure safety 1.5. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Set up tools, jigs, fixtures and equipment ready for production 2.2. Locate materials, patterns and consumables 2.3. Ensure safety equipment is available and fit for use 2.4. Identify non-conformances and report as required.
3. Cut materials to shape.	3.1. Cut material to pattern, marking points for further processes 3.2. Remedy faults and non-conformances by correcting operation or adjusting equipment as required 3.3. Collect material which is able to be recycled or reused, separate and dispose of waste and scrap.

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ELEMENT	PERFORMANCE CRITERIA
4. Form materials to shape.	4.1. Organise materials prior to forming 4.2. Form material into shape, using required fixing or joining methods, to procedures 4.3. Measure and check product to specifications, making adjustments as required.
5. Resolve routine problems.	5.1. Identify likely faults that occur during the operation 5.2. Identify and take action on causes of routine faults in accordance with procedures 5.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 5.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency unit includes the processes required to form materials into specified shapes, including cutting, bending, fixing, welding and finishing to component.

Materials may be any plastic, polymer, composite, rubber or combination. The material may be in any form: sheet, tubular, solid section, formed profile, etc.

It also includes the operation of all relevant ancillary equipment.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- guillotines, power saws, jig saws, band saws, thermal cutting devices
- drilling, riveting, bolting, stitching
- hand tools as required
- relevant personal protective equipment.

Typical hazards include:

- fibres, airborne and handled
- sharp edges, swarf and scrap
- manual handling
- cut hazards
- power tools, leads and power supplies
- stationary and moving machinery, parts and components.

Typical problems include:

- pattern
  - pattern incorrect
  - marking errors

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- equipment
  - wear and breakage
  - loss of power or drives
  - controller sequence, timer issues
- process
  - sequencing problems.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - different types of materials and their behaviour when cut and joined
  - different cutting, forming and joining equipment and suitability for materials
- identify:
  - controls of equipment
  - types of joiners used
- list and describe:
  - routine faults in products
  - routine problems in process
- distinguish between causes of faults such as:
  - materials
  - changes to materials during the forming process
  - equipment - adjustments/setup
  - equipment - maintenance requirements.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- ν fabrication production standards are met consistently
- ν upstream and downstream communication is timely and effective
- ν operating procedures and work instructions are read and interpreted correctly
- ν problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- ν all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- ν on an operating plant allowing for operation under all normal and a range of abnormal conditions
- ν by use of a suitable simulation and/or a range of case studies/scenarios
- ν by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

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UNIT TITLE

PMBPROD246B - Hand mix materials

UNIT DESCRIPTOR

This competency covers the application of knowledge of materials, product purpose and processes to the hand mixing of materials.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who hand mix materials in support of the production process. It does not apply to the composites sector. The key factors are the selection and mixing of the right material within the appropriate timeframe and to the consistency and uniformity required, ensuring there is no contamination of the materials. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- planning which jobs have the higher priority
- selecting and obtaining the correct materials in the correct quantities
- using the correct mixing container and hand mixers
- checking materials to ensure no contamination
- adding, mixing and removing the material within the appropriate safety guidelines
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Identify the requirements for hand mixing of materials.	1.1. Identify materials to be included in the hand mixing process 1.2. Identify hand mixing equipment and components used in the mixing process 1.3. Identify characteristics of the blended material produced in relation to the impact on the production process and final product quality 1.4. Compare stages in the mixing process with the quality requirements for the product.

ELEMENT	PERFORMANCE CRITERIA
2. Preplan hand mixing operations.	2.1. Identify work requirements from workplace approved operating procedures 2.2. Identify equipment and processes used for materials measurement, preparation, mixing and for the delivery of material to production area 2.3. Identify materials including base raw materials and required additives 2.4. Identify hazards connected with materials and process from observation of workplace reference materials including materials safety data sheets and equipment instructions 2.5. Identify appropriate measures to minimise risks from the identified hazards 2.6. Plan task sequences within scope of authority including identifying 2.7. times and locations in the blending process where checks for product quality and required production outputs are most appropriately made 2.8. ongoing materials input, waste management and work area housekeeping requirements 2.9. any required supplementary equipment for product quality testing.
3. Check hand mixing setup.	3.1. Identify equipment information, required quality specifications and standard operating procedures 3.2. Check materials for conformity with workplace operational requirements 3.3. Discard non-conforming materials or make adjustments to blending operations in accordance with workplace procedures 3.4. Identify changes in materials at each stage of the blending process.
4. Conduct hand mixing operations.	4.1. Monitor hand mixing operations noting materials quantity and product quality 4.2. Make adjustments to remedy faults and non-conformity to product blend standards where applicable 4.3. Move materials to point of use and pour in the appropriate manner 4.4. Collect and reuse material which is able to be reprocessed and deal with waste and scrap in accordance with workplace procedures 4.5. Complete equipment cleanup and waste management in accordance with workplace procedures.
5. Respond to product quality improvement requests.	5.1. Monitor hand mixing process and note conditions which may affect product quality standards 5.2. Report process variations within workplace procedures 5.3. Note and implement authorised changes in standard operating procedures and specifications.

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RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It includes the operation of all relevant additional equipment integral to the hand mixing process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- hand carts and trolleys
- knives and other bag opening equipment
- hoists/lifting equipment not requiring any special permits or licences
- mixing spatulas or paddles
- portable electrical paddle mixers
- relevant personal protective equipment.

Typical hazards include:

- spills and splashing
- noxious fumes and vapours
- hazardous materials
- manual handling hazards.

'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:

- incorrect material composition
- over or under mixing
- broken mixing equipment
- temperature variations.

Typical product problems include:

- variations in materials
- contamination of materials
- variations in setting times.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - impact of incorrect or faulty materials
  - production workflow sequences and materials demand
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures
- distinguish between causes of faults such as:
  - wrong raw materials/additives/catalyst
  - incorrect quantity of materials/additives/catalyst
  - contaminated materials/additives/catalyst
  - inadequate mixing
  - incorrect setting times/temperature/composition.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures
- plan and set up work before beginning the hand mixing process.

Consistent performance should be demonstrated. In particular look to see that:

- production standards are met consistently
- mixing produces a consistent product
- timing of mixing batches is consistent with production needs.

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Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg, to determine that mixtures might comprise 2 parts of A, 8 parts of B; and 20 parts of C; for a total mix comprising 30 parts.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

UNIT TITLE

PMBPROD247B - Hand lay up composites

UNIT DESCRIPTOR

This competency covers preparation and operations for hand laying up of composite materials to form a product and the resolving of routine problems to procedure.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are involved in the production of products by hand lay up of composite materials. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- understanding of the interaction of the resins and fibres required to form a product to the required specifications
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- setting up moulds
- preparing materials as required
- applying materials as required
- ensuring that safety procedures are applied to reduce the risks
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify quantity and quality of product and materials required and any special requirements 1.3. Recognise hazards and steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Setup mould and materials as required.	2.1. Set up mould ready for production 2.2. Check mould for cracks, chips and cleanliness 2.3. Ensure fibres are available in the form and quantities required 2.4. Ensure resins are prepared as required 2.5. Ensure safety equipment is available and fit for use 2.6. Undertake any other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Hand lay up composites.	3.1. Apply materials to the mould to specification 3.2. Monitor product quality, thickness, colour and integrity 3.3. Remedy faults and non-conformances by adjusting the application of materials as required 3.4. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures.
4. Resolve routine problems.	4.1. Identify the range of faults that can occur during the operation 4.2. Determine and rectify fault causes to procedures 4.3. Identify and rectify equipment failure causes in accordance with procedures 4.4. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.5. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency unit includes the use of equipment and materials to form composite products using hand layup processes. It includes the operation of all relevant additional equipment where that equipment is integral to the hand layup process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include, but are not limited to:

- setting up moulds
- preparation of resins, including mixing as required
- preparation of fibre reinforcement, including cutting and trimming
- use of composites materials including gel coats, resins and fibres
- application of composite materials to the mould by hand lay up.

This competency includes tools and equipment such as:

- open moulds for composite products
- hand mixing equipment and stirrers
- knives and cutters to trim fibres
- hand application tools, rollers, trowels, etc
- relevant personal protective equipment.

Typical hazards include:

- hazardous materials and vapours
- manual handling hazards
- knife hazards.

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Typical problems include:

- cracks, dents or imperfections of the mould
- variations in materials, colour, consistency or mix
- contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - impact of incorrect or faulty materials
  - production workflow sequences and materials demand
  - properties of the materials required to form a composite structure of the required strength and surface finish, including properties of gel coat and bonding
  - pot-life of the resins used
  - hazards of the materials and process and appropriate hazard control procedures
- distinguish between causes of faults such as:
  - wrong raw materials/additives/catalyst
  - incorrect quantity of materials/additives/catalyst
  - contaminated materials/additives/catalyst.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- composites production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is required to the level of reading tables of figures and graphs (and applying the resultant information), using formula percentages/ratios to determine the required mass of an additive (catalyst, pigment etc.) for a given amount of resin, and similar manipulations and interpretation.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

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UNIT TITLE

PMBPROD248B - Prepare surfaces for coating

UNIT DESCRIPTOR

This competency covers the preparation of surfaces for the application of surface coatings and finishes by hand or machine and the resolving of routine problems to procedure.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are involved in the preparation of surfaces prior to the application of surface finishes. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- setting up materials and equipment
- using appropriate surface preparation equipment and consumables
- comparing resultant preparation with specifications and rectifying defects within standard procedures
- ensuring that safety procedures are applied to reduce the risks
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Identify and exclude sources of contamination 1.4. Recognise hazards and adopt steps required to ensure safety 1.5. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Prepare surfaces.	2.1. Prepare surfaces to procedures 2.2. Make adjustments as required to meet specifications 2.3. Clean up equipment and work area when surface preparation is completed.
3. Ensure surfaces are adequately prepared.	3.1. Check surface preparation against specifications throughout the process 3.2. Test surfaces to ensure conformity with specifications 3.3. Rectify surface preparation faults as required.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated

ELEMENT	PERFORMANCE CRITERIA
	person.

RANGE OF VARIABLES:

This competency unit includes the processes required to prepare surfaces for application of surface coatings to specification. It includes the operation of all relevant additional equipment where that equipment is integral to the surface preparation process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- hand finishing tools, scrapers, sandpaper, buffs and polishes
- relevant personal protective equipment.

Typical hazards include:

- hazardous materials and vapours
- moving equipment
- manual handling hazards.

Typical problems include:

- equipment
  - wear and breakage
- process
  - overuse of tools, requiring rework.

All operations are performed in accordance with procedures.

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EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - effects of contamination on surface quality
  - surface finish measurement techniques
- identify:
  - equipment, tools and consumables required to deliver the specified surface finish
  - different substrates
- list and describe:
  - appropriate surface finish techniques for the substrates used
  - typical problems with each substrate
- distinguish between causes of faults such as:
  - materials
  - contaminants
  - equipment
- correctly select and use equipment, materials, processes and procedures
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the finishing process
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- finishing production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

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UNIT TITLE

PMBPROD249A - Apply liquid surface coatings

UNIT DESCRIPTOR

This competency covers the application of surface coatings by hand, spray gun or immersion. It applies to all sectors of the industry.

This competency is typically performed by all operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to apply surface coatings to products using a variety of manual and mechanical methods in support of the production process. The key factors are ensuring the surface of the component is correctly prepared, removal of any contaminants and correct application of the coating. It includes:

- checking job sheets for work requirements
- identifying the priority in which jobs/product will be made/completed
- discussing work progress with other workers
- checking the surface of products to be coated for imperfections or contamination
- assembling the correct equipment to support the coating process
- applying the surface coating material
- checking materials to ensure no contamination
- packing or storing the product successfully
- identifying and taking action on routine surface coating problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Select appropriate equipment, accessories and consumables for the surface coating process 1.2. Recognise hazards and adopt steps required to ensure safety 1.3. Determine the particular process techniques, time and safety requirements to be used within the coating process 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks.	2.1. Establish the implications of incorrect surface preparation on product quality 2.2. 2.2 Check surfaces for contamination and suitable preparation 2.3. 2.3 Take action to rectify products with surface or other faults within workplace procedures or recycle materials as appropriate 2.4. 2.4 Check equipment is clean and ready for use.

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ELEMENT	PERFORMANCE CRITERIA
3. Apply surface coating.	3.1. Start equipment safely and correctly when required 3.2. Apply coating(s) to specification 3.3. Check process/coating is within required limits 3.4. Collect coated products and store as required 3.5. Check coating is in specification/to required quality standard 3.6. Maintain supply of material(s) as required 3.7. Complete logs and records when required 3.8. Clean up equipment and work area in accordance with procedures 3.9. Pause equipment, or shutdown equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults that might occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics industry. It includes the operation of all relevant additional equipment where that equipment is integral to the coating process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include, but are not limited to:

- movement of materials
- opening of bags, drums, etc
- handling of semi-bulk materials
- stacking and storing of materials
- basic pre-blending of materials
- application of coatings.

This competency includes tools and equipment such as:

- hand carts, trolleys and other manual handling aids
- hoists/lifting equipment not requiring any special permits or licences
- brushes, spray guns and/or immersion equipment
- vapour extraction, application booths and similar equipment
- relevant personal protective equipment.

Typical hazards include:

- spills and splashes
- toxic fumes or vapours
- hazardous materials
- manual handling hazards.

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Typical problems include:

- incorrect selection of materials
- variations in materials
- contamination of materials or product surface
- inappropriate application of coatings
- dust and other contamination
- drying rates
- film thickness variation.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - impact of incorrect or faulty materials
  - impact of application rates and methods
  - importance of solvent/suspension systems and drying rates/temperatures viscosity and air flow rates
  - production workflow sequences and materials demand
  - focus of operation of work systems and equipment
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - potential effects of variations in materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the coating process
- identify factors which may affect product quality or production output and appropriate remedies

- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine faults such as:
  - wrong coating material
  - contaminated materials or surfaces
  - contamination from the atmosphere
  - process faults
  - equipment failure
  - wrong application rate/method.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

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Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	1	1	2	1

UNIT TITLE

PMBPROD251A - Apply gel coat or other polymer surface finish

UNIT DESCRIPTOR

This competency covers the application of gel coat, flow coat or similar surface finishes by hand or equipment and the resolving of routine problems to procedure.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are involved in the use of equipment for the application of gel coat, flow coat or similar surfaces. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- setting up materials and equipment
- using appropriate manual or machine application equipment
- preparing materials as required
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- checking product for quality and conformity to specifications
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check setup is according to specification 2.2. Ensure safety equipment is available and fit for use 2.3. Check raw materials are correct 2.4. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Set up mould/surface to be coated and materials as required.	3.1. Set up mould/surface ready for production 3.2. Check mould/surface for cracks, chips and cleanliness 3.3. Ensure fibres are available in the form and quantities required 3.4. Ensure resins are prepared as required 3.5. Ensure safety equipment is available and fit for use 3.6. Undertake any other pre-start checks in accordance with procedures.
4. Apply coat.	4.1. Mix materials to procedures 4.2. Make adjustments as required to meet specifications 4.3. Apply coat as required 4.4. Collect and reprocess/discard scrap materials in accordance with procedures 4.5. Shut off equipment safely and correctly as required to procedure 4.6. Clean up equipment when operations are completed.
5. Resolve routine problems.	5.1. Identify likely faults that occur during the operation 5.2. Identify and take action on causes of routine faults in accordance with procedures 5.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 5.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency unit includes the application of gel coat to specification using manual application or spray equipment. It involves the application of gel coat to a mould former as part of a manufacturing process. Where gel coating is not part of the manufacturing process, but a similar process occurs, then this unit should be customised to suit a similar coating process.

It is not intended to cover repairs or patching work to the gel coat surface of products.

It includes the operation of all relevant additional equipment where that equipment is integral to the process of applying gel coat.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- measurement devices, such as measuring flasks, containers, weighing machines, scales or meters.
- hand application equipment including brushes
- hand application by ‘slushing’
- spray application
- relevant personal protective equipment.

Typical hazards include:

- hazardous materials and vapours
- manual handling
- stationary and moving machinery, parts and components.

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Typical problems include:

- gel coat mix, colour and additives
- equipment problems, including spray blockage/buildup and wear and breakage
- poor mixing
- over or undermeasurement of components.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - operation of gel coat application equipment and components
  - function of gel coat in the composite products being manufactured
  - importance of gel coat application to the standard of the finished work
  - production workflow sequences and materials demand
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- distinguish between possible causes of routine gel coating faults such as:
  - base materials and additives
  - cure time and conditions
  - spray equipment.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

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Consistent performance should be demonstrated. In particular look to see that :

- gel coating production standards are met consistently
- upstream and down stream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

UNIT TITLE

PMBPROD252B - Operate compounding equipment

UNIT DESCRIPTOR

This unit applies to employees required to apply knowledge of materials, product purpose and processes to compounding operations.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who compound polymers with a range of other materials. It applies to both rubber and plastics where a more specific mixing unit of competency is not relevant. It includes:

- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- collecting and weighing/measuring materials to be compounded
- operating the compounder
- ensuring the right material is compounded at the right time
- there is no contamination or other spoilage of the compounded material
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check raw materials are correct 2.3. Check process settings and adjustments including formulae settings heat and speed for conformity to procedures 2.4. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Start machine safely and correctly when required 3.2. Check product/process is within required limits 3.3. Collect products and store as required 3.4. Check product is in specification/to required quality standard 3.5. Make adjustments to remedy faults and non-conformity to product blend standards where applicable 3.6. Maintain supply of material(s) as required 3.7. Complete logs and records when required 3.8. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.9. Clean up equipment and work area in accordance with procedures 3.10. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It includes the operation of all relevant additional equipment where that equipment is integral to the compounding process.

This competency unit covers the compounding of all materials using a range of equipment. It does NOT include the use of internal or open mill blenders (see PMBPROD253B - *Operate an internal mill blender*, or PMBPROD254B - *Operate an open mill blender*).

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- hand carts and trolleys
- knives and other bag opening equipment
- hoists/lifting equipment not requiring any special permits or licences
- bung spanners and similar
- basic hand tools required for opening of material packaging
- relevant personal protective equipment.

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Typical hazards include:
- spills
- dusts/vapours
- hazardous materials
- manual handling hazards
- knife hazards.

'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:
- equipment failures
- uneven mixing
- contamination of materials
- inappropriate formula selected.

Typical product problems include:
- variations in materials
- contamination of materials
- quantity errors.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:
- identify the function of compounding equipment, machine components and the materials used
- describe changes to materials at the stages of production conducted by the employee
- explain the impact of compounding machine speed, pressure, time, temperature on finished product quality, production process and output
- identify the role friction plays in the compounding of product
- describe causes and effects of variations in blended batches
- identify and describe own role and the roles of others involved in the compounding process and in delivery within the workplace of raw and blended materials
- explain the effect of unauthorised or emergency shutdown of equipment on the compounding process

- plan own work sequence including identification of key checkpoints for equipment monitoring, product quality checks and monitoring of supplies and downstream operations
- operate equipment and monitor product quality
- identify factors which may influence product quality and production output and appropriate remedies
- make appropriate authorised alterations to own work plan and equipment to maintain both product quality and required production output
- locate, interpret and apply relevant information and maintain workplace records
- identify and safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- apply and/or explain the:
  - nature of the mechanical, hydraulic, pneumatic, electrical and electronic principles which influence the compounding equipment operation and product compounding
  - impact that chemical reactions/mechanical processes have on changing the state, form and condition of the materials
  - purpose of developing elasticity and controlling temperatures
  - effects of mastication, differential speed, overheating
  - production workflow schedule requirements
  - focus of operation of work systems and equipment
  - identification and correct use of equipment, processes and procedures
  - need to plan own work including predicting consequences and identifying improvements.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- operate the equipment within organisational guidelines
- add the appropriate materials in the specified quantities
- recognise potential situations requiring action and then implement appropriate action.

Consistent performance should be demonstrated. In particular look to see that:

- production standards are met consistently.
- material quality and consistency is maintained at the specified levels
- upstream and downstream communication is timely and effective
- common production faults and equipment malfunctions are identified/anticipated and appropriate action is taken (ie the fault fixed or reported)
- non-routine problems are identified and reported to appropriate personnel
- all safety procedures are adhered to.

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Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

UNIT TITLE

PMBPROD253B - Operate an internal mill blender

UNIT DESCRIPTOR

This competency covers the gathering of materials and operation of internal mill blending equipment.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who collect, blend and prepare rubber compounds for further production processes such as calendering, extrusion and ultimately tyre building, moulding, rubber lining, roller building and conveyor belt manufacture. The key factors are the blending and mixing of the right materials at the right time and ensuring there is no contamination of the materials. It includes:

- checking job sheets for compounds to be prepared
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- collecting materials (rubber, oils and chemicals) and assembling them close to the start of the process
- checking materials to ensure no contamination
- weighing and adding materials to the mill according to recipe
- setting up mill and conducting pre-start checks
- monitoring equipment during production process
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check production plan.	1.1. Read and interpret product specifications (recipe card) 1.2. Identify required materials including base raw materials, additives and curatives and accelerators 1.3. Plan task sequences as per procedures, including noting times for checks of product quality 1.4. Identify non-conformity in materials 1.5. Communicate with supervisor/appropriate person where specifications or materials appear 'unusual'.
2. Set up and conduct pre-start checks.	2.1. Identify and check emergency stops, gauges, controls etc 2.2. Use switches and controls to set mixing cycle, heat and speed settings 2.3. Adjust control panel to cycle time according to external temperature and humidity 2.4. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Weigh materials.	3.1. Check scales are zeroed correctly 3.2. Minimise dust and rubbish in scales and feed mechanisms 3.3. Accurately weigh powders, rubber, etc, according to computer display, digital readout or other means, according to recipe card 3.4. Adjust rubber feed to ensure correct quantity delivered.
4. Operate equipment.	4.1. Start machine safely and correctly in accordance with procedures 4.2. Check to ensure mixing is occurring appropriately according to equipment operating temperature, speed, amperages and pressures 4.3. Monitor control panel in accordance with procedures 4.4. Record production data to procedure 4.5. Inform next stage operators when close to cycle completion 4.6. Shut down machine safely and correctly in accordance with procedures/work instructions.
5. Liaise with dump mill operator.	5.1. Advise dump mill operator of compound/batch being made 5.2. Ensure correct labeling and sampling of batch 5.3. Communicate any unusual process or product events to required personnel.
6. Identify problems.	6.1. Check each batch against specifications 6.2. Identify and record variations of compound from normal 6.3. Identify routine equipment, material or process causes of failure in accordance with procedures/work instructions 6.4. Recognise problems in production, the cause of which is not routine 6.5. Report instances of non-routine problems to designated person.
7. Rectify routine problems.	7.1. Consult standard operating procedures, job sheets or other documentation to identify possible solutions 7.2. Work with team/others where appropriate to determine solution 7.3. Rectify problem in accordance with procedures/work instructions 7.4. Maintain required records and logbooks of action taken.

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RANGE OF VARIABLES:

This competency applies to the operation of 'Shaw Intermix', 'Banbury' and similar internal mill mixers in work environments specific to the rubber sector. It includes the operation of all relevant additional equipment where that equipment is integral to the blending process. It excludes shifting of materials and rubber compounds by forklift.

This competency would typically apply to the mixing of rubbers or plastics, but may be applied to other materials mixed in an internal mill blender.

Standard operating procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- hoppers and other material feeding equipment
- hoists/lifting equipment not requiring any special permits or licences
- bung spanners and similar
- bale hooks
- basic hand tools required for opening of material packaging
- relevant personal protective equipment.

Typical hazards include those associated with:

- restricted spaces
- heat
- hazardous chemicals
- dust/fumes
- moving machinery hazards
- manual handling hazards
- knife hazards.

'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:

- contamination of materials
- non adherence to recipe mix or sequence specifications
- incorrect machine set up
- inadequate/excessive mixing time
- float pressure.

Typical product problems include:

- out of specification product
- contaminated product
- incorrect quantity.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - the purpose and operations of internal mill blenders
  - mixing steps and impact of mixing the incorrect type or amount of materials
  - the role of friction in the blending of product
  - production workflow sequences and materials demand
  - focus of operation of work systems and equipment
  - correct selection and use of equipment indicators on the control panel
  - characteristics of blended materials
  - hazards of the materials and process and appropriate hazard control procedures
- demonstrate knowledge of
  - recipe instructions in either card or digital forms
  - safety trips and resets
  - batch mix indicators
  - sequence of additions
  - batch dump indicators
- distinguish between causes of faults such as:
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - contaminated materials/additives.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- identify critical material properties and quantities.
- recognise potential situations requiring action and then implement appropriate action.

Consistent performance should be demonstrated. In particular look to see that:

- production standards are met consistently
- blending is performed to the required specification and consistency
- product is produced in the quantities and at the times required
- upstream and downstream communication is timely and effective
- common production faults and equipment malfunctions are identified/anticipated and appropriate action is taken (ie, the fault fixed or reported)
- non-routine problems are identified and reported to appropriate personnel
- all safety procedures are adhered to.

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Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required for example to:

- measure quantities of raw materials, additives, etc, to be blended
- calculate volumes from formulae
- measure and extract an exact quantity of compound from the mixed product for a sample to be tested.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

UNIT TITLE

PMBPROD254B - Operate an open mill blender

UNIT DESCRIPTOR

This unit applies to employees required to apply knowledge of materials, product purpose and processes to the operation of open mill blenders, Banbury dump mills and similar equipment.

This competency is typically performed by operators working in the rubber industry.

This competency in practice

This competency applies to operators who use open mill blenders/mixers to compound rubber. The key factors are the production of a homogeneous mix which has the right properties. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- breaking down bales of crude rubber
- adding and mixing the correct amount of the correct materials in the correct order
- mixing efficiently
- slabbing, stripping off or otherwise removing mixed rubber from the mill
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check raw materials are correct 2.3. Check process settings such as temperature and speed, adjustments such as nip, and formulae for conformity to procedures 2.4. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Mix using open mill blender.	3.1. Start, operate and stop mill as required by procedures 3.2. Band, cut, fold and work rubber as needed 3.3. Add materials evenly at correct rate and time and blend in 3.4. Check open mill blender operations 3.5. Make adjustments to remedy faults and non-conformity to product blend standards where applicable 3.6. Collect and reuse material which is able to be reprocessed 3.7. Deal with waste and scrap in accordance with procedures 3.8. Complete equipment cleanup, lubrication, adjustment and waste management in accordance with procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies mainly to the rubber industry, but may also be relevant in the plastics industry. It includes the operation of all additional equipment where that equipment is integral to the mill blending process.

This competency would typically apply to the mixing of rubbers or plastics, but may be applied to other materials mixed on an open mill blender.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This is an inherently hazardous operation, and hazards should be identified from observation of the mill itself, the blender feed and product delivery equipment, and from workplace reference materials including materials safety data sheets and equipment instructions.

This competency includes equipment and tools such as:

- mill knifes
- nip adjusting bars
- bale hooks
- relevant personal protective equipment.

Typical hazards include:

- cuts
- nip hazards
- material hazards
- burn hazards
- manual handling hazards.

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'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:

- power failures
- incorrect machine adjustments
- incorrect quantities of materials
- incorrect blending times
- equipment breakdowns
- short scorch products
- forming the initial band
- adjusting bank size for efficient mixing.

Typical product problems include:

- variations in materials
- contamination of materials
- lack of a homogeneous product.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - the nature of the principles which influence the open mill blender equipment operation and product blending
  - the impact that chemical reactions/mechanical processes have on changing the state, form and condition of the materials
  - purpose of developing elasticity and controlling temperatures
  - effects of mastication, differential speed, overheating,
  - production workflow schedule requirements
  - focus of operation of work systems and equipment
  - correct use of equipment, processes and procedures
  - planning own work including predicting consequences and identifying improvements
- identify the function of open mill blender equipment, machine components and the materials used
- describe changes to materials at the stages of production conducted by the employee

- explain the impact of open mill blender machine speed, pressure, time and temperature on finished product quality, production process and output
- identify the role friction plays in the blending of product
- describe causes and effects of variations in blended batches
- identify and describe own role and the roles of others involved in the open mill blender process and in delivery within the workplace of raw and blended materials
- explain the effect of unauthorised or emergency shutdown of equipment on the open mill blender process
- operate the open mill blender in accordance with the organisation's procedures
- plan own work sequence including identification of key checkpoints for equipment monitoring, product quality checks and monitoring of supplies and downstream operations
- monitor equipment operation and product quality
- identify factors which may influence product quality and production output, and appropriate remedies
- make appropriate alterations to own work plan and equipment to maintain both product quality and required production output
- locate, interpret and apply relevant information and maintain workplace records
- identify and safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- understand the importance of critical material properties and quantities
- recognise potential situations requiring action and then implement appropriate action.

Consistent performance should be demonstrated. In particular look to see that:

- production standards are met consistently.
- blending results in materials of the right consistency and specification
- upstream and downstream communication is timely and effective
- common production faults and equipment malfunctions are identified/anticipated and appropriate action is taken (ie the fault fixed or reported)
- non-routine problems are identified and reported to appropriate personnel
  all safety procedures are adhered to.

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Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

UNIT TITLE

PMBPROD255B - Operate mixing equipment

UNIT DESCRIPTOR

This competency covers the operation of mixing equipment to prepare materials to specification.

This competency is typically performed by all operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are involved in the mixing of materials using mixing equipment, maintaining personal safety and the safety of others within the context of production output and quality requirements. The key factors are the location, use and mixing of materials as required to meet a specification. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- setting up materials and equipment
- using mixing equipment and preparing materials as required
- ensuring that safety procedures are applied to reduce the risks
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Identify required materials and equipment.	1.1. Identify work requirements from production plan 1.2. Identify quantity and quality of product required and any special requirements 1.3. Identify equipment required 1.4. Recognise hazards and steps required to ensure safety 1.5. Identify adjustments and operating parameters 1.6. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Set up equipment and materials	2.1. Set up equipment for measurement, preparation, blending and delivery 2.2. Locate raw materials and additives 2.3. Set up mixing equipment 2.4. Ensure safety equipment is available and fit for use 2.5. Identify non-conformances and report as required.

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ELEMENT	PERFORMANCE CRITERIA
3. Mix materials.	3.1. Mix materials to standard procedures 3.2. Make adjustments as required to meet specifications 3.3. Collect material which is able to be recycled or reused, separate and dispose of waste and scrap 3.4. Clean up equipment when mixing operations are completed.
4. Identify problems.	4.1. Check products against specifications 4.2. Identify and record variations of product from normal 4.3. Identify routine equipment, material or process causes of failure in accordance with standard procedures 4.4. Recognise problems in production, the cause of which is not routine 4.5. Report instances of non-routine problems to designated person.

RANGE OF VARIABLES:

This competency applies to the processes required to mix materials to specification using mixing equipment. Materials may be any resin, multi-part mix or blend requiring specified quantities of raw materials and additives to meet a specification or recipe. It also includes the operation of all relevant additional equipment where that equipment is integral to the mixing process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- measurement devices, such as measuring flasks, containers, weighing machines, scales or meters
- mixing or blending equipment (stirrers, paddle, propeller or other driven mixer)
- relevant personal protective equipment.

Typical hazards include:

- hazardous materials and vapours
- manual handling
- stationary and moving machinery, parts and components.

'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include

- wear and breakage of equipment
- poor mixing
- over or under measurement of components
- mixing materials out of sequence.

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Typical product problems include
- poor formulation
- contaminated product
- lack of consistency.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability to:
- apply and/or explain:
  - calculation of volumes or weights used to make a batch from the specification or recipe
  - shear effects on mixing
- identify:
  - materials used
  - role of friction in the blending process
- list and describe:
  - changes to materials at each stage of the process
  - routine faults in materials
  - routine problems in process
  - routine recording of jobs and details
- distinguish between causes of faults such as:
  - materials
  - changes to materials during the mixing process
  - equipment.

Critical aspects:

It is essential that competence is demonstrated in the ability to:
- understand the importance of critical material properties and quantities
- recognise potential situations requiring action and then implement appropriate action.

Consistent performance should be demonstrated. In particular look to see that:

- production standards are met consistently
- mixing results in materials of the correct consistency and specification
- upstream and downstream communication is timely and effective
- common production faults and equipment malfunctions are identified/anticipated and appropriate action is taken (ie, the fault is fixed or reported)
- non-routine problems are identified and reported to appropriate personnel
- all safety procedures are adhered to.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

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UNIT TITLE

PMBPROD259B - Operate granulating equipment

UNIT DESCRIPTOR

This competency covers the operation of granulation equipment. It applies to a range of plastics and rubber sections where virgin or recycled material is processed into granules for further production.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of granulation equipment. The key factors are the production of material meeting quality standards and product requirements. It includes:

- checking job sheets for work requirements and preparing for production
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- checking granulator settings and adjustments
- identifying and taking action on routine process problems
- checking materials for quality and conformity to product requirements
- discarding non conforming materials ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- cleaning granulator after product/grade change or preparing equipment for maintenance
- completing logs and reports

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check raw materials are correct 2.3. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Check granulator setup.	3.1. Identify equipment information, required quality standards and standard operating procedures 3.2. Check granulator settings, adjustments and items such as magnets, screen size and lockout equipment for conformity to procedures 3.3. Check materials for conformity with requirements 3.4. Discard non-conforming materials or make adjustments to processing operations in accordance with procedures.
4. Operate equipment.	4.1. Start, operate and stop granulator as per procedure 4.2. Feed materials to granulator 4.3. Check granulator operation noting quality, outputs and equipment operating speed 4.4. Make routine checks and recognise developing problems 4.5. Make adjustments to remedy faults and non-conformity to production standards where applicable 4.6. Remove granules as required 4.7. Collect and reuse materials for reprocessing 4.8. Collect and dispose of waste and scrap in accordance with workplace procedures 4.9. Complete equipment cleanup, adjustment and waste management in accordance with procedures 4.10. Complete required workplace documentation/records.
5. Resolve routine problems.	5.1. Identify likely faults that occur during the operation 5.2. Identify and take action on causes of routine faults in accordance with procedures 5.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 5.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It includes the operation of all relevant additional equipment where that equipment is integral to the granulating process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- granulator equipment and auxiliary equipment including regrind evacuation systems, conveyors, hoppers, dust collection systems
- tools such as verniers and gauges
- relevant personal protective equipment.

Typical hazards include:

- spills
- dusts/vapours
- temperature

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- rotor speed, blades
- material hazards
- manual handling hazards.

'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:

- equipment malfunction
- variations in materials
- contamination of materials
- poor maintenance of blades, screens.

Typical product problems include:

- inconsistency
- incorrect product size.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Knowledge and understanding of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's standard procedures and work instructions and relevant regulatory requirements, along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Competence includes the ability to:

- apply and/or explain:
  - function of granulating equipment, machine components and the materials used
  - changes to materials during the process conducted by the operator
  - impact of feed rate on product quality and production output
  - production workflow sequences and materials demand
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - impact of variations in raw materials and equipment operation in relation to final product
  - waste management and importance of non-conforming materials
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures
- distinguish between causes of faults such as:
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - contaminated materials/additives
  - equipment faults such as clogged screens, poor gap distance between rotor and bed blades, blunt blades, failure in grinding systems.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- understand the importance of critical material properties and granulating variables
- recognise potential situations requiring action and then implement appropriate action.

Consistent performance should be demonstrated. In particular look to see that :

- granulating production standards are met consistently
- upstream and downstream communication is timely and effective
- common production faults and equipment malfunctions are identified/anticipated and appropriate action is taken (ie, the fault is fixed or reported)
- non routine problems are identified and reported to appropriate personnel
- all safety procedures are adhered to.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg, to determine required kilograms of materials

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

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UNIT TITLE

PMBPROD261A - Operate continuous vulcanising equipment

UNIT DESCRIPTOR

This unit applies to employees required to apply knowledge of materials, product purpose and processes to the operation of continuous vulcanising equipment.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who use continuous vulcanising equipment such as might be used in the manufacture of conveyor belts. The key factors are the correct application of heat and pressure for the correct time to ensure a well vulcanised product with no porosity and good bonding to other materials which may be included in the product such as reinforcing belt/wire or cable. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- checking temperature/pressure/time against specification
- adjusting temperature and time as required
- feeding green product and removing and possibly coiling cured product
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check green products/belt are correct 2.3. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Start vulcaniser safely and correctly when required 3.2. Check process is within required limits 3.3. Remove products/belt and store/coil as required 3.4. Check product is in specification/to required quality standard 3.5. Maintain supply of green product as required 3.6. Complete logs and records when required 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean up equipment and work area in accordance with procedures 3.9. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to the rubber sector and rubber covered cablemaking industry. It includes the operation of all relevant additional equipment such as feed and reeling equipment.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- the continuous press/autoclave
- feed and reeling equipment
- monitoring and control equipment
- tools for taking samples
- relevant personal protective equipment.

Typical hazards include:

- burns
- vapours
- moving equipment.

'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:

- variations in feed material
- scorched materials
- contamination of materials
- temperature variations
- pressure variations.

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Typical product problems include:

- entrapped particulates or air
- insufficient bond achieved
- uncured rubber
- exposed reinforcing or wire.

Key process variables to be checked include:

- temperature
- pressure
- time
- feed rate
- clamp/press cycle.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - the influence of the mechanical, hydraulic, pneumatic, electrical and electronic principles on vulcanising equipment operation and product curing
  - the impact that chemical reactions/mechanical processes have on changing the state, form and condition of the vulcanised materials
  - the role of retarders, fillers and extenders, processing aids and protective agents appropriate for the rubber compounds and processes used
  - the reasons for minimising waste of vulcanised products
  - production workflow schedule requirements
  - identification and correct use of materials, equipment, processes and procedures
  - planning own work including predicting consequences and identifying improvements
- identify the function of vulcanising equipment, components and the materials used
- describe changes to materials at the stages of production conducted by the employee
- explain the impact of vulcanising machine speed, pressure, time, temperature and tension on product quality and production output
- describe the role of heat and pressure in relation to providing strength, stiffness, resistance to deformation, fatigue and abrasion

- identify and describe own role and the roles of others involved directly in the vulcanising process
- decide if they (the operator) are able to rectify the fault or if assistance is required
- explain the effect of unauthorised or emergency shutdown of equipment on the vulcanising process
- plan own work sequence including identification of key checkpoints for equipment monitoring, product quality checks and monitoring of supplies and downstream operations
- operate equipment and monitor product quality
- identify factors which may influence product quality and production output, and appropriate remedies
- make appropriate authorised alterations to own work plan and equipment to maintain both product quality and required production output
- locate, interpret and apply relevant information and maintain workplace records
- identify and safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - materials
  - process conditions
  - equipment condition.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- apply procedures
- explain the importance of critical material properties and quantities
- recognise potential situations requiring action and then implement appropriate action.

Consistent performance should be demonstrated. In particular look to see that:

- production standards are met consistently
- wire or reinforcing is not visible in the finished product
- bonding is achieved in accordance with the specification.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required to the level of reading and interpreting numbers.

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Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

UNIT TITLE

PMBPROD262A - Operate tyre curing equipment

UNIT DESCRIPTOR

This competency covers the operation of tyre curing equipment in a tyre manufacturing plant or retreading situation where the 'green' tread is laid on the tyre casing.

This competency is typically performed by operators working independently.

This competency in practice

This competency applies to operators who are involved in curing ‘green’ tyres and 'hot cap' retreads (ie, retreads made using green treads), assembled from a number of intermediate components and stored. It does not cover the use of precured treads (‘Bandag’ process) - see PROD263A. The key factors are the checking of the production process and identifying routine problems. It includes:

- checking job sheets for work to be done
- conducting pre-start checks of setup
- starting up and shutting down of equipment
- checking equipment during production process
- resolving routine production problems.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify job requirements of tyre to be cured (PSR., LVR., TBR.), especially curing time 1.2. Identify any special requirements 1.3. Plan task sequence within scope of authority 1.4. Recognise hazards and adopt steps required to ensure safety 1.5. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check machine setup according to specification sheets 2.2. Check stretch height and roundness of green tyres 2.3. Check safety gates and guards are located in their correct working positions 2.4. 2.4 Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Load green tyre or 'hot cap' retread onto mould and inflate into fixed position 3.2. Close machine safely and correctly in accordance with procedures 3.3. Adjust steam pressure/temperature according to product specifications 3.4. Terminate curing, allowing sufficient time for product type and size 3.5. Unload vulcanised tyre from machine and store appropriately for finishing 3.6. Communicate to next stage operators when tyre supply sufficient 3.7. Clean up equipment and work area in accordance with procedures 3.8. Pause equipment, or shut down equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify faults/variations from normal that can occur as a result of faulty or incomplete vulcanisation or low air /mould pressure 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency unit includes curing operations.

This competency applies to all work environments within the tyre manufacture sector and some retread areas (although comparatively rare). It also includes the operation of all relevant ancillary equipment.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include, but are not limited to:
- moulding/curing of green tyres
- moulding/curing of retread tyre treads (non-Bandag process).

This competency includes tools and equipment such as:
- hand tools as required
- relevant personal protective equipment.

Typical hazards include:
- manual handling
- noise, light, energy sources
- humidity, air temperatures, radiant heat
- stationary and moving machinery, parts and components.

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Routine problems include:

- equipment
  - poorly aligned guides
  - mould incorrectly placed on machine
  - poor mould closure/alignment
  - poorly prepared mould (dirty/mould release)
- materials
  - contaminated green tyres
  - squashed or distorted green tyres
  - scorchy rubber
- process
  - curing time/cycle
  - temperature
  - mould temperature/steam pressure/air blinded/waterlogged mould
  - mould/air pressure
- product
  - excessive trim/spue
  - out of round/eccentric.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or describe:
  - the function of the curing process
  - the impact that chemical reactions in the curing process have on the changed state of the vulcanised product
  - interrelationship between time and temperature
  - importance of pressure during curing
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the curing process

- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine faults such as:
  - incorrect quantity of materials
  - contaminated materials
  - equipment faults
  - mould damage
  - mould preparation/cleanliness/mould release
  - cure time/temperature/pressure faults
  - scorchy rubber
  - machine failure.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

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Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

UNIT TITLE

PMBPROD263A - Operate retread curing equipment

UNIT DESCRIPTOR

This competency covers the operation of tyre curing equipment in retreading workplaces where prevulcanised tread is laid on the retread tyre.

This competency is typically performed by operators working independently.

This competency in practice

This competency applies to operators who are involved in curing retread tyres assembled from a prepared carcass and a prevulcanised tread. The key factors are the checking of the production process and identifying routine problems. It includes:

- checking job sheets for work to be done
- conducting pre-start checks of setup
- starting up and shutting down of equipment
- checking equipment during production process
- resolving routine production problems.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check production plan.	1.1. Identify job requirements of tyre to be cured especially curing time 1.2. Identify any special requirements 1.3. Check with supervisor/appropriate person if requirements are not in accordance with usual practice. 1.4. Plan task sequence within scope of authority.
2. Prepare retreads for curing	2.1. Check stretch height and roundness of tyres 2.2. Insert equipment used to pressurise inside of tyre to specifications 2.3. Place tyre within rubber envelope according to workplace (and process specific) specifications.
3. Conduct pre-start checks of setup.	3.1. Check machine setup according to specification sheets 3.2. Check safety gates and guards are located in their correct working positions 3.3. Undertake other pre-start checks in accordance with procedures/work instructions.

ELEMENT	PERFORMANCE CRITERIA
4. Operate machine.	4.1. Load enveloped retread tyres into curing oven according to process and workplace specifications 4.2. Start machine safely and correctly in accordance with procedures 4.3. Adjust steam pressure/temperature according to product specifications 4.4. Terminate curing, allowing sufficient time for product type and size 4.5. Unload vulcanised tyre from machine and store appropriately for finishing 4.6. Shut down machine safely and correctly in accordance with procedures.
5. Resolve routine problems.	5.1. Identify faults/variations from normal that can occur as a result of faulty or incomplete vulcanisation of bonding material 5.2. Identify and take action on causes of routine faults in accordance with procedures 5.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 5.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency unit includes curing operations in retreading operations. Curing is mainly of bonding agents.

This competency applies to most work environments within the tyre retreading sector, but does not include retread processes where the green extruded tread is laid onto the buffed casing. It includes the operation of all relevant additional equipment where that equipment is integral to the retreading process.

Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- hand tools as required
- relevant personal protective equipment.

Typical hazards include:

- manual handling
- noise, light, energy sources
- humidity, air temperatures, radiant heat
- stationary and moving machinery, parts and components
- steam and temperature hazards.

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Routine problems include:

- equipment
  - too much moisture in the oven
  - air not being extracted properly from the envelope
  - air blinding of steam equipment
- materials
  - contaminated treads
  - poorly prepared/contaminated casing
  - poor quality bonding material
- process
  - curing time/cycle
  - temperature
  - air pressure
- product
  - excessive trim/spue
  - out of round/eccentric.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or describe:
  - function of the curing process
  - impact that chemical reactions in the curing process have on the changed state of the vulcanised product
  - interrelationship between time and temperature
  - interrelationship between steam pressure and temperature
  - importance of pressure during curing
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the retreading process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements

- distinguish between types of faults arising from:
  - materials
  - equipment
  - process.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

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KEY COMPETENCIES						
1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

UNIT TITLE

PMBPROD264B - Check recycle wash process

UNIT DESCRIPTOR

This competency covers the use of recycle wash equipment and checking of the process.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who check the operations of the recycle wash process. The key factors are the checking of the equipment, checking on performance of the equipment and making approved adjustments and equipment corrections. It includes:

- discussing work progress with other workers
- ensuring appropriate raw materials are available
- checking on the operation of the process
- checking the outputs for conformance with specification.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Identify equipment controls and procedures.	1.1. Identify work requirements from workplace approved operating procedures 1.2. Identify equipment components and component function 1.3. Identify and test fluid circuits, pumps, shutoffs and control valves 1.4. Check operating procedures and controls to identify approved adjustments and operating parameters 1.5. Establish actions to be used in the event of fault conditions in the reticulation system or out of specification products from operating procedures.
2. Establish work requirements.	2.1. Establish inspection and sampling procedures in line with workplace and operating procedures 2.2. Identify and address hazards connected with the use of electricity in the proximity of water, mechanical components, chemical reactions and spills 2.3. Identify and locate equipment emergency stops, gauges, guards and controls 2.4. Identify and note requirements for checking materials condition, ancillary supplies and equipment, 2.5. Identify product quality requirements for the relevant stage in the continuous recycle washer process 2.6. Arrange any required supplementary equipment for routine lubrication and adjustments.

ELEMENT	PERFORMANCE CRITERIA
3. Maintain recycle washer operations.	3.1. Check operations noting product quality in comparison to normal visual condition of product, production cycle time and outputs and waste condition within workplace procedures 3.2. Collect samples of product outputs, check for conformity to specifications, and store 3.3. Safely remove chemical waste for disposal/recycling and deal with scrap in accordance with workplace procedures 3.4. Check readouts against standard statistical process information and enter production data into the control system 3.5. Clean up equipment and work and complete waste management in accordance with workplace procedures.
4. Identify product quality requirements.	4.1. Check process and note conditions which may affect product quality standards 4.2. Interpret reports from quality inspections and rectify or report as appropriate equipment conditions within workplace procedures 4.3. Note and implement authorised changes in standard operating procedures and specifications.

RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics industry. It includes the operation of all relevant ancillary equipment.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include, but are not limited to:

- movement of materials
- opening of bags, drums, etc
- stacking and storing of materials
- basic measurement of quantities.

This competency includes tools and equipment such as:

- hand carts and trolleys and other manual handling aids
- knives and other bag opening equipment
- hoists/lifting equipment not requiring any special permits or licences
- bung spanners and similar
- basic hand tools required for opening of material packaging
- relevant personal protective equipment.

Typical hazards include:

- spills
- hazardous materials
- manual handling hazards.

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Typical problems include:
- variations in materials
- contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:
- apply and/or explain:
  - impact of incorrect or faulty materials
  - focus of operation of work systems and equipment
  - hazards of the materials and process and appropriate hazard control procedures
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation
- identify when the operator is able to rectify problems, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the recycle wash process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- distinguish between causes of faults such as:
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - contaminated materials/additives.

Critical aspects:

It is essential that competence is demonstrated in the ability to:
- apply approved procedures
- take appropriate action to resolve problems or report problems to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :
- recycle wash standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
1	1	1	1	1	1	1

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UNIT TITLE

PMBPROD265B - Operate portable vulcanising equipment

UNIT DESCRIPTOR

This competency covers the application of technical expertise, work planning and problem solving to setting up and operating portable vulcanising equipment.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who set up and operate portable vulcanising equipment either in a production facility or an on-site work environment. The key factors are the establishment of the appropriate safe working environment, obtaining the necessary power and other supplies, conducting vulcanising operations and assessing and taking appropriate action at the end of the operations. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- discussing work practices and site clearance with other workers
- ensuring the site is safe and setting up equipment
- obtaining appropriate electric, pneumatic or other power sources
- conducting vulcanising operations
- assessing the finished work and identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Identify work requirements for vulcanising operations.	1.1. Identify product characteristics in relation to the impact of the vulcanising process on product quality 1.2. Identify and obtain equipment and materials concerned with the vulcanising process 1.3. Identify and address hazards connected with materials and the vulcanising process 1.4. Check materials, ancillary supplies and equipment and product quality requirements for the completed vulcanised product 1.5. Identify and check emergency stops, gauges, guards and controls.

ELEMENT	PERFORMANCE CRITERIA
2. Plan vulcanising operations.	2.1. Plan the task sequences including times and locations where product quality checks, equipment operation and required production outputs are most appropriately made 2.2. Plan for ongoing materials input, waste management and work area housekeeping requirements 2.3. Schedule any required supplementary equipment for product quality testing or routine equipment lubrication, adjustments and site housekeeping.
3. Prepare vulcanising equipment.	3.1. Check tools and equipment for safe operation and appropriateness of purpose 3.2. Connect equipment to appropriate ancillary electrical, air and/or hydraulic power sources appropriate to site needs 3.3. Obtain materials specifications for material to be vulcanised 3.4. Follow workplace procedures for equipment setup in accordance with customer requirements and specifications 3.5. Set equipment control parameters in accordance with specifications 3.6. Make any required adjustments to own work plan 3.7. Obtain appropriate clearances for work to commence.
4. Conduct and monitor vulcanising operations.	4.1. Mount or locate equipment in accordance with product requirements 4.2. Start the unit and observe the unit operating through the full operating range, noting vulcanisation quality, equipment operating temperatures and pressures 4.3. Make adjustments to remedy production faults and non-conformity to production standards within procedures, and shut down unit. 4.4. Note and report non-conformity to required workplace specifications in accordance with workplace procedures 4.5. Assess the outcome of the vulcanising process and take remedial action as necessary or report to the appropriate person 4.6. Clean up, lubricate and adjust equipment 4.7. Complete waste removal or recycling as required.

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RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the rubber industry. It includes the operation of all relevant additional equipment where that equipment is integral to the vulcanising process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- knives and other rubber cutting and shaping equipment
- hoists/lifting equipment not requiring any special permits or licences
- manual handling aids such as handcarts
- relevant personal protective equipment
- powered equipment/aids.

Typical hazards include:

- heat and hot rubber
- chemical splashes or spills
- dust or vapours/fumes
- manual handling hazards
- knife hazards.

'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:

- variations in materials
- contamination of materials
- unsuccessful vulcanising processes.

Typical product problems include:

- entrapped gasses
- wire or reinforcing exposure
- inappropriate material specification.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - impact of incorrect or faulty materials
  - production workflow sequences
  - focus of operation of work systems and equipment
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures
- distinguish between causes of faults such as:
  - wrong raw materials/additives/catalyst
  - incorrect temperatures or pressures and entrapped air in the vulcanised area
  - contaminated materials/additives/catalyst
- identify the function of vulcanising equipment, components and the materials used
- describe changes to materials at the stages of production conducted by the employee
- explain the impact of vulcanising speed, pressure, time, temperature and tension on product quality and production output
- describe the role of heat and pressure in relation to providing strength, stiffness, resistance to deformation, fatigue and abrasion
- explain any differences in vulcanising processes and additives for natural, synthetic and mixed rubber compounds
- decide if they (the operator) are able to rectify the fault or if assistance is required
- explain the effect of unauthorised or emergency shutdown of equipment on the vulcanising process
- plan own work sequence including identification of key checkpoints for equipment monitoring and product quality checks
- operate equipment and monitor product quality
- identify factors which may influence product quality and production output and appropriate remedies
- make appropriate authorised alterations to own work plan and equipment to maintain both product quality and required production output
- locate, interpret and apply relevant information and maintain workplace records
- identify and safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - materials
  - process conditions
  - equipment condition.

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Critical aspects:

It is essential that competence is demonstrated in the ability to:

- understand procedures
- understand the importance of critical material properties and quantities
- recognise potential situations requiring action and then implement appropriate action.

Consistent performance should be demonstrated. In particular look to see that:

- production standards are met consistently
- wire or reinforcing is not visible in the finished product
- bonding is achieved in accordance with specifications.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

UNIT TITLE

PMBPROD266A - Prepare tyre casings for retreading

UNIT DESCRIPTOR

This competency covers the preparation (buffing) of used tyres prior to the laying on of retread. It applies to the tyre retreading sector of the industry.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who buff residual tread from used tyres to prepare a carcass for laying retread. The key factors are the removal of sufficient but not excessive old rubber from the used tyre to establish a sound platform for the new tread. It includes:

- checking job sheets for work requirements
- identifying the priority in which jobs/product will be made/completed
- discussing work progress with other workers
- checking the machine set-up
- buffing the tyre
- repairing any holes or areas where the steel radial becomes exposed.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Read and interpret product specifications 1.2. Identify specific requirements of the tyre being retreaded 1.3. Identify required equipment including handling, buffing, inspection and repair equipment 1.4. Identify hazards connected with materials and process from observation of the equipment, workplace reference materials including materials safety data sheets and equipment instructions 1.5. Identify equipment emergency stops, gauges, guards and controls.
2. Conduct pre-start checks of retread buffing equipment.	2.1. Identify equipment information, required quality specifications and standard operating procedures 2.2. Check blade and buff settings and adjustments for conformity to documented procedures 2.3. Check safety gates and guards are located in the correct working position 2.4. Check casings for conformity with requirements 2.5. Discard non-conforming tyres in accordance with workplace procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate buffing equipment.	3.1. Start machine safely and correctly when required 3.2. Monitor buffing operations noting process stages, depth of cut (according to standard operating procedures) and abrasion 3.3. Check against workplace standards for colour and texture before completing process 3.4. Make adjustments to remedy non-conformity to buffing requirements 3.5. Buzz out areas around exposed steel radials with hand held stone grinder 3.6. Collect material which is able to be reprocessed and reused, and deal with waste and scrap in accordance with workplace procedures 3.7. Complete equipment cleanup, lubrications, adjustments and waste management in accordance with workplace procedures 3.8. Pause equipment or shut down equipment in an emergency, following workplace and emergency procedures.
4. Repair imperfections.	4.1. Locate casing imperfections from previous inspection 4.2. Repair casings (especially exposed steel areas) with rubber plugs in accordance with standard operating procedures 4.3. Complete required workplace documentation/records.
5. Complete operations.	5.1. Check casings for compliance with specifications 5.2. Create job card, tyre ID, other tracking/information items needed as specified by procedures 5.3. Adhere the metal tag/s to the tyre wall with uncured rubber.

RANGE OF VARIABLES:

This competency unit includes the use of manual handling aids and various powered equipment/aids.

This competency applies to work environments and sectors within the rubber industry. It includes the operation of all relevant ancillary equipment.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include, but are not limited to:

- movement of materials
- stacking of materials
- basic measurement of quantities
- basic pre-blending of materials.

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This competency includes tools and equipment such as:

- hand carts and trolleys
- knives and other bag opening equipment
- hoists/lifting equipment not requiring any special permits or licences
- bung spanners and similar
- basic hand tools required for opening of material packaging
- relevant personal protective equipment.

Typical hazards include:

- spills
- dusts/vapours
- hazardous materials
- manual handling hazards
- knife hazards.

Typical problems include:

- variations in tyres
- contamination of tyres
- damaged tyres.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - impact of incorrect or faulty materials
  - production workflow sequences and materials demand
  - focus of operation of work systems and equipment
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures
  - purpose of the buffing and repair processes
  - changes in tyre texture and dimensions at each stage of the process
  - characteristics of retreaded tyres in relation to the impact of the production process on product quality

- identify requirements for checking
  - casing size
  - buffing head contact pressure
  - construction
  - tyre inflation
  - compound
  - contour template
  - defects in casing
- recognise pre-cure retreads and cured recaps, remould retreads and the relevant procedures to buff casings for each type
- distinguish between causes of faults such as:
  - wrong raw materials
  - inappropriate blade selection
  - insufficient or too deep buffing
  - previously damaged tyre.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

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Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
1	2	2	1	1	1	2

UNIT TITLE

PMBPROD267A - Operate steel cutting equipment

UNIT DESCRIPTOR

This competency covers the operation of equipment for cutting steel belts and beads as used in the tyre industry and the resolving of routine problems to procedure.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake the routine operation of steel cutting equipment. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- monitoring steel cutting equipment operation and reporting process variations
- checking product for quality and conformity to specifications
- discarding non-conforming products, ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check raw materials are correct 2.3. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Start machine safely and correctly when required 3.2. Check process is within required limits 3.3. Collect products and store as required 3.4. Check product is in specification/to required quality standard 3.5. Maintain supply of material(s) as required 3.6. Complete logs and records when required 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean up equipment and work area in accordance with procedures 3.9. Pause equipment or shut down equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to all steel cutting operations within the tyre sector. It includes the operation of all relevant additional equipment where that equipment is integral to the steel cutting process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- steel bias cutter, shearer cutter, metallic cutter, universal cutter
- hand tools used in the steel cutting process
- material loading equipment used for loading and unloading of materials
- relevant personal protective equipment.

Typical hazards include:

- hazardous substances
- moving equipment
- manual handling hazards.

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Typical process problems include:
- ν equipment malfunction
- ν variations in temperature, pressure, speed
- ν variations in materials or contamination of materials.

Typical product problems include:
- ν machine malfunction
- ν tooling problems
- ν variations in materials and/or contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:
- ν apply and/or explain:
  - operation of steel cutting equipment and components
  - production workflow sequences and materials demand
  - reasons for checking process control panels and reporting readings which do not conform to the work instructions
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures
- ν plan own work including predicting consequences and identifying improvements
- ν monitor equipment operation and product quality
- ν identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- ν identify and describe own role and role of others involved directly in the steel cutting process
- ν identify factors which may affect product quality or production output and appropriate remedies

- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine steel cutting problems such as:
  - incorrect quantity of materials
  - contaminated materials/additives
  - equipment faults
  - wrong raw materials/additives
  - machine failure.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- steel cutting production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

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Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	2

UNIT TITLE

PMBPROD268A - Operate bead coiling equipment

UNIT DESCRIPTOR

This competency covers the operation of bead coiling equipment and the resolving of routine problems to procedure.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake the routine operation of bead coiling equipment. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- monitoring bead coiling equipment operation and reporting process variations
- checking product for quality and conformity to specifications
- discarding non-conforming products ensuring discarded materials are reused where possible, and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check raw materials are correct 2.3. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Start machine safely and correctly when required 3.2. Check process is within required limits 3.3. Collect products and store as required 3.4. Check product is in specification/to required quality standard 3.5. Maintain supply of material(s) as required 3.6. Complete logs and records when required 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean up equipment and work area in accordance with procedures. 3.9. Pause equipment or shut down equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to all bead coiling operations within the rubber sector. It includes the operation of all relevant additional equipment where that equipment is integral to the bead coiling process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- spiral layer, band builder, johnstone slitter, apexer
- hand tools used in the bead coiling process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

Typical hazards include:

- spills
- slip and fall
- hazardous substances
- moving equipment
- manual handling hazards.

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Typical process problems include:

- equipment malfunction
- variations in temperature, pressure, speed, injection
- variations in materials or contamination of materials.

Typical product problems include:

- routine bead coiling faults
- machine malfunction
- variations in materials and/or contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - operation of bead coiling equipment and components
  - production workflow sequences and materials demand
  - reasons for checking process control panels and reporting readings which do not conform to the work instructions
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the bead coiling process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements

- distinguish between possible causes of routine bead coiling faults such as:
  - incorrect quantity of materials
  - contaminated materials/additives
  - equipment faults
  - wrong raw materials/additives
  - machine failure.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- bead coiling production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

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KEY COMPETENCIES						
1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

UNIT TITLE

PMBPROD270A - Operate injection blow moulding equipment

UNIT DESCRIPTOR

This competency covers the operation of injection blow moulding equipment and the resolving of routine problems to procedure.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake the routine operation of injection blow moulding equipment. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- monitoring injection blow moulding equipment operation and reporting process variations
- checking product for quality and conformity to specifications
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check raw materials are correct 2.3. Undertake other pre-start checks in accordance with procedures 2.4. Start up equipment safely and 'dry run' to warm hydraulics and components to operating temperature before production, as required.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Check condition of equipment and introduce raw materials as required by procedures 3.2. Check product/process is within required limits 3.3. Collect products and store as required 3.4. Check product is in specification/to required quality standard 3.5. Maintain supply of material(s) as required 3.6. Complete logs and records when required 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean up equipment and work area in accordance with procedures 3.9. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to all injection blow moulding operations within the plastics and rubber sectors. It includes the operation of all relevant additional equipment where that equipment is integral to the injection blow moulding process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- electrical, pneumatic, mechanical, electromechanical and hydraulic injection blow moulding machines and components such as base, frame, feed hoppers and material supply mechanisms, barrel and screw plastification unit, injection blow units, die/mould tool
- additional equipment including chillers/cooling towers, die heating equipment, hopper driers, mixing hoppers, dehumidifying driers, air compressors, dosing machines, colour blending equipment and conveyors
- hand tools used in the injection blow moulding process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

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Typical hazards include:

- spills
- dusts/vapours
- slip and fall, particularly due to spilt granules
- temperature
- hazardous substances
- moving equipment
- manual handling hazards.

'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:

- ν equipment malfunction
- ν variations in temperature, pressure, speed, inflation
- ν variations in materials or contamination of materials
- ν mould damage.

Typical product problems include:

- ν routine injection blow moulding faults - wall thinning, holes, poor surface finish, warping, poor colour dispersion, ejection damage, colour contamination, black spots and other defects
- ν machine malfunction
- ν mould/tooling problems
- ν variations in materials and/or contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- ν apply and/or explain:
  - operation of injection blow moulding equipment and components
  - production workflow sequences and materials demand
  - reasons for checking process control panels and reporting readings which do not conform to the work instructions
  - purpose and requirements of 'dry running' before starting production
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures

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- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the injection blow moulding process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine injection blow moulding faults such as:
  - contaminated materials/additives
  - equipment faults
  - mould damage
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - machine failure.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- injection blow moulding production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed for a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

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UNIT TITLE

PMBPROD280A - Operate resin-glass depositor equipment

UNIT DESCRIPTOR

This competency covers the operation of automated resin–glass depositor (chopper gun) equipment for composite products and the resolving of routine problems to procedure in the production process.

Note that the manufacture of products using hand operated resin glass depositor is covered in PMB PROD 380 A.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake the routine operation of automated resin-glass depositor equipment. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- monitoring equipment operation and reporting process variations
- checking product for quality and conformity to specifications
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety equipment and guards are in position and working 2.2. Check operation of resin-glass depositor equipment 2.3. Check moulds for cracks, chips, marks and cleanliness 2.4. Check materials, including fibre preforms, resins, additives and release agents are correct 2.5. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Start machine safely and correctly when required 3.2. Check process is within required limits 3.3. Collect products and store as required 3.4. Check product/process is in specification/to required quality standard 3.5. Maintain supply of material(s) as required 3.6. Complete logs and records when required 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean up equipment and work area in accordance with procedures 3.9. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to the operation of automated resin-glass depositor equipment including moulds, depositor arm and controller, pumps and programmable logic controllers (PLCs) if fitted.

It includes the operation of all relevant additional equipment where that equipment is integral to the process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- moulds
- resin pumps, fibre feed and fittings, such as hoses and couplings
- controller, such as PLC if fitted
- hand tools used in the this process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

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Typical hazards include:
- spills
- dusts/vapours
- slip and fall
- temperature
- hazardous substances
- moving equipment
- manual handling hazards.

'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:
- equipment malfunction
- resin and fibre over or under supplied to mould
- variations in process conditions
- variations in materials or contamination of materials
- equipment, tool or mould damage.

Typical product problems include:
- routine product faults
- machine malfunction
- mould/tooling problems
- variations in materials and/or contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:
- apply and/or explain:
  - operation of automated resin-glass depositor equipment and components
  - production workflow sequences and materials demand
  - reasons for checking process control panels and reporting readings which do not conform to the work instructions
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures

- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine faults such as:
  - incorrect quantity of materials
  - contaminated materials/additives
  - equipment faults
  - mould damage
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - machine failure.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is required to the level of reading tables of figures and graphs (and applying the resultant information), using formula percentages/ratios to determine the required mass of an additive (catalyst, pigment etc.) for a given amount of resin, and similar manipulations and interpretation.

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Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	1	1	1	1

UNIT TITLE

PMBPROD281A - Finish composite products

UNIT DESCRIPTOR

This competency covers the finishing operations for composite products and the resolving of routine problems to procedure.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are involved in the finishing operations for products made from composite materials. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- setting up materials and equipment
- using appropriate equipment and consumables
- comparing resultant finish, fit and product integrity with specifications
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- discarding non-conforming products, ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Prepare equipment and materials.	2.1. Check tools, equipment, jigs, fixtures, measuring devices are to requirements 2.2. Check that products, components and consumables are available 2.3. Ensure safety equipment is available and fit for use 2.4. Identify non-conformances and report as required.

ELEMENT	PERFORMANCE CRITERIA
3. Assemble and finish products.	3.1. Assemble and join components as required by specifications 3.2. Prepare surfaces to procedures 3.3. Make adjustments as required to meet specifications 3.4. Check surface alignment, appearance and surface preparation against specifications throughout the process 3.5. Use relevant testing methods to ensure conformity with specifications 3.6. Clean up equipment when finishing operation is completed.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency unit includes the processes required to assemble and finish, including alignment to ensure appearance is as required and surface quality meets specifications. It includes the operation of all relevant additional equipment where that equipment is integral to the finishing process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- hand finishing tools, scrapers, sandpaper, buffs and polishes
- power tools (including drills and routers)
- supporting fixtures and jigs
- relevant personal protective equipment.

Typical finishing processes include:

- joining
- fairing
- repairing faults.

Typical materials include:

- glues, solvents, sealers
- nuts and bolts, rivets, and other fasteners.

Typical hazards include:

- dusts/vapours
- hazardous substances
- moving equipment
- manual handling hazards.

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Typical problems include:

- product or components warped
- surface defects
- equipment wear and breakage
- over use of tools, requiring rework.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - requirements of completed product
  - application of joining process
  - fairing process
  - surface finish measurement techniques
  - measurements required to meet specifications
  - production workflow sequences and materials demand
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task

- distinguish between possible causes of routine finishing faults such as:
  - incorrect quantity of materials
  - contaminated materials/additives
  - wrong raw materials/additives
  - incorrect quantity of materials/additives.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel.

Consistent performance should be demonstrated. In particular look to see that :

- finishing production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

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Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

UNIT TITLE

PMBPROD282A - Assemble mould

UNIT DESCRIPTOR

This competency covers the assembling and dismantling of moulds.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are involved in assembling moulds for production of products, typically in the rotational moulding sector. The key factors are the selection of correct mould parts, assembling of the mould and dismantling of mould after production. It includes:

- checking job sheets for work to be done
- setting up moulds
- dismantling moulds and replacing worn parts
- maintaining mould part stock controls.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify the type of product required 1.2. Check for any special requirements 1.3. Recognise mould parts required 1.4. Interpret mould and part dimensions. 1.5. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Assemble mould.	2.1. Select and check required mould parts 2.2. Use correct mould setup jig 2.3. Assemble mould as per procedures 2.4. Check position of mould in relation to rest of machine 2.5. Check mould will open and close 2.6. Apply release agent 2.7. Check breather/vent system for safe functioning 2.8. Pack breather/vent system with material to avoid spillages.
3. Dismantle mould.	3.1. Use correct mould dismantling jig 3.2. Dismantle mould as per work instructions 3.3. Strip mould of release agent 3.4. Clean mould to remove contaminants in accordance with procedures 3.5. Dry out mould 3.6. Store mould parts in appropriate place.
4. Identify and replace worn parts.	4.1. Identify worn parts 4.2. Check condition of other mould parts 4.3. Replace worn mould parts 4.4. Record details of worn parts.

ELEMENT	PERFORMANCE CRITERIA
5. Maintain mould part stocks.	5.1. Check stocks of spare parts 5.2. Advise supervisor of stock required, parts used and date of completed mould.

RANGE OF VARIABLES:

This competency applies to all work environments and sectors within rotational moulding, polyurethane, composites and thermoforming where moulds are used. It includes the operation of all relevant additional equipment where that equipment is integral to the moulding process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include, but are not limited to:

- assembling cast and prefabricated moulds (typically made from metal or composite materials)
- use of hand tools as required
- interpretation of production schedules/ work cards as appropriate.

This competency includes tools and equipment such as:

- handling aid such as handcarts, hoists, jigs and gantries
- pedestrian forklifts
- hoists, jigs and gantries
- powered equipment/aids such as sanders and sand blasting equipment
- relevant personal protective equipment.

It does not cover the use of equipment requiring special licences.

Typical hazards include:

- noise, light, energy sources
- humidity, air temperatures, radiant heat
- stationary and moving machinery, parts or components
- manual handling hazards.

Typical problems include:

- matching moulds to production requirements
- servicing of moulds
- recognition of parts requiring replacement
- selection of correct parts for replacement.

All operations are performed in accordance with procedures.

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EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- describe:
  - different mould part types
  - types of releasing agents
  - role of releasing agents
  - procedures
- plan own work including predicting consequences and identifying improvements
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of problems such as:
  - use of incorrect mould parts
  - incorrect positioning of mould parts
  - worn/damaged mould parts.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel.

Consistent performance should be demonstrated. In particular look to see that :

- production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

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UNIT TITLE

PMBPROD283A - Demould product

UNIT DESCRIPTOR

This competency covers the removal of products from moulds.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are involved in the removal of products from moulds, typically in the rotational moulding sector. It includes:

- identifying the type of product to be made
- opening the mould and removing the product
- visually checking the product for faults.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check production schedule.	1.1. Identify type of product required 1.2. Interpret product specifications.
2. Demould product.	2.1. Open mould 2.2. Remove product in accordance with procedures 2.3. Clean surface of mould and apply release agent as required.
3. Identify problems.	3.1. Check product against specifications 3.2. Identify product faults from visual inspection 3.3. Report product faults to designated person.

RANGE OF VARIABLES:

This competency applies to all work environments and sectors within rotational moulding, polyurethane, composites and thermoforming where moulds are used. It includes the operation of all relevant additional equipment where that equipment is integral to the process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- use of handling aid such as handcarts, hoists, jigs and gantries
- pedestrian forklift
- hand tools
- relevant personal protective equipment.

Typical hazards include:
- handling moulds/products not cooled properly
- manual handling
- noise, light, energy sources
- humidity, air temperatures, radiant heat
- stationary and moving machinery, parts or components.

Typical problems include:
- badly prepared mould
- malformed product
- removing product without damaging mould or product.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:
- apply and/or describe:
  - correct temperature for demoulding products
  - demoulding procedures
- plan own work including predicting consequences and identifying improvements
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of problems such as:
  - leakage/spillage of raw materials
  - incorrect quantity of materials
  - contaminated materials/additives
  - equipment faults
  - mould damage
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - machine failure.

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Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel.

Consistent performance should be demonstrated. In particular look to see that :

- production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
1	1	1	2	1	1	1

UNIT TITLE

PMBPROD284A - Operate open flame moulding equipment

UNIT DESCRIPTOR

This competency covers the operation of open flame moulding equipment and the resolving of routine problems to procedure.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are involved in the operation of open flame moulding equipment and monitoring production. The key factors are the monitoring of the production process and identifying routine problems. It includes:

- checking job sheets for work to be done
- conducting pre-start checks of setup
- starting up and shutting down of equipment
- monitoring equipment during production process
- resolving routine production problems and notifying appropriate persons of non-routine problems.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Recognise hazards and adopt steps required to ensure safety 1.3. Identify quantity and quality of product required and any special requirements 1.4. Examine process control cards to identify adjustments and operating parameters 1.5. Identify procedures for obtaining raw materials. 1.6. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check setup speed and ratios for rotation according to specification sheets 2.3. Check raw materials for conformity to specifications 2.4. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Start machine safely and correctly when required 3.2. Check product/process is within required limits 3.3. Collect products and store as required 3.4. Check mould to ensure it is rotating on axes at correct speed 3.5. Monitor control panel in accordance with procedures/work instructions 3.6. Check product is in specification/to required quality standard 3.7. Maintain supply of material(s) as required 3.8. Complete logs and records when required 3.9. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.10. Clean up equipment and work area in accordance with procedures 3.11. Shut down machine safely and correctly in accordance with procedures/work instructions.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to all work environments within the rotational moulding sector. It includes the operation of all relevant additional equipment where that equipment is integral to the flame rotational moulding process.

This competency unit includes the use of 'rock and roll' as well as rotating type machines.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- hand tools as required
- interpretation of production schedules/work cards as appropriate
- relevant personal protective equipment.

Typical hazards include:

- noise, light, energy sources
- humidity, air temperatures, radiant heat
- stationary and moving machinery, parts and components.

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Routine problems include:

- equipment
  - blockages in gas burner
  - mould incorrectly placed on machine
- process
  - even temperatures
  - temperature profiles
- product
  - wall thickness profile
  - too thick/too thin product.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or describe:
  - differences between LPG and natural gas
  - different types of raw materials used
  - range of products made using this method
  - component parts of open flame moulding equipment
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the flame rotational moulding process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements

- distinguish between possible causes of routine faults such as:
  - incorrect quantity of materials
  - contaminated materials/additives
  - equipment faults
  - mould damage
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - machine failure.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

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KEY COMPETENCIES						
1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

UNIT TITLE

PMBPROD287A - Weld plastics materials

UNIT DESCRIPTOR

This competency covers the manual welding of plastics materials to specification using manual techniques and hand held equipment.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are involved in the welding of plastic pipe and fabricated products to a product specification, maintaining personal safety and the safety of others within the context of production output and quality requirements. The key factors are the understanding of the processes used to weld plastics materials to form a homogenous joint created by a melt of plastics materials. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- setting up equipment
- preparing materials as required
- ensuring that safety procedures are applied to reduce the risks.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Identify required materials and equipment.	1.1. Identify work requirements from production plan 1.2. Identify quantity and quality of product required and any special requirements including welding specifications 1.3. Interpret plans, patterns, designs or product specifications 1.4. Recognise hazards and steps required to ensure safety 1.5. Plan sequence of welding operations for the whole process to ensure work follows a logical procedure 1.6. Check with supervisor/appropriate person if requirements are not in accordance with usual practice 1.7. Examine process requirements to identify suitability of plastics materials for manual welding operations.
2. Set up equipment and materials.	2.1. Set up tools and equipment ready for production 2.2. Locate materials, patterns and consumables 2.3. Ensure safety equipment is available and fit for use 2.4. Identify non-conformances and report as required.
3. Prepare plastics materials or components for welding.	3.1. Cut components to pattern to assemble for welding processes 3.2. Remedy faults and non-conformances by correcting assembly for welding or adjusting clamps and jigs equipment as required 3.3. Collect material which is able to be recycled or reused, separate and dispose of waste and scrap.

ELEMENT	PERFORMANCE CRITERIA
4. Weld to specification.	4.1. Organise materials prior to welding 4.2. Weld materials to specification, using required welding techniques to procedures.
5. Identify problems.	5.1. Check finished welds or products against specifications 5.2. Identify and record variations of product from normal 5.3. Identify routine equipment or process causes of failure in accordance with procedures 5.4. Recognise problems during welding which are not routine 5.5. Report instances of non-routine problems to designated person.

RANGE OF VARIABLES:

This competency unit includes the processes required to weld plastic pipe and materials to specified requirements, including cutting and assembling components, welding and finishing of joint or component to a required standard.

Materials may be from a range of thermoplastic materials for which a compatible welding polymer rod or filler can be provided to form a homogeneous melt. The material may be in any form: sheet, pipe, formed tube, solid section, formed profile, etc.

It also includes the operation of hot air and other hand held welding equipment of various types and all relevant ancillary equipment.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- power saws, jig saws, band saws, bending or forming devices
- welding equipment
- hand tools as required
- relevant personal protective equipment.

Typical hazards include:

- fumes from overheating or poor ventilation
- cuts from sharp edges on components
- burns from manual handling
- eye injury
- power tools, leads and power supplies
- welding equipment, parts and attachments.

Routine problems include:

- pattern incorrect or inaccurate assembly or clamping
- incorrect filler rods selected
- poor surface preparation
- incorrect selection of welding nozzle or attachments
- moisture contacting welding devices
- burns to electrical leads
- sequencing problems, weld run too fast or too slow
- bonding problems, weld deposit incomplete or plastication not achieved.

All operations are performed in accordance with procedures and work instructions.

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EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production of welded plastic joints or components.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - different types of materials and their behaviour when prepared and welded
  - different welding equipment and procedures and suitability for materials
- identify:
  - control of equipment used in welding
  - types of welders used
- list and describe:
  - routine faults in products
  - routine problems in process
- distinguish between causes of faults such as:
  - materials
  - changes to materials during the welding process
  - equipment – adjustments/setup
  - equipment – maintenance requirements.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- welding production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required to interpret specifications and make measurements.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	1	2	2	2

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UNIT TITLE

PMBPROD290A - Operate filament winding equipment

UNIT DESCRIPTOR

This competency covers the operation of filament winding equipment for composite products and the resolving of routine problems to procedure in the production process.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake the routine operation of filament winding equipment. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- monitoring equipment operation and reporting process variations
- checking product for quality and conformity to specifications
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check materials, including filament, resins, additives and release agents are correct 2.3. Check the mandrel is correct and set up as required 2.4. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Start machine safely and correctly when required 3.2. Check process is within required limits 3.3. Collect products and store as required 3.4. Check product/process is in specification/to required quality standard 3.5. Maintain supply of material(s) as required 3.6. Complete logs and records when required 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean up equipment and work area in accordance with procedures 3.9. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to the operation of filament winding equipment used to manufacture filament wound composite products. It includes the operation of all relevant additional equipment where that equipment is integral to the process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- filament winding equipment and its major components
- hand tools used in the this process
- material loading equipment used for loading of filament spools and resins
- relevant personal protective equipment.

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Typical hazards include:
- spills
- dusts/vapours
- slip and fall
- temperature
- hazardous substances
- moving equipment
- manual handling hazards.

'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:
- equipment malfunction
- variations in process conditions
- variations in materials or contamination of materials
- equipment, tool, die damage.

Typical product problems include:
- routine product faults
- machine malfunction
- mould/tooling problems
- variations in materials and/or contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:
- apply and/or explain:
  - operation of filament winding equipment and components
  - production workflow sequences and materials demand
  - reasons for checking process control panels and reporting readings which do not conform to the work instructions
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures

- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine faults such as:
  - incorrect quantity of materials
  - contaminated materials/additives
  - equipment faults
  - mould/mandrel/die/tool damage
  - incorrect or non-conforming winding pattern
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - machine failure.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

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Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is required to the level of reading tables of figures and graphs (and applying the resultant information), using formula percentages/ratios to determine the required mass of an additive (catalyst, pigment etc.) for a given amount of resin, and similar manipulations and interpretation.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	1	1	1	1

UNIT TITLE

PMBPROD291A - Operate resin infusion moulding equipment

UNIT DESCRIPTOR

This competency covers the operation of resin infusion moulding equipment and the resolving of routine problems to procedure in the production process.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake the routine operation of resin infusion moulding equipment. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- monitoring equipment operation and reporting process variations
- checking product for quality and conformity to specifications
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check moulds, closures and fittings to procedures 2.3. Check moulds for cracks, chips, marks and cleanliness 2.4. Check materials, including fibre preforms, resins, additives and release agents are correct 2.5. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Start machine safely and correctly when required 3.2. Check process is within required limits 3.3. Collect products and store as required 3.4. Check product/process is in specification/to required quality standard 3.5. Maintain supply of material(s) as required 3.6. Complete logs and records when required 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean up equipment and work area in accordance with procedures 3.9. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to the operation of resin infusion moulding equipment including moulds, pumps and programmable logic controllers (PLC) if fitted.

It includes the operation of all relevant additional equipment where that equipment is integral to the process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- Moulds
- vacuum pumps and fittings, such as hoses and couplings
- controller, such as PLC if fitted
- hand tools used in the this process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

Typical hazards include:

- spills
- dusts/vapours
- slip and fall
- temperature
- hazardous substances
- moving equipment
- manual handling hazards.

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'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:

- equipment malfunction
- resin, over or under supplied to mould
- variations in process conditions, especially temperature variations affecting cure rate
- variations in materials or contamination of materials
- equipment, tool, die or mould damage.

Typical product problems include:

- routine product faults
- machine malfunction
- mould/tooling problems
- variations in materials and/or contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - operation of resin infusion moulding equipment and components
  - production workflow sequences and materials demand
  - reasons for checking process control panels and reporting readings which do not conform to the work instructions
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies

- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine faults such as:
  - incorrect quantity of materials
  - contaminated materials/additives
  - equipment faults
  - mould damage
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - machine failure.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- production standards are met consistently
- upstream and down stream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

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Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	1	1	1	1

UNIT TITLE

PMBPROD292A - Operate pultrusion equipment

UNIT DESCRIPTOR

This competency covers the operation of pultrusion equipment for composite products and the resolving of routine problems to procedure in the production process.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake the routine operation of pultrusion equipment. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- monitoring equipment operation and reporting process variations
- checking product for quality and conformity to specifications
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check dies, closures and fittings to procedures 2.3. Check materials, including fibre reinforcement, resins, additives and release agents are correct 2.4. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Start machine safely and correctly when required 3.2. Check process is within required limits 3.3. Collect products and store as required 3.4. Check product/process is in specification/to required quality standard 3.5. Maintain supply of material(s) as required 3.6. Complete logs and records when required 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean up equipment and work area in accordance with procedures 3.9. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to the operation of pultrusion equipment used to manufacture formed composite products.

It includes the operation of all relevant additional equipment where that equipment is integral to the process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- pultrusion equipment, dies, feed and product handling gear
- controller, such as PLC if fitted
- hand tools used in the this process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

Typical hazards include:

- spills
- dusts/vapours
- slip and fall
- temperature
- hazardous substances
- moving equipment
- manual handling hazards.

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'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:

- equipment malfunction
- variations in process conditions, especially temperature variations affecting cure rate
- variations in materials or contamination of materials
- equipment, tool, die or mould damage.

Typical product problems include:

- routine product faults
- machine malfunction
- die problems
- variations in materials and/or contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - operation of pultrusion equipment and components
  - production workflow sequences and materials demand
  - reasons for checking process control panels and reporting readings which do not conform to the work instructions
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance

- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine faults such as:
  - incorrect quantity of materials
  - contaminated materials/additives
  - equipment faults
  - die damage
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - machine failure.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- production standards are met consistently
- upstream and down stream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is required to the level of reading tables of figures and graphs (and applying the resultant information), using formula percentages/ratios to determine the required mass of an additive (catalyst, pigment etc.) for a given amount of resin, and similar manipulations and interpretation.

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Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	1	1	1	1

UNIT TITLE

PMBPROD293A - Operate vacuum bagging equipment

UNIT DESCRIPTOR

This competency covers the operation of vacuum bagging equipment for composite products and the resolving of routine problems to procedure in the production process.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake the routine operation of vacuum bagging equipment. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- monitoring equipment operation and reporting process variations
- checking product for quality and conformity to specifications
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check moulds, vacuum bag, closures and fittings to procedures 2.3. Check moulds for cracks, chips, marks and cleanliness 2.4. Check materials, including fibre preforms, resins, additives and release agents are correct 2.5. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Start machine safely and correctly when required 3.2. Check process is within required limits 3.3. Collect products and store as required 3.4. Check product/process is in specification/to required quality standard 3.5. Maintain supply of material(s) as required 3.6. Complete logs and records when required 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean up equipment and work area in accordance with procedures 3.9. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to the operation of vacuum bagging equipment including moulds, pumps and programmable logic controllers (PLC) if fitted.

It includes the operation of all relevant additional equipment where that equipment is integral to the process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- Moulds
- vacuum pumps and fittings, such as hoses and couplings
- controller, such as PLC if fitted
- hand tools used in the this process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

Typical hazards include:

- spills
- dusts/vapours
- slip and fall
- temperature
- hazardous substances
- moving equipment
- manual handling hazards.

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'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:

- equipment malfunction
- resin, over or under supplied to mould
- variations in process conditions, especially temperature variations affecting cure rate
- variations in materials or contamination of materials
- equipment, tool or mould damage.

Typical product problems include:

- routine product faults
- machine malfunction
- mould/tooling problems
- variations in materials and/or contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - operation of vacuum bagging equipment and components
  - production workflow sequences and materials demand
  - reasons for checking process control panels and reporting readings which do not conform to the work instructions
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies

- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine faults such as:
  - incorrect quantity of materials
  - contaminated materials/additives
  - equipment faults
  - mould damage
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - machine failure.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- production standards are met consistently
- upstream and down stream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is required to the level of reading tables of figures and graphs (and applying the resultant information), using formula percentages/ratios to determine the required mass of an additive (catalyst, pigment etc.) for a given amount of resin, and similar manipulations and interpretation.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

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Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	1	1	1	1

UNIT TITLE

PMBPROD294A - Operate resin transfer moulding equipment

UNIT DESCRIPTOR

This competency covers the operation of resin transfer moulding equipment and the resolving of routine problems to procedure in the production process.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake the routine operation of resin transfer moulding equipment. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- monitoring equipment operation and reporting process variations
- checking product for quality and conformity to specifications
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check moulds, closures and fittings to procedures 2.3. Check moulds for cracks, chips, marks and cleanliness 2.4. Check materials, including fibre preforms, resins, additives and release agents are correct 2.5. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Start machine safely and correctly when required 3.2. Check process is within required limits 3.3. Collect products and store as required 3.4. Check product/process is in specification/to required quality standard 3.5. Maintain supply of material(s) as required 3.6. Complete logs and records when required 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean up equipment and work area in accordance with procedures 3.9. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to the operation of resin transfer moulding equipment including moulds, pumps and programmable logic controllers (PLC) if fitted.

It includes the operation of all relevant additional equipment where that equipment is integral to the process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- moulds
- resin pumps and fittings, such as hoses and couplings
- controller, such as PLC if fitted
- hand tools used in the this process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

Typical hazards include:

- spills
- dusts/vapours
- slip and fall
- temperature
- hazardous substances
- moving equipment
- manual handling hazards.

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'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:

- equipment malfunction
- resin, over or undersupplied to mould
- variations in process conditions, especially temperature variations affecting cure rate
- variations in materials or contamination of materials
- equipment, tool or mould damage

Typical product problems include:

- routine product faults
- machine malfunction
- mould/tooling problems
- variations in materials and/or contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - operation of resin transfer moulding equipment and components
  - production workflow sequences and materials demand
  - reasons for checking process control panels and reporting readings which do not conform to the work instructions
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies

- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine faults such as:
  - incorrect quantity of materials
  - contaminated materials/additives
  - equipment faults
  - mould damage
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - machine failure.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- production standards are met consistently
- upstream and down stream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is required to the level of reading tables of figures and graphs (and applying the resultant information), using formula percentages/ratios to determine the required mass of an additive (catalyst, pigment etc.) for a given amount of resin, and similar manipulations and interpretation.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

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Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	1	1	1	1

UNIT TITLE

PMBPROD295A - Operate composite sheeting equipment

UNIT DESCRIPTOR

This competency covers the operation of composite sheet manufacturing equipment and the resolving of routine problems to procedure in the production process.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake the routine operation of composite sheeting equipment. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- monitoring equipment operation and reporting process variations
- checking product for quality and conformity to specifications
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check profiles, rollers, equipment and fittings to procedures 2.3. Check materials, including fibres, resins, additives and release agents are correct 2.4. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Start machine safely and correctly when required 3.2. Check process is within required limits 3.3. Collect products and store as required 3.4. Check product/process is in specification/to required quality standard 3.5. Maintain supply of material(s) as required 3.6. Complete logs and records when required 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean up equipment and work area in accordance with procedures 3.9. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to the operation of composite sheeting equipment used to manufacture composite material profile sheets used primarily for roofing and cladding.

It includes the operation of all relevant additional equipment where that equipment is integral to the process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- sheeting equipment
- profiles, rollers and sheet handling equipment
- controller, such as PLC if fitted
- hand tools used in the this process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

Typical hazards include:

- spills
- dusts/vapours
- slip and fall
- temperature
- hazardous substances
- moving equipment
- manual handling hazards.

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'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:

- equipment malfunction
- variations in process conditions
- variations in materials or contamination of materials
- equipment, tool, die or mould damage.

Typical product problems include:

- routine product faults
- machine malfunction
- mould/tooling problems
- variations in materials and/or contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - operation of composite sheeting equipment and components
  - production workflow sequences and materials demand
  - reasons for checking process control panels and reporting readings which do not conform to the work instructions
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task

- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine faults such as:
  - incorrect quantity of materials
  - contaminated materials/additives
  - equipment faults
  - profiling rollers damage
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - machine failure.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is required to the level of reading tables of figures and graphs (and applying the resultant information), using formula percentages/ratios to determine the required mass of an additive (catalyst, pigment etc.) for a given amount of resin, and similar manipulations and interpretation.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

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Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	1	1	1	1

UNIT TITLE

PMBPROD296A - Operate centrifugal casting equipment

UNIT DESCRIPTOR

This competency covers the operation of centrifugal casting equipment for composite products and the resolving of routine problems to procedure in the production process.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake the routine operation of centrifugal casting equipment. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- monitoring equipment operation and reporting process variations
- checking product for quality and conformity to specifications
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check moulds, sprays and fittings to procedures 2.3. Check moulds for cracks, chips, marks and cleanliness 2.4. Check materials, including fibres, resins, additives and release agents are correct 2.5. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Start machine safely and correctly when required 3.2. Check process is within required limits 3.3. Collect products and store as required 3.4. Check product/process is in specification/to required quality standard 3.5. Maintain supply of material(s) as required 3.6. Complete logs and records when required 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean up equipment and work area in accordance with procedures 3.9. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to the operation of centrifugal casting equipment for the manufacture of composite products (eg, pipes) including moulds, pumps, sprays and programmable logic controllers (PLC) if fitted.

It includes the operation of all relevant additional equipment where that equipment is integral to the process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- centrifugal casting equipment
- pumps and fittings, such as hoses and couplings
- controller, such as PLC if fitted
- hand tools used in the this process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

Typical hazards include:

- spills
- dusts/vapours
- slip and fall
- temperature
- hazardous substances
- moving equipment
- manual handling hazards.

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'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:
- ν equipment malfunction
- ν variations in process conditions
- ν variations in materials or contamination of materials
- ν equipment, tool or mould damage.

Typical product problems include:
- ν routine product faults
- ν machine malfunction
- ν mould/tooling problems
- ν variations in materials and/or contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:
- ν apply and/or explain:
  - operation of centrifugal casting equipment and components
  - production workflow sequences and materials demand
  - reasons for checking process control panels and reporting readings which do not conform to the work instructions
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures
- ν plan own work including predicting consequences and identifying improvements
- ν monitor equipment operation and product quality
- ν identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- ν identify and describe own role and role of others involved directly in the process
- ν identify factors which may affect product quality or production output and appropriate remedies

- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine faults such as:
  - incorrect quantity of materials
  - contaminated materials/additives
  - equipment faults
  - mould damage
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - machine failure.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- production standards are met consistently
- upstream and down stream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

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Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	1	1	1	1

UNIT TITLE

PMBPROD297A - Operate equipment using moulding compounds

UNIT DESCRIPTOR

This competency covers the operation of equipment using moulding compounds (eg, SMC, BMC, LPMC) to produce composite products and the resolving of routine problems to procedure in the production process.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake the routine operation of equipment using moulding compounds. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- monitoring equipment operation and reporting process variations
- checking product for quality and conformity to specifications
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check moulds, closures and fittings to procedures 2.3. Check moulds for cracks, chips, marks and cleanliness 2.4. Check moulding compounds and other materials are correct 2.5. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Start machine safely and correctly when required 3.2. Check process is within required limits 3.3. Collect products and store as required 3.4. Check product/process is in specification/to required quality standard 3.5. Maintain supply of material(s) as required 3.6. Complete logs and records when required 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean up equipment and work area in accordance with procedures 3.9. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to the operation of equipment using moulding compounds to manufacture composite products including moulds, equipment and programmable logic controllers (PLC) if fitted.

Moulding compounds include:

- SMC - sheet moulding compound
- BMC - bulk moulding compound
- LPMC - low pressure moulding compound.

It includes the operation of all relevant additional equipment where that equipment is integral to the process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- moulds
- moulding equipment, press and closures
- controller, such as PLC if fitted
- hand tools used in the this process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

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Typical hazards include:
- spills
- dusts/vapours
- slip and fall
- temperature
- hazardous substances
- moving equipment
- manual handling hazards.

'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:
- equipment malfunction
- compound, over or under supplied to mould
- variations in process conditions, especially temperature variations affecting cure rate
- variations in materials or contamination of materials
- equipment, tool or mould damage.

Typical product problems include:
- routine product faults
- machine malfunction
- mould/tooling problems
- variations in materials and/or contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:
- apply and/or explain:
  - operation of moulding equipment and components
  - production workflow sequences and materials demand
  - reasons for checking process control panels and reporting readings which do not conform to the work instructions
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures

- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine faults such as:
  - incorrect quantity of materials
  - contaminated materials/additives
  - equipment faults
  - mould damage
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - machine failure.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- production standards are met consistently
- upstream and down stream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (i.e. the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is required to the level of reading tables of figures and graphs (and applying the resultant information), using formula percentages/ratios to determine the required mass of an additive (catalyst, pigment etc.) for a given amount of resin, and similar manipulations and interpretation.

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Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	1	1	1	1

UNIT TITLE

PMBPROD298A - Operate equipment using pre-preg material

UNIT DESCRIPTOR

This competency covers the operation of equipment using pre-preg materials to produce composite products and the resolving of routine problems to procedure in the production process.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to undertake the routine operation of equipment using pre-preg materials. The key factors are the making of products to meet quality standards and workplace requirements. It includes:

- checking job sheets for work requirements
- following approved hazard minimisation procedures for any hazards connected with materials and process, using work instructions, labels and materials safety data sheets, and in accordance with occupational health and safety legislative responsibilities
- monitoring equipment operation and reporting process variations
- checking product for quality and conformity to specifications
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- identifying and taking action on routine process problems
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify work requirements from procedures 1.2. Identify product, materials and equipment requirements for job(s) 1.3. Recognise hazards and adopt steps required to ensure safety 1.4. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check safety gates and guards are in position and working 2.2. Check moulds, closures and fittings to procedures 2.3. Check moulds for cracks, chips, marks and cleanliness 2.4. Check pre-preg materials and other raw materials are correct 2.5. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Start machine safely and correctly when required 3.2. Check process is within required limits 3.3. Collect products and store as required 3.4. Check product/process is in specification/to required quality standard 3.5. Maintain supply of material(s) as required 3.6. Complete logs and records when required 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean up equipment and work area in accordance with procedures 3.9. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency applies to the operation of equipment using pre-preg materials to manufacture composite products. It includes moulds, equipment and programmable logic controllers (PLCs) if fitted.

Processes using pre-preg materials may include vacuum bagging or other closed mould processes.

It includes the operation of all relevant additional equipment where that equipment is integral to the process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- moulds
- moulding equipment and closures
- controllers, such as PLCs if fitted
- hand tools used in the this process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

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Typical hazards include:
- spills
- dusts/vapours
- slip and fall
- temperature
- hazardous substances
- moving equipment
- manual handling hazards.

'Rectify routine problems' means 'apply known solutions to a limited range of predictable problems'.

Typical process problems include:
- equipment malfunction
- poor handling or storage of pre-preg materials
- pre-preg incorrectly supplied to mould
- variations in process conditions, especially temperature variations affecting cure rate
- variations in materials or contamination of materials
- equipment, tool or mould damage.

Typical product problems include:
- routine product faults
- machine malfunction
- mould/tooling problems
- variations in materials and/or contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - operation of moulding equipment and components
  - production workflow sequences and materials demand
  - reasons for checking process control panels and reporting readings which do not conform to the work instructions
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - waste management and importance of reusing non-conforming products wherever possible
  - correct selection and use of equipment, materials, processes and procedures
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine faults such as:
  - incorrect quantity of materials
  - contaminated materials/additives
  - equipment faults
  - mould damage
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - machine failure.

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Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- production standards are met consistently
- upstream and down stream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (i.e. the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is required to the level of reading tables of figures and graphs (and applying the resultant information), using formula percentages/ratios to determine the required mass of an additive (catalyst, pigment etc.) for a given amount of resin, and similar manipulations and interpretation.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	1	1	1	1

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UNIT TITLE

PMBMAINT303B - Identify equipment faults

UNIT DESCRIPTOR

This unit requires the application of planning, technical knowledge and skills to check and isolate routine and non-routine equipment faults used in production and report on the status of equipment. It applies to all sectors of the industry.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the identification and isolation of faults in equipment. The key factors are the planning, checking and identification of routine and non-routine faults, in order to return the equipment to production. It includes:

- identifying and planning scope of equipment checks
- identifying and minimising any hazards connected with materials and process
- checking settings, adjustments and performance of equipment
- checking materials for conformity to job requirements
- identifying and isolating faults in equipment
- proposing solutions and carrying out solutions within scope of authority
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Identify scope of operational check.	1.1. Identify and classify equipment components and operating systems 1.2. Match appropriate tests and procedures to the equipment operating systems 1.3. Identify special test procedures and parameters in manufacturer's specifications and procedures 1.4. Explain the operating principles of hydraulic, pneumatic, mechanical and electrical/electronic systems as related to workplace equipment 1.5. Observe and undertake checks on the physical condition of equipment as per procedures 1.6. Record preliminary observations 1.7. Discuss test procedures with appropriate personnel and obtain necessary permission where required.
2. Plan operational checks.	2.1. Check specifications and notes from preliminary observations and identify areas to be clarified 2.2. Plan testing sequence/s noting areas where results and observations should be recorded 2.3. Identify safe area for testing 2.4. Make arrangements for any additional resources (including other employees).

ELEMENT	PERFORMANCE CRITERIA
3. Check unit through full operational range.	3.1. Undertake testing observing relevant safety and operational requirements 3.2. Confirm results and findings.
4. Identify fault and/or formulate recommendations.	4.1. Identify impact of fault on work schedule 4.2. Record proposals for equipment repair based on faults found, cost/time implications and workplace approval systems 4.3. Explain report to relevant workplace personnel including any options and recommendations 4.4. Undertake repairs where appropriate in accordance with procedures.

RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It does not include maintenance that would require trade level skills. It is not intended that this competency would cover maintenance that is carried on in a workshop.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include, but are not limited to:

- predictive and preventative operational maintenance
- reactive maintenance.

Typical information sources, observed data and plant records may include:

- plant data
- log sheets
- operational and performance reports
- physical aspects such as noise, smell, feel and pressure
- condition monitoring information
- planned maintenance schedules
- standard operating procedures and plant description manuals
- manufacturer's instructions, specifications and service manuals
- machine circuit diagrams for hydraulic/pneumatic and electrical/electronic circuits.

Typical tools and equipment may include:

- hand tools specific for the task
- testing equipment
- measuring and aligning equipment.

All operations are performed in accordance with procedures.

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EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Knowledge and understanding of equipment operation and maintenance practices sufficient to recognise fault and no-fault conditions in standard and non-standard situations and then determine appropriate action which is consistent with operational guidelines is required.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - principles of the operation of the equipment to be maintained
  - functions and troubleshooting of internal components and their problems
  - routine and non-routine causes of equipment failures and the service conditions which may increase maintenance
  - appropriate testing procedures and use of equipment for a range of equipment faults
  - operating principles for mechanical, hydraulic, pneumatic, electrical/electronic systems
  - urgency and timeliness factors in planning maintenance activities in relation to production requirements
- identify and select testing methods based on cost and time effectiveness
- conduct inspections, checks and tests on equipment as appropriate
- read and interpret circuit diagrams for mechanical, hydraulic, pneumatic and electrical/electronic operating systems
- use technical information and manufacturer's information to locate relevant data
- interpret technical specifications and manufacturer's instructions
- ensure workplace is safe for testing and maintenance of equipment
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task.

Critical aspects:

It is essential that the procedures be understood and that the importance of critical operational systems is known. Competence must be demonstrated in the ability to recognise potential situations requiring action and then implement appropriate action.

Consistent performance should be demonstrated. In particular look to see that:

- early warning signs of equipment in need of attention/with potential problems are recognised
- appropriate tests are undertaken and tests are analysed appropriately
- proposals for equipment repair are based upon the most appropriate and cost effective method to return equipment to full performance in a timely manner
- items initiated are followed through until final resolution has occurred.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical equipment specifications schematics and diagrams.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, to the level of calculating equipment throughputs and performance.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

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UNIT TITLE

PMBPREP301B - Set up and prepare for production

UNIT DESCRIPTOR

This competency covers the setup and preparation of materials and equipment for production in the plastics, rubber and cablemaking sectors. It applies to batch, one-off and non-standard production lots.

This competency is typically performed by experienced operators working either independently or as part of a work team.

This unit of competency may be designated for a stream – see the range of variables.

This competency in practice

This competency applies to operators who set up and prepare for the production process. The key factors are checking equipment and materials for conformity to specification and working to a process plan. It includes:

- selecting and checking equipment and materials against specifications
- identifying requirements for special tooling and set up
- drafting a work process plan including objectives and timeframe
- preparing tools, equipment and materials
- setting up, checking and adjusting the production process
- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- correcting materials, equipment or process variations and making appropriate adjustments
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Select equipment and materials.	1.1. Identify equipment and materials from job specification 1.2. Check equipment and materials for conformity to specification 1.3. Note any variances in materials (within materials supplier specifications) which may require variation in production process settings 1.4. Identify requirements for special tooling and set up 1.5. Note conformity deficiencies and report to appropriate personnel 1.6. Identify production objectives and timelines 1.7. Clarify product specifications 1.8. Draft work process plan, noting key quality characteristics, check points and activities where other personnel will be involved.

ELEMENT	PERFORMANCE CRITERIA
2. Prepare tools, equipment and materials.	2.1. Locate tools and equipment within workplace ensuring safety and operational checks are performed and equipment is appropriate for purpose 2.2. Obtain materials specifications and confirm materials are at site for the commencement of production in accordance with established procedures 2.3. Check materials are prepared to achieve product specification.
3. Set up and check production process.	3.1. Follow procedures for setup in accordance with workplace procedures, customer requirements and specifications 3.2. Set machine control parameters in accordance with specifications 3.3. Check work process plan and set up for conformity with identified workplace procedures and customer requirements 3.4. Make any required adjustments to own work plan 3.5. Obtain appropriate clearances for production to commence 3.6. Check equipment for function and make provisional control settings 3.7. Check performance of equipment and materials 3.8. Adjust process settings and materials to ensure production outcomes are within quality specifications 3.9. Make and store records of required adjustments within specification ranges in accordance with workplace procedures.

RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It includes the operation of all relevant ancillary equipment.

Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This unit of competency may be designated for one of the following streams where workers use that unit substantially only in that stream area:

- cablemaking
- blow moulding
- blown film
- calendering
- composites
- compounding
- extrusion
- fabrication
- injection moulding
- polystyrene
- expanded foam polyurethane
- rotational moulding
- thermoforming
- belt splicing
- rubber lining
- tyre manufacture
- tyre retreading
- surface coating.

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This competency includes tools and equipment such as:

- hand carts and trolleys
- hoists/lifting equipment not requiring any special permits or licences
- relevant personal protective equipment.

Typical hazards include:

- spills
- dusts/vapours
- hazardous materials
- manual handling hazards.

Typical problems include:

- variations in materials
- contamination of materials
- faulty functioning of equipment.

Key variables to be monitored include:

- variations in the timing of machine cycles
- variations in the sequence of product availability
- variations in the quality of the raw materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - behaviour of materials in relation to heat, pressure and time
  - quality requirements at each production stage
  - function and operating principles of equipment, machine components and ancillary equipment
  - impact of machine operating parameters on product quality and production output
  - nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which may effect machine operation and product development
- assess operational capabilities of equipment
- predict materials behaviour
- adjust machine parameters
- assess production workflow in relation to focus of operation of work systems and equipment
- identify and correctly use equipment, processes and procedures
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures

- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check equipment for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- select, set up and adjust equipment
- arrange materials supply
- inspect results of checks for equipment and materials performance
- locate, interpret and apply relevant information
- maintain workplace records
- identify and handle products and materials safely, applying safety precautions appropriate to the task
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is also required, eg, to determine quantities required for production run/batch.

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Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

UNIT TITLE

PMBPREP303B - Set up equipment for continuous operation

UNIT DESCRIPTOR

This competency covers setting up equipment for a continuous production run. It applies to processes which are essentially continuous in nature, and standard production processes.

This competency is typically performed by experienced operators working either independently or as part of a work team.

This unit of competency may be designated for a stream – see the range of variables.

This competency in practice

This competency applies to operators who set up equipment for continuous operation. The key factors are production requirements and setting up equipment to match requirements. It includes:

- identifying production requirements and key stages of the process
- setting up equipment and components safely, accurately and in a way that allows production to flow and workers to move safely
- explaining processes to the operator if required
- producing a one-off sample
- observing process outcomes and using them to fine tune the process
- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA

ELEMENT	PERFORMANCE CRITERIA
1. Identify production requirements.	1.1. Read specifications and standard operating procedures for production run and equipment 1.2. Identify materials required 1.3. Note production control requirements for production and warm up time, pressure(s), speed(s), temperature(s) and product specifications 1.4. Note key stages in the process for quality checks 1.5. Identify equipment and components required 1.6. Check assembly requirements for items of production and downstream equipment or specialised componentry to ensure efficient work flow will occur.
2. Set up equipment.	2.1. Check work area to ensure adequate space for the process 2.2. Place equipment and components in required configuration 2.3. Install guards, warning devices and cut-offs as required 2.4. Check all connecting components and services for integrity and effectiveness 2.5. Check dies/moulds/jigs as required for suitability for production requirements 2.6. Place standard operating procedures and quality procedures in appropriate work stations 2.7. Check work area for operator ergonomic efficiency, access and egress requirements.
3. Explain process to operators when required.	3.1. Explain particular requirements for machine adjustments, materials characteristics, quality specifications and key production stages to the operator 3.2. Explain standard operating procedures and any particular occupational health and safety issues are identified 3.3. Identify and explain appropriate contingency strategies for process faults, quality, occupational health and safety issues, materials supply or quality machine malfunctions 3.4. Encourage operators to ask questions and clarify procedures.
4. Produce first-off production sample(s).	4.1. Start process following standard operating procedures 4.2. Observe product quality through process and compare to standards 4.3. Compare machine setting ranges to documented requirements 4.4. Use observations of the process outcomes to fine tune the settings and other production variables 4.5. Check final product for the required standards 4.6. Compare standard operating procedures with actual production run and note variances.
5. Fine tune the process.	5.1. Use information collected during trial to modify workplace documentation including standard operating procedures, machine settings and process instructions 5.2. Obtain appropriate advice and permission where variations are outside of quality or specification range 5.3. Advise operators of variations to process and document as

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ELEMENT	PERFORMANCE CRITERIA
	required.

RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry.

Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include, but are not limited to:

- movement of equipment and components.

This unit of competency may be designated for one of the following streams where workers use that unit substantially only in that stream area:

- cablemaking
- blow moulding
- blown film
- calendering
- composites
- compounding
- extrusion
- fabrication
- injection moulding
- polystyrene
- expanded foam polyurethane
- rotational moulding
- thermoforming
- belt splicing
- rubber lining
- tyre manufacture
- tyre retreading
- surface coating.

This competency includes equipment and tools such as:

- hand carts and trolleys
- hoists/lifting equipment not requiring any special permits or licences
- basic hand tools required for opening of material packaging
- relevant personal protective equipment
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

Typical hazards include:

- inadequate use of guards and warning signs
- manual handling hazards
- hazardous materials
- equipment operations.

Typical problems include:

- variations in materials
- faulty components
- machine malfunction
- variation in product
- contamination of materials
- processing problems.

Key variables to be monitored include:

- variations in the timing of machine cycles
- variations in the sequence of product availability
- variations in the quality of the raw materials
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

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EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - quality requirements at each production stage
  - function and operating principles of equipment, machine components and ancillary equipment
  - impact of machine speed, temperature, pressure, time during cycles on product quality and production output
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- identify impact of mechanical, hydraulic, pneumatic and electrical/electronic principles of the production process
- distinguish particular requirements of products, materials, equipment and production process
- identify likely faults and remedies
- recognise focus of operation of work systems and equipment
- assess production workflow and the relationships with equipment, materials and product storage areas and workplace rosters and order systems
- identify and correctly use equipment, processes and procedures
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- start up equipment and make appropriate adjustments to bring process on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify factors which may affect product quality or production output and appropriate remedies
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify equipment and components by name and operating principles and function, and to locate, interpret and apply relevant information
- maintain workplace records, identify and safely handle products and materials applying safety precautions appropriate to the task
- identify critical materials properties and process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is also required, eg, to determine quantities required for a run.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

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Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	3	3	3	3	3	3

UNIT TITLE

PMBPREP304B - Change equipment dies

UNIT DESCRIPTOR

This competency covers the removal and refitting of dies in preparation for production. It applies typically to the moulding areas of the industry such as injection moulding and blow moulding. This unit does not apply to extrusion dies – use PMBPREP305A *Change Extrusion Die and Calibration Set-up*

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This unit of competency may be designated for a stream – see the range of variables.

This competency in practice

This competency applies to operators who change dies in preparation for the production process. The job involves the die change and the setting of the new die program, and can include nozzle change, screw clean and connection of ancillary equipment. The key factors are the safe and precise removal and installation. It includes:

- planning and preparing the change including informing others
- selecting dies that match product/process specification
- removing, cleaning and storing the existing dies
- fitting the replacement according to specification
- testing the changeover and fine tuning as needed.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare to change dies.	1.1. Follow procedure for machine close-down and for informing relevant personnel. 1.2. Take last-off samples as required for die reports 1.3. Close down machine 1.4. Activate isolating locks, disconnect power and post relevant signage 1.5. Select dies or cores to match product/process specification 1.6. Check relevant equipment for safe, effective operation.
2. Change dies.	2.1. Plan removal process to ensure no damage to self, equipment or others 2.2. Remove, clean and store die according to workplace procedures 2.3. Fit replacement die ensuring that locating devices and marks are matched and securing devices are installed and tightened to specification 2.4. Clean dies and immediate machinery, applying corrosion protection if required.

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ELEMENT	PERFORMANCE CRITERIA
3. Test fitting of dies.	3.1. Restart machine as per procedure 3.2. Check operation of die against product quality specifications 3.3. Compare machine setting ranges against documented requirements 3.4. Check the first off sample for required standards 3.5. Fine tune settings and other production variables as required 3.6. Note variances between standard operating procedures and actual production run 3.7. Complete workplace documentation and report to appropriate personnel.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problems using appropriate solutions within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency unit includes the selection and fitting of dies.

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry which use moulding dies. It includes the operation of all relevant ancillary equipment.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This unit of competency may be designated for one of the following streams where workers use that unit substantially only in that stream area:

- √ cablemaking
- √ blow moulding
- √ blown film
- √ calendering
- √ composites
- √ compounding
- √ extrusion
- √ fabrication
- √ injection moulding
- √ polystyrene
- √ expanded foam polyurethane
- √ rotational moulding
- √ thermoforming
- √ belt splicing
- √ rubber lining
- √ tyre manufacture
- √ tyre retreading
- √ surface coating.

This competency includes tools and equipment such as:

- √ hand carts and trolleys
- √ hoists/lifting equipment not requiring any special permits or licences
- √ basic hand tools
- √ relevant personal protective equipment.

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Typical hazards include:
- ν hazardous materials
- ν manual handling hazards
- ν hot surfaces.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical problems include:
- ν lack of cleaning leading to corrosion
- ν inadequate fitting
- ν fine adjustments to optimise production.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:
- ν apply and/or explain:
  - impact of incorrect or faulty fitting
  - production workflow sequences
  - correct selection and use of equipment and procedures
  - hazards of the removal and fitting process and appropriate hazard control procedures
  - the performance of dies
  - relevant information and workplace records
  - safety precautions appropriate to the task.
- ν distinguish between causes of faults such as:
  - faulty equipment
  - inadequate fitting/adjustment
  - incorrect process variables (eg, temperature, pressure)
- ν plan own work including predicting consequences and identifying improvements
- ν start up equipment and make appropriate adjustments to bring process on line
- ν take samples when required and identify product out of specification
- ν safely shut down equipment in normal or abnormal circumstances
- ν identify and describe own role and role of others involved directly in the process
- ν identify factors which may affect product quality or production output and appropriate remedies
- ν identify hazards of the materials and process
- ν implement appropriate procedures for hazard control
- ν use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task.

Critical aspects:

It is essential that competence is demonstrated in the ability to perform a die-change which will put the injection moulding machine back into full production of in-specification product in standard time.

In particular it is essential that the operator can:

- select, install and check the performance of die and cores
- locate, interpret and apply relevant information
- maintain workplace records
- identify and safely handle products and materials
- apply safety precautions appropriate to the task
- recognise potential situations requiring action and then implement appropriate action.

Consistent performance should be demonstrated. In particular look to see that production standards are met consistently.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

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UNIT TITLE

PMBPREP305A - Change extrusion die and calibration setup

UNIT DESCRIPTOR

This competency covers the removal and refitting of dies, pins, sizing dies (calibrator), vacuum blocks and seals in preparation for production. This competency applies to extrusion, and similar, dies. For all other dies use PMB PREP 304A - *Change equipment dies.*

This competency is typically performed by senior operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are responsible for changing setups to meet the production schedule for an extrusion line process. The setup changes means the work involving the extrusion die and sizing equipment only.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare to change dies or cores.	1.1. Plan process for closing down machinery and inform relevant personnel 1.2. Take last-off samples as required for die reports 1.3. Select dies or cores to match product/process specification.
2. Shut down extruder.	2.1. Stop downstream equipment 2.2. Stop feed, drop temperatures, stop vacuum pump and purge the extruder 2.3. Activate isolating locks, disconnect power to heaters.
3. Change setup.	3.1. Remove, clean and store die according to workplace procedures 3.2. Fit replacement die ensuring that locating devices and marks are matched and securing devices are installed and tightened to specification 3.3. Remove and refit calibrator sleeve and seals 3.4. Set heats according to pre-start procedures.
4. Restart and test-run the new setup.	4.1. Check operation of die against product quality 4.2. Compare machine setting ranges against documented requirements 4.3. Check the first-off sample for required standards 4.4. Fine-tune settings and other production variables as required 4.5. Note variances between standard operating procedures and actual production run 4.6. Complete workplace documentation and report to appropriate personnel.

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RANGE OF VARIABLES:

This competency unit includes the selection and fitting of dies and cores.

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry which use extrusion type dies and cores. It includes the operation of all relevant ancillary equipment.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- √ hand carts and trolleys
- √ hoists/lifting equipment not requiring any special permits or licences
- √ basic hand tools
- √ relevant personal protective equipment.

Typical hazards include:

- √ hazardous materials
- √ manual handling hazards
- √ hot surfaces.

Typical problems include:

- √ lack of cleaning leading to corrosion
- √ inadequate fitting
- √ fine adjustments to optimise production.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- √ apply and/or explain:
  - impact of incorrect or faulty fitting
  - production workflow sequences
  - correct selection and use of equipment and procedures
  - hazards of the removal and fitting process and appropriate hazard control procedures
  - the performance of die and cores
  - relevant information and workplace records
  - safety precautions appropriate to the task
- √ distinguish between causes of faults such as:
  - faulty equipment
  - inadequate fitting/adjustment
  - incorrect process variables (eg, temperature, pressure)
- √ plan own work including predicting consequences and identifying improvements
- √ start up equipment and make appropriate adjustments to bring process on line
- √ take samples when required and identify product out of specification

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- νsafely shut down equipment in normal or abnormal circumstances
- νidentify and describe own role and role of others involved directly in the process
- νidentify factors which may affect product quality or production output and appropriate remedies
- νidentify hazards of the materials and process and take appropriate hazard control
- νuse PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task.

Critical aspects:

It is essential that competence is demonstrated by the setup being performed methodically and smoothly to bring the extrusion line back into full production of in-specification product in standard time.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- νon an operating plant allowing for operation under all normal and a range of abnormal conditions
- νby use of a suitable simulation and/or a range of case studies/scenarios
- νby a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

UNIT TITLE

PMBPROD300A - Produce products

UNIT DESCRIPTOR

This competency covers the operation and adjustment of processes and the solving of non-routine problems. This competency is for enterprise specific processes which are not elsewhere covered in this Training Package.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of processes. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit of competency has the prerequisite of:

- a PROD 200 series unit of competency.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Check process setup.	2.1. Determine equipment requirements 2.2. Set process to specifications as required 2.3. Check equipment settings and adjustments are as required 2.4. Check materials are correct 2.5. Discard, or make adjustments to the process for, non-conforming materials 2.6. Set up date, batch and materials markings to specifications, as required 2.7. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments to the process as required.	3.1. Operate process equipment, noting key variables 3.2. Monitor controls/displays/terminals for production/process data 3.3. Monitor product/process quality in accordance with procedures 3.4. Make adjustments to remedy faults and nonconformity to standard as required 3.5. Maintain continuity of process 3.6. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.7. Clean, adjust and lubricate equipment as required 3.8. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problems using appropriate solutions within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to the operation of enterprise specific processes within the plastics, rubber and cablemaking sectors not covered by more specific units of competency. It includes the operation of all relevant additional equipment where that equipment is integral to the process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- process equipment and its major components
- hand tools used in the process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

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Typical hazards include:
- spills
- dusts/vapours
- slip and fall
- temperature
- hazardous materials
- manual handling hazards
- equipment operations.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems include:
- routine and non-routine product faults
- machine malfunction
- mould/tooling/die problems
- variations in materials and/or contamination of materials
- processing problems.

Key variables to be monitored include:
- temperatures
- speed
- pressures
- colour
- cycle time/process timing
- output rate
- product weight
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:
- apply and/or explain:
  - products, materials and material characteristics
  - behaviour of materials in relation to key process variables
  - quality requirements at each production stage
  - function and operating principles of equipment, machine components and ancillary equipment
  - impact of key process variables on product quality and production output
  - nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which effect machine operation and product development
  - the importance of machine set up and start up procedure up for effective processing of materials

- safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
- the hierarchy of control including engineering controls
- impact of variations in raw materials and equipment operation in relation to final product
- changes to materials at various stages of production
- waste management and importance of non-conforming materials

ν plan own work including predicting consequences and identifying improvements
ν interpret from production requests the correct selection and use of equipment, materials, processes and procedures
ν maintain output and product quality using appropriate instruments, controls, test information and readings
ν make adjustments to equipment operation to rectify variations in equipment operation or product quality
ν check machine for correct set up to job specifications and implement adjustments or report deviations immediately
ν start up equipment and make appropriate adjustments to bring process on line
ν take samples when required and identify product out of specification
ν safely shut down equipment in normal or abnormal circumstances
ν identify and describe own role and role of others involved directly in the process
ν identify factors which may affect product quality or production output and appropriate remedies
ν identify when the operator is able to rectify faults and when assistance is required
ν identify hazards of the materials and process
ν implement appropriate procedures for hazard control
ν use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
ν distinguish between causes of faults such as:

- non-routine faults
- incorrect quantity of materials
- contaminated materials.

Critical aspects:

It is essential that competence is demonstrated in the ability to

ν identify critical materials properties and process characteristics in relation to the process requirements and the end product
ν plan own work process within workplace procedures and explain the reasons for the steps in the process
ν take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

ν production quality and output standards are met consistently
ν problems are anticipated from process observations
ν problems are efficiently resolved
ν the process runs consistently and smoothly.

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Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

UNIT TITLE

PMBPROD301B - Draw wire

UNIT DESCRIPTOR

This competency covers the operation of wire drawing equipment and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of wire drawing equipment. The key factors are the production of product meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine wire drawing equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Check wire drawing process setup.	2.1. Determine equipment requirements 2.2. Check equipment settings and adjustments are as required 2.3. Select appropriate dies (number and sizes) and arrange in correct production sequence 2.4. Identify and check dies, capstans, head, wire reel pack and gears, replacing or maintaining if required 2.5. Coat wire drawing capstan with lubricant to procedures 2.6. Check materials are correct 2.7. Check material spool sizes for conformity with requirements 2.8. Discard, or make adjustments to the process for, non-conforming materials 2.9. Thread new materials checking free operation through dies and secure fixing to reels or spools 2.10. Conduct equipment and component checks to ensure safe and efficient operation in accordance with procedures 2.11. Set up date, batch and materials markings as required 2.12. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments as required to the wire drawing process.	3.1. Operate wire drawing equipment, noting key variables 3.2. Monitor controls/displays/terminals for production/process data 3.3. Monitor product/process quality in accordance with procedures 3.4. Make adjustments to remedy faults and nonconformity to standard as required 3.5. Maintain continuity of process 3.6. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.7. Clean, adjust and lubricate equipment as required 3.8. Complete required workplace documentation/records. 3.9. Pause equipment, or stop equipment in an emergency, following procedures.
4. Shut down equipment.	4.1. Shut down equipment in accordance with procedures 4.2. Complete equipment cleanup, adjustments and waste management in accordance with procedures 4.3. Place suitable guards, locks and notices to prevent inadvertent startup.
5. Respond to problems.	5.1. Identify possible routine and non-routine problems in the equipment, materials or process 5.2. Determine problems needing action 5.3. Determine possible fault causes 5.4. Rectify problems using appropriate solutions within area of responsibility 5.5. Report problems outside area of responsibility to designated person.

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RANGE OF VARIABLES:

This competency applies to the operation of all wire drawing equipment within the plastics, rubber and cablemaking industries. It includes the operation of all relevant additional equipment where that equipment is integral to the wire drawing process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- wire drawing equipment and components including die box, payoff, capstan, internal cooling system, annealer, tinner, accumulator, spooler, main drive, control unit, wire drawing dies (diamond, tungsten, carbide, compax)
- associated equipment including manual handling equipment, pointers, taggers, welders, lubrication system, packaging, measuring equipment
- hand tools used in production process
- relevant personal protective equipment.

Typical hazards include:

- temperature
- hazardous materials
- manual handling hazards
- equipment operations.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical problems include:

- routine and non-routine product wire drawing faults –see Evidence Guide for list
- equipment malfunctions
- processing problems.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - function of wire drawing equipment, equipment components and ancillary equipment
  - impact of die wear and build up, faulty capstan and wire welds on product quality and production output
  - wire drawing manufacturing processes
  - behaviour of materials in relation to speed, temperature and tension
  - safety procedures and the use of PPE in relation to handling materials, equipment

operation and clean up
- changes to materials in wire drawing manufacturing process
- waste management and importance of non-conforming materials

ν plan own work including predicting consequences and identifying improvements
ν interpret from production requests the correct selection and use of equipment, materials, processes and procedures
ν maintain output and product quality using appropriate instruments, controls, test information and readings
ν make adjustments to equipment operation to rectify variations in equipment operation or product quality
ν check wire drawing equipment for correct setup to job specifications and implement adjustments or report deviations immediately
ν start up equipment and make appropriate adjustments to bring process on line
ν take samples when required and identify product out of specification
ν safely shut down equipment in normal or abnormal circumstances
ν identify and describe own role and role of others involved directly in the process
ν identify factors which may affect product quality or production output and appropriate remedies
ν identify when the operator is able to rectify faults and when assistance is required
ν identify hazards of the materials and process
ν implement appropriate procedures for hazard control
ν use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
ν distinguish between causes of faults such as
- incorrect diameter, ovality, surface appearance, colour, inclusions, elongation, tensile strength, weight, wrap
- wire breaks – raw material contamination, die wear, die buildup, faulty capstan bands, faulty wire welds,
- raw material contamination, die wear, die build up, faulty capstan bands, faulty wire welds
- incorrect quantity of materials
- equipment malfunction.

Critical aspects:

It is essential that competence is demonstrated in the ability to

ν identify critical materials properties and wire drawing process characteristics in relation to the process requirements and the end product
ν plan own work process within workplace procedures and explain the reasons for the steps in the process
ν take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

ν production quality and output standards are met consistently
ν problems are anticipated from process observations
ν problems are efficiently resolved
ν the process runs consistently and smoothly.

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Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

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UNIT TITLE

PMBPROD302B - Bunch and strand wire

UNIT DESCRIPTOR

This competency covers the operation of wire bunching and stranding equipment and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement..

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of wire bunching and stranding equipment. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with procedures
- solving routine and non-routine wire bunching and stranding equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Check wire bunching and stranding process setup.	2.1. Determine equipment requirements 2.2. Set process to specifications as required 2.3. Select appropriate dies (number and sizes) and arrange in correct production sequence 2.4. Check wire bunching and stranding equipment settings and adjustments including tension, die number, sizes and threading arrangements are as required 2.5. Check materials are correct 2.6. Discard, or make adjustments to the process for, non-conforming materials 2.7. Set up date, batch and materials markings to specifications, as required 2.8. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments as required to the wire bunching and stranding process.	3.1. Set up wire bunching and stranding equipment to procedures 3.2. Load materials to procedures 3.3. Start up equipment and make adjustments to reach required settings 3.4. Monitor controls/displays/terminals for production/process data 3.5. Monitor product/process quality in accordance with procedures 3.6. Maintain continuity of process 3.7. Make adjustments to remedy faults and nonconformity to standard as required 3.8. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.9. Complete required workplace documentation/records. 3.10. Clean, adjust and lubricate equipment as required 3.11. Pause equipment, or stop equipment in an emergency, following procedures.
4. Shut down equipment.	4.1. Shut down equipment to procedures 4.2. Complete equipment cleanup, adjustments and waste management to procedures 4.3. Place suitable guards, locks and notices to prevent inadvertent startup.
5. Respond to problems.	5.1. Identify possible routine and non-routine problems in the equipment, materials or process 5.2. Determine problems needing action 5.3. Determine possible fault causes 5.4. Rectify problems using appropriate solutions within area of responsibility 5.5. Report problems outside area of responsibility to designated person.

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RANGE OF VARIABLES:

This competency applies to all wire bunching and stranding within the plastics, rubber and cablemaking industries. It covers single and multiple stranded cable. It includes the operation of all relevant additional equipment where that equipment is integral to the wire bunching and stranding process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- wire bunching and stranding equipment and components including dies, threading path, spools, gears, etc
- associated equipment including manual handling equipment, welders, lubrication system, packaging, measuring equipment
- hand tools used in production process
- relevant personal protective equipment.

Typical hazards include:

- temperature
- wire breakages
- hazardous materials
- manual handling hazards
- equipment operations.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical problems include:

- routine and non-routine wire bunching and stranding quality faults - see Evidence Guide for list
- equipment malfunctions
- processing problems.

Key variables to be monitored include:

- equipment operating speed
- time
- tension
- wind off speed
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - wire bunching and stranding manufacturing processes
  - function of wire bunching and stranding equipment, equipment components and ancillary equipment
  - why multiple strand wires are used and the purpose of armouring and annealing wires
  - the changes in materials in each stage of the production process
  - behaviour of materials in relation to speed, temperature and tension
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - changes to materials in wire bunching and stranding manufacturing process
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check wire bunching and stranding equipment for correct set up to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- take measurements when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task

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- distinguish between causes of faults such as
  - incorrect diameter, ovality, surface appearance, colour, inclusions, elongation, tensile strength, weight, wrap
  - wire breaks – raw material contamination, die wear, die buildup, faulty capstan bands, faulty wire welds
  - raw material contamination
  - incorrect quantity of materials
  - equipment malfunction.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and wire bunching and stranding process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

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UNIT TITLE

PMBPROD303B - Lay up and tape cables

UNIT DESCRIPTOR

This competency covers the operation and adjustment of cable lay-up, taping and armouring equipment and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of lay-up and taping equipment typically used for the production of armoured cable. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine rotating equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Check equipment setup.	2.1. Determine equipment requirements 2.2. Set process to specifications as required 2.3. Check materials are correct 2.4. Check tensions, tape lay-up or tensions of armouring materials to requirements 2.5. Check rotating plant and equipment settings and adjustments including tensions, lay length, attachments to spools and threading path adjustments to specifications 2.6. Attach wire to spools and fit appropriate taping materials 2.7. Discard, or make adjustments to the process for, non-conforming materials 2.8. Set up date, batch and materials markings to specifications, as required 2.9. Complete other pre-start checks to procedures.
3. Operate and make adjustments as required to lay-up and taping equipment.	3.1. Check and load materials using correct manual handling methods 3.2. Start up equipment and make adjustments to reach required settings 3.3. Monitor controls/displays/terminals for production/process data 3.4. Monitor product/process quality to procedures 3.5. Maintain continuity of process 3.6. Make adjustments to remedy faults and nonconformity to standard as required 3.7. Collect and reprocess/discard scrap/trim and other materials to procedures 3.8. Complete required workplace documentation/records. 3.9. Clean, adjust and lubricate equipment as required 3.10. Pause equipment, or stop equipment in an emergency, following procedures.
4. Shut down equipment.	4.1. Shut down equipment to procedures 4.2. Complete equipment cleanup, adjustments and waste management to procedures 4.3. Place suitable guards, locks and notices to prevent inadvertent startup.
5. Respond to problems.	5.1. Identify possible routine and non-routine problems in the equipment, materials or process 5.2. Determine problems needing action 5.3. Determine possible fault causes 5.4. Rectify problems using appropriate solutions within area of responsibility 5.5. Report problems outside area of responsibility to designated person.

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RANGE OF VARIABLES:

This competency applies to rotating plant and equipment – lay-up and taping plant within the cable making industry. It includes the operation of all relevant additional equipment where that equipment is integral to the lay-up and taping process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The rotating plant and processes covered by this unit include, but are not limited to:

- armoured cable
- screened cable
- other relevant wires/cables/product.

This competency includes equipment and tools such as:

- rotating plant and equipment and components including taping machines and lay-up machines
- manual handling equipment, lubrication system, packaging, measuring equipment
- hand tools used in production process
- relevant personal protective equipment.

Typical hazards include:

- temperature
- wire breakages
- hazardous materials
- manual handling hazards
- equipment operations.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical problems include:

- routine and non-routine rotating plant and quality faults including tensions, breaks, taping problems
- equipment malfunctions
- processing problems.

Key variables to be monitored include:

- operating temperatures
- operating speed
- pressure
- time
- temperature
- tension
- wind off speed
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - function of rotating plant and equipment, equipment components and ancillary equipment
  - rotating plant and manufacturing processes
  - behaviour of materials in relation to speed, temperature and tension
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - changes to materials in rotating plant and manufacturing process
  - waste management and importance of non-conforming materials
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check rotating equipment for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- make measurements when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the cable making process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task

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- distinguish between causes of faults such as:
  - process problems
  - incorrect quantity of materials/contaminated materials
  - equipment malfunction.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and lay-up and taping process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES						
1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

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UNIT TITLE

PMBPROD304B - Wind products onto drums

UNIT DESCRIPTOR

This competency covers the operation and adjustment of equipment winding products such as wire, cable or pipe onto drums/spools or similar and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of winding equipment. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine wire winding equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Check equipment setup.	2.1. Determine equipment requirements 2.2. Set process to specifications as required 2.3. Check materials are correct 2.4. Check speed, time, tension and wind- off speed to requirements 2.5. Check winding equipment settings and adjustments including tensions and spool loading to specifications 2.6. Discard, or make adjustments to the process for, non-conforming materials 2.7. Set up date, batch and materials markings to specifications, as required 2.8. Complete other pre-start checks to procedures.
3. Operate and make adjustments as required to winding equipment.	3.1. Check and load materials using correct manual handling methods 3.2. Start up equipment and make adjustments to reach required settings 3.3. Monitor controls/displays/terminals for production/process data 3.4. Monitor product/process quality to procedures 3.5. Maintain continuity of process 3.6. Make adjustments to remedy faults and nonconformity to standard as required 3.7. Collect and reprocess/discard scrap/trim and other materials to procedures 3.8. Complete required workplace documentation/records. 3.9. Clean, adjust and lubricate equipment as required 3.10. Pause equipment, or stop equipment in an emergency, following procedures.
4. Shut down equipment .	4.1. Shut down equipment to procedures 4.2. Complete equipment cleanup, adjustments and waste management to procedures 4.3. Place suitable guards, locks and notices to prevent inadvertent startup.
5. Respond to problems.	5.1. Identify possible routine and non-routine problems in the equipment, materials or process 5.2. Determine problems needing action 5.3. Determine possible fault causes 5.4. Rectify problems using appropriate solutions within area of responsibility 5.5. Report problems outside area of responsibility to designated person.

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RANGE OF VARIABLES:

This competency applies to wire winding equipment for the cablemaking industry and the winding of plastic coils for the extrusion sector and similar jobs. It includes the operation of all relevant additional equipment where that equipment is integral to the winding process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- winding equipment and components
- associated equipment including manual handling equipment, welders, lubrication system, packaging, measuring equipment.
- hand tools used in production process
- relevant personal protective equipment.

Typical hazards include:

- temperature
- wire/coil breakages
- hazardous materials
- manual handling hazards
- equipment operations.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical problems include:

- quality faults including tensions and wire breaks
- equipment malfunctions
- processing problems.

Key variables to be monitored include:

- operating temperatures
- operating speed
- tension
- wind-off speed
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

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EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - function of winding equipment, components and ancillary equipment
  - winding equipment and manufacturing processes
  - behaviour of materials in relation to speed, temperature and tension
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - changes to materials in winding equipment and manufacturing process
  - waste management and importance of non-conforming materials
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check winding equipment for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- make measurements when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the cable making process
- identify factors which may affect product quality or production output and appropriate remedies

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- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - process problems
  - incorrect quantity of materials/contaminated materials
  - equipment malfunction.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and winding equipment characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

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UNIT TITLE

PMBPROD305B - Colour optical fibre

UNIT DESCRIPTOR

This competency covers the operation and adjustment of optical fibre colouring lines and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of optical fibre colouring lines. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine optical fibre colouring line and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Check equipment setup.	2.1. Determine equipment requirements 2.2. Set process to specifications as required 2.3. Check materials are correct 2.4. Check speed, time, tension and wind-off speed to requirements 2.5. Check optical fibre colouring and winding equipment settings and adjustments, including tensions and spool loading, to specifications 2.6. Discard, or make adjustments to the process for, non-conforming materials 2.7. Set up date, batch and materials markings to specifications, as required 2.8. Complete other pre-start checks to procedures.
3. Operate and make adjustments as required to optical fibre colouring line.	3.1. Check and load materials using correct manual handling methods 3.2. Start up equipment and make adjustments to reach required settings 3.3. Monitor controls/displays/terminals for production/process data 3.4. Monitor product/process quality to procedures 3.5. Maintain continuity of process 3.6. Make adjustments to remedy faults and nonconformity to standard as required 3.7. Collect and reprocess/discard scrap/trim and other materials to procedures 3.8. Complete required workplace documentation/records. 3.9. Clean, adjust and lubricate equipment as required 3.10. Pause equipment, or stop equipment in an emergency, following procedures.
4. Shut down equipment.	4.1. Shut down equipment to procedures 4.2. Complete equipment cleanup, adjustments and waste management to procedures 4.3. Place suitable guards, locks and notices to prevent inadvertent startup.
5. Respond to problems.	5.1. Identify possible routine and non-routine problems in the equipment, materials or process 5.2. Determine problems needing action 5.3. Determine possible fault causes 5.4. Rectify problems using appropriate solutions within area of responsibility 5.5. Report problems outside area of responsibility to designated person.

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RANGE OF VARIABLES:

This competency applies to optical fibre colouring lines for the cablemaking industry. It includes the operation of all relevant additional equipment where that equipment is integral to the optical fibre colouring process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- optical fibre colouring equipment and components including dies, threading path, spools, etc
- associated equipment including manual handling equipment, welders, lubrication system, packaging, measuring equipment, fusion splicing equipment.
- hand tools used in production process
- relevant personal protective equipment.

Typical hazards include:

- temperature
- fibre breakages
- hazardous materials
- manual handling hazards
- equipment operations.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical problems include:

- quality faults including tensions and wire breaks
- equipment malfunctions
- processing problems.

Key variables to be monitored include:

- operating temperatures
- operating speed
- temperature
- tension
- wind-off speed
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - function of optical fibre colouring lines, components and ancillary equipment
  - optical fibre colouring equipment and manufacturing processes
  - behaviour of materials in relation to speed, temperature and tension
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - changes to materials in optical fibre colouring equipment and manufacturing process
  - waste management and importance of non-conforming materials
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check optical fibre colouring equipment for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- make measurements when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the cable making process

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- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - process problems
  - incorrect quantity of materials/contaminated materials
  - equipment malfunction.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and optical fibre colouring equipment characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

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UNIT TITLE

PMBPROD306A - Prepare and start equipment for production

UNIT DESCRIPTOR

This competency covers the pre-start preparations and start-up operations to bring a production machine from 'power-off' to first-off product and handover to the operator to continue the production run.

This competency is typically performed by senior operators working either independently or as part of a work team.

This unit of competency may be designated for a stream – see the range of variables.

This competency in practice

This competency applies to operators who apply knowledge of the machine and the processes required to bring a "cold" machine back into production.

PREREQUISITES

This competency has the prerequisite of a PROD 200 series unit of competency.

ELEMENT	PERFORMANCE CRITERIA
1. Perform pre-start checks.	1.1. Check all emergency stops, guards, controls 1.2. Collect a copy of the product data sheet 1.3. Identify requirements for materials, quality, production run 1.4. Retighten head/die bolts, etc, as required 1.5. Check that the equipment has been set-up correctly.
2. Carry out pre-start operations.	2.1. Restore all power to the machine and ancillary equipment 2.2. Start up the ancillary equipment/heater circuit and set the temperature and other controllers to the condition stated on the setup information card 2.3. Check all machine settings against setup information card and switch on the machine 2.4. Bring machine to operational readiness 2.5. Select and load the correct material 2.6. Charge, purge and clean machine as required.
3. Start machine and hand over to operator.	3.1. Start and check machine 3.2. Adjust machine as required to bring to operational speed/ condition 3.3. Check and run machine until a quality product is obtained 3.4. Make adjustments to machine and extra equipment in line to produce an acceptable product 3.5. Make any adjustments required to ensure the machine and its upstream and downstream extra equipment in line are in balance 3.6. Give the operator all necessary instructions and hand over the machine.

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RANGE OF VARIABLES:

This competency applies to all sectors within the plastics, rubber and cablemaking industries which use dedicated production machines. It includes the operation of all relevant additional equipment where that equipment is integral to the production process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This unit of competency may be designated for one of the following streams where workers use that unit substantially only in that stream area:

- cablemaking
- blow moulding
- blown film
- calendering
- composites
- compounding
- extrusion
- fabrication
- injection moulding
- polystyrene
- expanded foam polyurethane
- rotational moulding
- thermoforming
- belt splicing
- rubber lining
- tyre manufacture
- tyre retreading
- surface coating.

This competency includes equipment and tools such as:

- hand carts and trolleys
- hoists/lifting equipment not requiring any special permits or licences
- hand tools used in the process
- relevant personal protective equipment.

Typical hazards may include:

- spills
- dusts/vapours
- slip and fall, particularly due to spilt polymer granules
- temperature
- hazardous materials
- manual handling hazards
- equipment operations.

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EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification process problems and equipment.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to apply and explain:

- machine construction
  - types of machines
  - component parts of machines, structure, function and general operating principles
- machine safety interlocks and systems
  - limit switches, normally open/normally closed, overstroke control systems, hydraulic temperature control, material temperature control, machine guards, nozzle purge guard, mould protection systems, ejection limit switches
- principles of operation
  - production cycle/process/sequence
  - function tools/components
  - calculation of machine cycle time/production rate
  - safe work procedures for checking machine cycle time/production rate
  - variations to the cycle/process for different systems/products
- machine controls, their identification and function
  - measuring instruments and their function: leveling, temperature sensing devices, thermocouples and pyrometers, transducers, thermometers, pressure and vacuum gauges, flow meters
  - machine control systems: basic controls, open loop, closed loop, shot size and correction capacity, injection speed, screw position, injection pressure, clamp pressure, injection time, screw speed, screw back pressure, screw back time, melt decompress position, sprue break
  - differences between analogue controls, digital controls, microprocessor based process controls
- impact of incorrect or faulty setup
- production workflow sequences
- correct selection and use of equipment and procedures
- hazards of the removal and fitting process and appropriate hazard control procedures
- the performance of dies and cores
- relevant information and workplace records
- safety precautions appropriate to the task

and to

- distinguish between causes of faults such as:
  - faulty equipment
  - standard process variables
- plan own work including predicting consequences and identifying improvements

- start up equipment and make appropriate adjustments to bring process on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect standard product quality or production output
- identify hazards of the materials and process and take appropriate hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task.

Critical aspects:

It is essential that competence be demonstrated by bringing a 'cold' machine into ready-for-production status methodically and smoothly in standard time.

Language, literacy and numeracy requirements:

Literacy is required to the level of being able to read and interpret technical specifications and production schedules and specifications. Numeracy is required to the level of being able to calculate cycle times and production rates. An appreciation of numbers is also required to the extent needed to set and interpret numeric data. Verbal communication is required to the extent necessary to instruct the operator.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	3	3

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UNIT TITLE

PMBPROD307B - Produce calendered products

UNIT DESCRIPTOR

This competency covers the conversion of plastic or rubber compound into intermediate or final film/sheet products and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who apply precise coatings of plastic or rubber compounds to prepared steel wire or fabric to create calendered sheet products. The key factor is the application of a precise thickness of plastic/rubber to the given materials. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine equipment and process problems, seeking guidance where necessary or appropriate.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Read and check product specifications 1.3. Identify required materials are in sufficient available supply from earlier stage processes 1.4. Recognise hazards and follow appropriate hazard control/minimisation methods 1.5. Identify and check emergency stops, guards and controls 1.6. Identify requirements for materials, quality, production and equipment checks 1.7. Identify materials, waste management and housekeeping needs.

ELEMENT	PERFORMANCE CRITERIA
2. Check calendering process setup.	2.1. Determine equipment requirements 2.2. Check process is set to specifications as required 2.3. Check feed supply according to product demand 2.4. Check 'thread' feed supply from bobbins, creels and let-off spools through calender onto wind-up spools as appropriate 2.5. Coordinate calender machine start with feed supply source 2.6. Check settings for temperature, speed and nip size 2.7. Check setting for compound flow onto steel or fabric 2.8. Check materials are correct 2.9. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments as required to the calendering process.	3.1. Operate equipment, noting key variables 3.2. Monitor controls/displays/terminals for production/process data 3.3. Monitor product/process quality in accordance with procedures 3.4. Make adjustments to remedy faults and nonconformity to standard as required 3.5. Maintain continuity of process 3.6. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.7. Clean, adjust and lubricate equipment as required 3.8. Pause equipment, or shut down equipment in an emergency, following workplace and emergency procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problems using appropriate solutions within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to the operation of various calenders. This includes a 3-roll and 4-roll calender. It also includes the operation of all relevant ancillary equipment, particularly feed/supply equipment such as creel room and mill.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include, but are not limited to:

- movement of materials
- spooling, let-off and wind-up of fabric-like materials
- coating of wires and fabric
- creel room equipment and similar.

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This competency includes tools and equipment such as:

- material feeding equipment
- hoists/lifting equipment not requiring any special permits or licences
- mill knifes
- basic hand tools
- relevant personal protective equipment.

Typical hazards include those associated with:

- restricted spaces
- heat
- hazardous chemicals
- dust/fumes
- manual handling hazards
- knife hazards
- nip hazards
- creel and spooling hazards.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical problems include:

- contamination of materials
- incorrect machine setup, especially the nip setting
- tensions
- temperatures
- uniformity of product.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - the purpose and operations of calendering equipment
  - impact of machine settings such as nip setting, speed, temperature, tension etc. on product quality and production output
  - the effects of foreign objects in the nip area on product quality
  - production workflow sequences and materials demand
  - correct selection and use of equipment indicators on the control panel

- characteristics of different types of coated materials
- hazards of the materials and process and appropriate hazard control procedures
- safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
- the hierarchy of control including engineering controls
- impact of variations in raw materials and equipment operation in relation to final product
- changes to materials at various stages of production
- waste management and importance of non-conforming materials

ν plan own work including predicting consequences and identifying improvements
ν interpret from production requests the correct selection and use of equipment, materials, processes and procedures
ν maintain output and product quality using appropriate instruments, controls, test information and readings
ν make adjustments to equipment operation to rectify variations in equipment operation or product quality
ν check calendering equipment for correct setup to job specifications and implement adjustments or report deviations immediately
ν start up equipment and make appropriate adjustments to bring process on line
ν take samples when required and identify product out of specification
ν safely shut down equipment in normal or abnormal circumstances
ν identify and describe own role and role of others involved directly in the calendering process
ν identify factors which may affect product quality or production output and appropriate remedies
ν identify when the operator is able to rectify faults and when assistance is required
ν identify hazards of the materials and process
ν implement appropriate procedures for hazard control
ν use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
ν demonstrate knowledge of

- job instructions
- safety trips and resets
- batch dump indicators

ν distinguish between causes of faults such as:

- wrong raw materials
- incorrect quantity of materials
- contaminated materials.

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Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and calendering process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	1

UNIT TITLE

PMBPROD308A - Take a machine out of production

UNIT DESCRIPTOR

This competency covers the operations for a short-term shutdown for die change or material change or similar, as well as for a long term shutdown for maintenance or other requirements, of a 'cold' machine.

This competency is typically performed by all operators working either independently or as part of a work team.

This unit of competency may be designated for a stream – see the range of variables.

This competency in practice

This competency is applied by operators and uses extensive knowledge of machines and their controls, and some knowledge of polymers and dies. A short-term stop can be twenty minutes for example (and includes any period where production is stopped but there is no need for a 'cold' machine). A long-term stop is where the machine needs to be, or will become, 'cold'.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Take over operation of the machine.	1.1. Arrange handover from the operator (if necessary) 1.2. Determine type and reason for shutdown 1.3. Notify relevant associated personnel.
2. Perform short-term shutdown.	2.1. Stop material feed 2.2. Run/mould out material in the barrel. 2.3. Purge material from the barrel and leave in correct condition 2.4. Reduce barrel temperature to required temperature 2.5. Make required adjustments to ensure the safety of machine and materials 2.6. Isolate, lock out and make machine safe for personnel.
3. Perform long-term shutdown.	3.1. Stop material feed 3.2. Run/mould out material in the barrel. 3.3. Ensure machine parts remain at correct temperature (eg, by switching off chiller) 3.4. Remove the last product and leave equipment in required condition 3.5. Purge barrel using appropriate materials and leave in correct condition 3.6. Switch off the heater circuits and other ancillary equipment 3.7. Make required adjustments to ensure the safety of machine and materials 3.8. Isolate, lock out and make machine safe for personnel.

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ELEMENT	PERFORMANCE CRITERIA
4. Perform post-shutdown preventive maintenance and cleanup (long-term shutdown).	4.1. Clean all components as required 4.2. Apply rust preventative to required surfaces (eg, both die faces) 4.3. Leave all parts in required condition 4.4. Isolate all power to the machine and ancillary equipment if this has not already been done 4.5. Pack/process any remaining good product and label as required 4.6. Sort material that can be salvaged from waste and arrange reprocessing/disposal to procedures 4.7. Cover granulated material 4.8. Clean up the work area ready for restarting of the machine.

RANGE OF VARIABLES:

This competency applies to all sectors within the plastics, rubber and cablemaking industries which use dedicated production machines. It includes the operation of all relevant additional equipment where that equipment is integral to the production process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This unit of competency may be designated for one of the following streams where workers use that unit substantially only in that stream area:

- √ cablemaking
- √ blow moulding
- √ blown film
- √ calendering
- √ composites
- √ compounding
- √ extrusion
- √ fabrication
- √ injection moulding
- √ polystyrene
- √ expanded foam polyurethane
- √ rotational moulding
- √ thermoforming
- √ belt splicing
- √ rubber lining
- √ tyre manufacture
- √ tyre retreading
- √ surface coating.

This competency includes equipment and tools such as:

- √ hand carts and trolleys
- √ hoists/lifting equipment not requiring any special permits or licences
- √ hand tools used in the process
- √ relevant personal protective equipment.

Typical hazards may include:

- √ spills
- √ dusts/vapours
- √ slip and fall, particularly due to spilt polymer granules
- √ temperature
- √ hazardous materials
- √ manual handling hazards
- √ equipment operations.

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EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to apply and explain:

- machine construction
  - types of machines
  - component parts of machines, structure, function and general operating principles
- machine safety interlocks and systems
  - limit switches, normally open/normally closed, overstroke control systems, hydraulic temperature control, material temperature control, machine guards, nozzle purge guard, mould protection systems, ejection limit switches
- principles of operation
  - production cycle/process/sequence
  - function tools/components
  - variations to the cycle/process for different systems/products
- machine controls, their identification and function
  - measuring instruments and their function: leveling, temperature sensing devices, thermocouples and pyrometers, transducers, thermometers, pressure and vacuum gauges, flow meters
  - machine control systems: basic controls, open loop, closed loop, shot size and correction capacity, injection speed, screw position, injection pressure, clamp pressure, injection time, screw speed, screw back pressure, screw back time, melt decompress position, sprue break
  - differences between analogue controls, digital controls, microprocessor based process controls.

Critical aspects:

It is essential that competence be demonstrated by taking a machine out of production for a temporary short-term shutdown of say twenty minutes, as well as for a long-term 'cold' shutdown, in a safe and efficient manner, to standard requirements.

Language, literacy and numeracy requirements:

Literacy is required to the level of being able to read and interpret technical specifications and production schedules and specifications. An appreciation of numbers is also required to the extent needed to set and interpret numeric data. Verbal communication is required to the extent necessary to instruct the operator.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	3	3

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UNIT TITLE

PMBPROD309B - Produce electroplated products

UNIT DESCRIPTOR

This competency covers the operation of electroplating equipment for non-metallic components and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of electroplating equipment for rubber, plastic and other components. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine electroplating equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify component, electrode and bath materials 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Check electroplating process setup.	2.1. Determine equipment requirements 2.2. Set process to specifications as required 2.3. Set up and adjust bath conditions 2.4. Check materials are correct 2.5. Check racking, baskets or supports are as required 2.6. Discard, or make adjustments to the process for, non-conforming materials 2.7. Set up date, batch and materials markings to specifications, as required 2.8. Complete other pre-start checks in accordance with procedures.
3. Operate electroplating equipment.	3.1. Start equipment safely and correctly to procedures 3.2. Load components to be plated onto racks, supports or fixtures 3.3. Compare measures of plating deposition and quality against specifications 3.4. Monitor controls including operating temperatures, voltage/current relationships, plating time 3.5. Record production data as required 3.6. Shut down equipment safely and correctly to procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problems using appropriate solutions within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to all electroplating equipment within the plastics and rubber industries. It includes the operation of all relevant additional equipment where that equipment is integral to the electroplating process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- hand tools as required
- racks, baskets, clips or supports
- pretreatment baths
- plating baths and equipment
- relevant personal protective equipment.

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Typical hazards include:

- hazardous plating materials
- electrical equipment and controls
- manual handling
- humidity, air temperatures, radiant heat, hot surfaces
- stationary and moving machinery, parts and components.

Typical product faults include:

- poor surface coverage
- contamination
- plating thickness variation
- blemishes
- missing detail.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process problems include:

- plating solution contamination or out of specification
- electrode material contamination or wrong material/grade
- equipment settings
- temperature variations
- process variations
- sequencing problems.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - quality requirements at each production stage
  - different types of electroplating material
  - nature of plating solutions
  - relationship between electrical controls for baths
  - controls of electroplating equipment and explain purpose
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - the hierarchy of control including engineering controls
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality

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- check electroplating equipment for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- make measurements when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - electrode materials
  - bath plating solutions
  - heat
  - equipment - adjustments/setup
  - equipment - maintenance requirements.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and electroplating process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

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UNIT TITLE

PMBPROD310B - Produce injection moulded products

UNIT DESCRIPTOR

This competency covers the operation and adjustment of injection moulding processes and the solving of non-routine problems. It does not cover die setting.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of injection moulding equipment. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine injection moulding equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit of competency has the prerequisite of:

- PMB PROD 210 A Operate injection moulding equipment.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Check injection moulding process setup.	2.1. Determine equipment requirements 2.2. Set process to specifications as required 2.3. Check injection moulding equipment settings and adjustments are as required 2.4. Check materials are correct 2.5. Discard, or make adjustments to the process for, non-conforming materials 2.6. Set up date, batch and materials markings to specifications, as required 2.7. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments as required to the injection moulding process.	3.1. Operate injection moulding equipment, noting key variables 3.2. Monitor controls/displays/terminals for production/process data 3.3. Monitor product/process quality in accordance with procedures 3.4. Make adjustments to remedy faults and nonconformity to standard as required 3.5. Maintain continuity of process 3.6. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.7. Clean, adjust and lubricate equipment as required 3.8. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problems using appropriate solutions within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to all injection moulding within the plastics and rubber industries. It includes the operation of all relevant additional equipment where that equipment is integral to the injection moulding process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- electrical, pneumatic, mechanical, electromechanical and hydraulic injection moulding machines and components such as base, frame, feed hoppers and material supply mechanisms, barrel and screw plastification unit, injection units, die/mould tool

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- additional equipment including chillers/cooling towers, die heating equipment, hopper driers, mixing hoppers, dehumidifying driers, air compressors, dosing machines, colour blending equipment and conveyors where they are integral to the operation of the injection molder
- hand tools used in the injection moulding process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

Typical hazards include:

- spills
- dusts/vapours
- slip and fall, particularly due to spilt granules
- temperature
- hazardous materials
- manual handling hazards
- equipment operations.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems include:

- routine and non-routine product injection moulding faults – see Evidence Guide for list
- machine malfunction
- mould/tooling problems
- variations in materials and/or contamination of materials
- processing problems.

Key variables to be monitored include:

- operating temperatures
- speed
- hunt or sprue break pressures
- colour
- cushion specification
- cycle time
- output rate
- product weight
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - behaviour of materials in relation to heat, pressure and time
  - quality requirements at each production stage
  - function and operating principles of injection moulding equipment, machine components and ancillary equipment
  - impact of machine speed, temperature, pressure, time during cycles on product quality and production output
  - nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which effect machine operation and product development
  - injection moulding cycle and the importance of machine set up and warm up for effective processing of materials
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check injection moulding machine for correct set up to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the injection moulding process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - routine faults – short mouldings, sink marks, voids, burn marks, mica, splash marks, warping, silver streaking, blistering, flow marks, poor surface finish, windows, erratic cycles, poor colour dispersion, ejection damage, colour contamination, black spots
  - incorrect quantity of materials
  - contaminated materials.

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Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and injection moulding process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

UNIT TITLE

PMBPROD311B - Produce blow moulded products

UNIT DESCRIPTOR

This competency covers the operation and adjustment of blow moulding processes and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement..

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of blow moulding equipment. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine blow moulding equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit of competency has the prerequisite of:

- PMB PROD 211 A Operate blow moulding equipment.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

ELEMENT	PERFORMANCE CRITERIA
2. Set up and conduct pre-start checks.	2.1. Set up equipment to specifications 2.2. Set up and adjust blow moulding equipment for shot size, parison control, die gap, temperature, screw speed, cycle speed, slow close setting (or cushion) and timing to specifications 2.3. Check safety gates and guards are located in their correct working positions and emergency stops are identified and checked as required 2.4. Verify equipment, raw material and mould all match job requirement 2.5. Set up date, batch and materials markings to procedures. 2.6. Complete other pre-start checks to procedures 2.7. Start up equipment safely and 'dry run' to warm hydraulics and components to operating temperature before production, as required.
3. Operate and make adjustments as required to the blow moulding process.	3.1. Check condition of equipment and introduce raw materials as required 3.2. Operate blow moulding equipment, noting key variables 3.3. Monitor controls/displays/terminals for production/process data 3.4. Monitor product/process quality to procedures 3.5. Make adjustments to remedy faults and nonconformity to standard as required 3.6. Maintain continuity of process 3.7. Collect and reprocess/discard scrap/trim and other materials to procedures 3.8. Clean, adjust and lubricate equipment as required 3.9. Complete logs and records as required 3.10. Pause equipment, or stop equipment in an emergency, following procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problems using appropriate solutions within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

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RANGE OF VARIABLES:

This competency applies to all blow moulding within the plastics and rubber industries. It includes the operation of all relevant additional equipment where that equipment is integral to the blow moulding process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- bottom blow, top blow, needle blow, tail to tail blow, parison pre-blow and pre-squeeze, parison stretching and parison orientation type machines
- additional equipment including chillers/cooling towers, die heating equipment, hopper driers, mixing hoppers, dehumidifying driers, air compressors, dosing machines, colour blending equipment and conveyors
- hand tools as required
- material loading equipment for raw materials
- relevant personal protective equipment.

Typical hazards include:

- spills
- dusts/vapours
- slip and fall, particularly due to spilt granules
- temperature
- hazardous materials
- manual handling hazards
- equipment operations.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process problems include:

- equipment malfunction
- variations in temperature, pressure, speed, inflation
- variations in materials or contamination of materials
- mould damage.

Typical product problems include:

- routine blow moulding faults – wall thinning, holes, poor surface finish, warping, poor colour dispersion, ejection damage, colour contamination, black spots and other defects
- machine malfunction
- mould/tooling problems
- variations in materials and/or contamination of materials.

Key variables to be monitored include:

- operating temperatures
- speed
- cycle time
- output rate
- concentration or dispersion of colour
- product weight
- product wall thickness
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - operation of blow moulding equipment and components
  - production workflow sequences and materials demand
  - reasons for checking process control panels and reporting readings which do not conform to the work instructions
  - purpose and requirements of 'dry running' before starting production
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - correct selection and use of equipment, materials, processes and procedures
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check blow moulding machine for correct setup to job specifications and implement adjustments or report deviations immediately

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- start up equipment and make appropriate adjustments to bring process on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the blow moulding process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - contaminated materials/additives
  - equipment faults
  - mould damage
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - machine failure.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and blow moulding process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

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UNIT TITLE

PMBPROD312B - Produce continuous thermoforming products

UNIT DESCRIPTOR

This competency covers production of continuous thermoforming products using thermoforming equipment.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are involved in the operation of continuous thermoforming equipment, monitoring production, maintaining personal safety and the safety of others within the context of required production output and product quality standards. The key factors are the setting up of thermoforming equipment, monitoring production and identifying and rectifying problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit of competency has the prerequisite of:

- PMB PROD 212 A Operate thermoforming equipment.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

ELEMENT	PERFORMANCE CRITERIA
2. Check continuous thermoforming process setup.	2.1. Check thermoforming equipment settings and adjustments for conformity to documented procedures 2.2. Check materials for conformity including colour and thickness 2.3. Discard non-conforming materials or adjust processing operations in accordance with workplace procedures 2.4. Set up (where applicable) date and/or batch markings, materials identifications for the appropriate information 2.5. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments as required to the continuous thermoforming process.	3.1. Start machine safely and correctly in accordance with procedures 3.2. Monitor thermoforming operations in accordance with procedures 3.3. Monitor product/process quality in accordance with procedures 3.4. Make adjustments to remedy faults and nonconformity to standard as required 3.5. Maintain continuity of process 3.6. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.7. Deal with waste and scrap in accordance with procedures/ workplace instructions 3.8. Clean, adjust and lubricate equipment as required 3.9. Interrupt equipment, or shut down equipment in an emergency, following workplace and emergency procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problems using appropriate solutions within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

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RANGE OF VARIABLES:

This competency applies to continuous thermoforming processes and includes the use of air pressure or vacuum processes It includes the operation of all relevant additional equipment where that equipment is integral to the thermoforming process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- hand tools as required
- additional equipment including programmable limit controllers
- relevant personal protective equipment.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical hazards include:

- spills
- fumes/vapours
- stationary and moving machinery, parts and components.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - additives used in the process
  - component parts of thermoforming equipment
  - identity, purpose and controls of thermoforming equipment
  - routine problems
  - quality requirements at each production stage
  - function and operating principles of continuous thermoforming equipment, machine components and ancillary equipment
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials

- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check thermoforming machine for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the thermoforming process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - materials
  - equipment - adjustments/setup
  - equipment - maintenance requirements.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and continuous thermoforming process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

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Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

UNIT TITLE

PMBPROD313B - Produce extruded products

UNIT DESCRIPTOR

This competency covers the operation and adjustment of extrusion equipment and extrusion processes and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement..

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of extrusion equipment. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine extrusion equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit of competency has the prerequisite of:

- PMB PROD 213 A Operate extruders.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/ minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

ELEMENT	PERFORMANCE CRITERIA
2. Check extrusion process setup.	2.1. Determine equipment requirements 2.2. Set process to specifications as required 2.3. Check extrusion equipment settings and adjustments are as required 2.4. Check materials are correct 2.5. Check die setup matches workplace operational requirements 2.6. Discard, or make adjustments to the process for, non-conforming materials 2.7. Set up date, batch and materials markings to specifications, as required 2.8. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments as required to the extrusion process.	3.1. Operate extrusion equipment, noting key variables 3.2. Monitor controls/displays/terminals for production/process data 3.3. Monitor product/process quality in accordance with procedures 3.4. Make adjustments to remedy faults and nonconformity to standard as required 3.5. Maintain material feed and product removal as required 3.6. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.7. Clean/purge, adjust and lubricate equipment as required 3.8. Pause or shutdown equipment in an emergency, following workplace and emergency procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problems using appropriate solutions within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

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RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It includes the operation of all relevant ancillary equipment.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include, but are not limited to:

- rod
- sheet
- profile
- film
- tube/hose
- tyre tread
- cable.

This competency includes equipment and tools such as:

- extruder equipment and components such as main drive, gear box, thrust assembly, adapter, gate, breaker plate, screen pack, doser, screw/s, barrel, heaters, thermocouples
- extrusion dies - rod, sheet, pipe, profile and cable
- auxiliary equipment - water pump, feeders, hopper loader, pellitiser, dehumidifiers, etc
- tools for taking samples
- relevant personal protective equipment.

Typical hazards include:

- fumes/vapours
- burns
- moving equipment
- hazardous materials
- manual handling hazards.

Respond to/rectify ‘non-routine problems’ means ‘apply known solutions to a variety of predictable problems’.

Typical problems include:

- equipment malfunction
- variations in materials
- contamination of materials
- temperature/speed variations.

Key variables to be monitored include:

- operating temperatures
- speed
- colour
- output rate
- product integrity and general conformance to specification/sample.
- All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - function of extruder equipment, machine components and materials used
  - function of downstream equipment - stackers, haul off, saw/cutter, printing, embossing, coil winder, packaging, etc
  - impact of extruder machine speed, temperature, pressure, time, haul-off speed, on product quality and production output
  - nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which affect machine operation and product development
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check extruder for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the extrusion process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task

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- distinguish between causes of faults such as:
  - routine product extrusion faults – burn marks, flow marks, poor surface finish, poor colour dispersion, blistering, colour contamination, black spots
  - incorrect quantity of materials
  - contaminated materials/additives
  - equipment faults.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and extrusion process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- extrusion production quality and output standards are met consistently
- quality is monitored to minimise wastage
- process is monitored continually and adjustments made in a timely manner in accordance with workplace instructions upstream and down stream communication is timely and effective
- problems are anticipated and appropriate action is taken (ie, the problem fixed or reported)
- all safety procedures are adhered to.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

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UNIT TITLE

PMBPROD314B - Produce compression moulded products

UNIT DESCRIPTOR

This competency covers the operation and adjustment of compression moulding processes and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of compression moulding equipment. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine compression moulding equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

ELEMENT	PERFORMANCE CRITERIA
2. Check compression moulding process setup.	2.1. Determine equipment requirements 2.2. Set process to specifications as required 2.3. Check compression moulding equipment settings and adjustments for temperature, speed, timing and shot size to procedures 2.4. Check materials are correct 2.5. Discard, or make adjustments to the process for, non-conforming materials 2.6. Set up date, batch and materials markings to specifications, as required 2.7. Complete other pre-start checks to procedures.
3. Operate and make adjustments as required to the compression moulding process.	3.1. Charge mould, close mould and cure product 3.2. Monitor compression moulding operations noting product quality, production outputs, equipment operating temperatures, speed, hunt or sprue break pressures, colour, thickness and product integrity 3.3. Make adjustments to remedy faults and non-conformity to production standards where applicable 3.4. Demould product at end of cycle and prepare mould for next cycle 3.5. Maintain continuity of process 3.6. Collect and reprocess/discard scrap/trim and other materials to procedures 3.7. Clean, adjust and lubricate equipment as required 3.8. Pause equipment, or stop equipment in an emergency, to procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problems using appropriate solutions within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to all compression moulding within the plastics and rubber industries. It includes the operation of all relevant additional equipment where that equipment is integral to the compression moulding process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include, but are not limited to:

- compression moulding of rubber
- compression moulding of plastics
- cutting/gauging of raw material charge to the correct amount
- inspection of moulded product to determine process or material faults
- demoulding of product, cleaning and preparation of mould for next cycle.

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This competency includes tools and equipment such as:

- knifes/scissors
- scoops, measures, scales, fixed gauges
- levers and other mould handling devices
- mould release sprays or other means of application
- relevant personal protective equipment.

Typical hazards include:

- fumes/vapours
- crushing hazards
- temperature
- hazardous materials
- manual handling hazards
- equipment operations.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical problems include:

- variations in materials/scorchy rubber
- contamination of materials
- blank/charge/shot size
- mould temperature/temperature profile
- demoulding
- dirty moulds, damaged moulds.

Key variables to be monitored include:

- operating temperatures
- colour
- cycle time
- output rate
- product weight
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - behaviour of materials in relation to heat, pressure and time
  - quality requirements at each production stage

- function and operating principles of compression moulding equipment, machine components and ancillary equipment
- impact of machine speed, temperature, pressure, time during cycles on product quality and production output
- nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which affect machine operation and product development
- compression moulding cycle and the importance of machine setup and warm-up for effective processing of materials
- safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
- the hierarchy of control including engineering controls
- impact of variations in raw materials and equipment operation in relation to final product
- changes to materials at various stages of production
- waste management and importance of non-conforming materials

- identify and read transducers for hydraulic position and clamping force
- plan own work sequence including identification of key checkpoints for equipment monitoring, product quality checks and monitoring of supplies and downstream operations
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check compression moulding machine for correct set up to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the compression moulding process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - wrong raw materials
  - incorrect quantity of materials
  - contaminated materials
  - dirty mould
  - damaged mould
  - mould open too long
  - mould/product temperature/temperature profile
  - pressure.

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Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and compression moulding process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

UNIT TITLE

PMBPROD315B - Produce polyurethane foam

UNIT DESCRIPTOR

This competency covers the application of knowledge of materials, product purpose and processes to the production of polyurethane foam.

This competency is typically performed by all operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators producing polyurethane foam. The key factors are the adequate planning of the process stages, preparation of the equipment, checking on performance of the equipment and making approved adjustments and equipment corrections. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- ensuring appropriate raw materials are available
- ensuring the equipment and materials are appropriate for the job
- carrying out the process
- checking the outputs for conformance with specification
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Plan process stages for polyurethane foam production.	1.1. Plan the stages in the polyurethane foaming process and ensure these comply with the quality requirements for production 1.2. Identify and allow for changes in materials at each stage of the polyurethane foaming process 1.3. Plan the availability of the equipment and components for each production stage 1.4. Anticipate the impact of the process on product characteristics and product quality and useability 1.5. Plan work requirements based on procedures.

ELEMENT	PERFORMANCE CRITERIA
2. Identify work requirements for polyurethane foaming operations.	2.1. Prepare materials including base raw materials and additives 2.2. Recognise hazards and follow appropriate hazard control/minimisation methods 2.3. Check materials, ancillary supplies and equipment are correct 2.4. Check equipment and processes used for materials preparation, production process and for the downstream operations are available 2.5. Check product quality requirements for the relevant process stage(s) 2.6. Identify and check emergency stops, gauges, guards and controls 2.7. Plan the task sequences including times and locations for product quality checks, equipment operation and required production outputs 2.8. Provide for ongoing materials input, waste management and work area housekeeping requirements 2.9. Arrange any required supplementary equipment for product quality testing or routine equipment maintenance and/or adjustments.
3. Check polyurethane foaming process setup.	3.1. Comply with equipment information, required quality specifications and setup procedures 3.2. Set up equipment in accordance with required quality specifications and standard operating procedures 3.3. Check polyurethane foaming equipment settings and adjustments and conformity to documented procedures 3.4. Inspect materials for conformity with requirements including surface condition and materials thickness 3.5. Discard non-conforming materials or make adjustments to processing operations in accordance with procedures.
4. Operate and make adjustments as required to the foam process.	4.1. Start up, operate and shut down foam equipment as required by procedures 4.2. Monitor polyurethane foaming operations noting product quality, production outputs, equipment operating temperature, amperage, pressures, colour, thickness and product integrity 4.3. Make adjustments to remedy faults and non-conformity to production standards where applicable 4.4. Collect material which is able to be reprocessed and reused, and dispose of waste and scrap in accordance with workplace procedures 4.5. Clean up equipment, lubricate, and adjust in accordance with procedures.
5. Respond to problems.	5.1. Identify possible routine and non-routine problems in the equipment, materials or process 5.2. Determine problems needing action 5.3. Determine possible fault causes 5.4. Rectify problems using appropriate solutions within area

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ELEMENT	PERFORMANCE CRITERIA
	of responsibility 5.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics industry. It includes the operation of all relevant ancillary equipment.

Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- manual handling aids - hand carts and trolleys
- knives and other bag opening equipment
- hoists/lifting equipment not requiring any special permits or licences
- basic hand tools required for opening of material packaging
- relevant personal protective equipment
- material loading equipment used for loading of raw materials.

Typical hazards include:

- spills
- dusts/vapours
- slip and fall, particularly due to spilt granules
- temperature
- hazardous materials
- manual handling hazards
- equipment operations.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems include:

- machine malfunction
- out of specification equipment operation
- contamination of materials
- variations in materials and/or contamination of materials
- processing problems.

Key variables to be monitored include:

- operating temperatures
- speed
- colour
- cushion specification
- cycle time
- output rate
- product weight
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - behaviour of materials in relation to heat, pressure and time
  - impact of machine speed, temperature, pressure, time during cycles on product quality and production output
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- apply and/or explain:
  - impact of incorrect or faulty materials
  - production workflow sequences and materials demand
  - focus of operation of work systems and equipment
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures
- distinguish between causes of faults such as:
  - wrong raw materials
  - incorrect quantity of materials
  - contaminated materials
  - inadequately mixed materials
- plan own work including predicting consequences and identifying improvements
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- start up equipment and make appropriate adjustments to bring process on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the foam process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task.

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Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and polyurethane foaming process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg, to determine that 16 units and 46 units are equal to a total of 62 units.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	2	2	2	1	2	1

UNIT TITLE

PMBPROD316B - Produce blown film

UNIT DESCRIPTOR

This competency covers the operation and adjustment of blown film lines and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of blown film lines. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine blown film equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit of competency has the prerequisite of:

- PMB PROD 216 A Operate blown film equipment.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Check blown film process setup.	2.1. Determine equipment requirements 2.2. Set process to specifications as required 2.3. Set up and adjust blown film line for extruder temperature, back pressures and currents, nip and winding speeds, nip roller settings, corona treatment settings, winder settings, slitters, trimmers and die gap adjustments according to specifications 2.4. Check materials are correct 2.5. Discard, or make adjustments to the process for, non-conforming materials 2.6. Set up date, batch and materials markings to specifications, as required 2.7. Complete other pre-start checks to procedures.
3. Operate and make adjustments as required to the blown film process.	3.1. Start up blown film line as required 3.2. Operate blown film line, noting key variables 3.3. Monitor controls/displays/terminals for production/process data 3.4. Monitor product thickness and quality to procedures 3.5. Make adjustments to remedy faults and nonconformity to standard as required 3.6. Maintain continuity of process 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean, adjust and lubricate equipment as required 3.9. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problems using appropriate solutions within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to blown film line operations within the plastics and rubber industries. It includes the operation of all relevant additional equipment where that equipment is integral to the blown film process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

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This competency includes tools and equipment such as:

- extruder
- die, air ring and blower
- bubble guides and rollers
- film rollers, slitting, trimming and winding gear
- coolers, heaters and ancillary equipment
- hand tools, knives, adjustment tools
- relevant personal protective equipment.

Typical hazards include:

- high air velocities
- high voltage corona treatment systems
- sharp knives
- high towers
- manual handling
- fumes, humidity, air temperatures, radiant heat, hot dies
- stationary and moving machinery, parts and components.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems include:

- extruder control, temperature, pressures, screw speed
- contamination
- bubble control, size, stability
- blemishes, voids, gels, die and weld lines, burn marks, poor surface finish, poor colour dispersion, partially decomposed products, uneven colour, contamination of colour
- alignment and control of trimming and winding gear
- materials variations
- worn/damaged dies and extruder adjustments
- raw material contamination, wrong grade, variations of polymer properties
- hydraulic pressure variations, temperature variations, loss of power or drives
- process sequencing problems
- variations in component speeds.

Key variables to be monitored include:

- extruder operating temperatures, melt temperatures, back pressures and current (amps)
- nip and winding speeds, nip roller settings
- corona treatment settings
- winder settings, slitters, trimmers and die gap adjustments
- colour
- output rate
- product thickness
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - behaviour of materials in relation to heat, pressure and time
  - quality requirements at each production stage
  - function and operating principles of blown film equipment, machine components and ancillary equipment
  - impact of extruder speed, temperature, pressure on product quality and production output
  - impact of changes and adjustments to the winding gear on film properties
  - nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which effect machine operation and product development
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check blown film line for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- make measurements when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the film process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task

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- distinguish between causes of faults such as:
  - materials
  - contaminants
  - equipment - adjustments/setup
  - equipment - maintenance requirements.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and blown film process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES						
1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

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UNIT TITLE

PMBPROD317B - Print and decorate rigid products

UNIT DESCRIPTOR

This competency covers the application of knowledge of materials, product purpose and processes to the printing and decoration of rigid products.

This competency is typically performed by all operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators of printing and decorating equipment for rigid products. The key factors are the adequate planning of the process stages, preparation of the equipment, checking on performance of the equipment and making adjustments and equipment corrections. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- discussing work progress with other workers
- planning which jobs have the higher priority
- ensuring appropriate raw materials are available
- ensuring the equipment and materials are appropriate for the job
- carrying out the process
- checking the outputs for conformance with specification
- completing logs and reports.

PREREQUISITES

This unit of competency has the prerequisite of:

- PMB PROD 217 A Operate printing equipment.

ELEMENT	PERFORMANCE CRITERIA
1. Plan process stages for printing and decorating.	1.1. Plan the stages in the printing and decorating process and ensure these comply with the quality requirements for production 1.2. Identify and allow for changes in materials at each stage of the printing and decorating process 1.3. Plan the availability of the equipment and components for each production stage 1.4. Anticipate the impact of the process on product characteristics and product quality and usability 1.5. Plan work requirements based on procedures.

ELEMENT	PERFORMANCE CRITERIA
2. Identify work requirements for printing and decorating operations	2.1. Prepare materials including base raw materials and additives 2.2. Identify and address hazards connected with both production materials and process 2.3. Check materials inputs and outputs, dyes and print chemical colours, ancillary supplies and equipment are within specifications 2.4. Check product quality requirements for the relevant process stage(s) 2.5. Identify and check equipment emergency stops, gauges, guards and controls 2.6. Plan the task sequences including times and locations for product quality checks, equipment operation and required production outputs 2.7. Provide for ongoing materials input, waste management and work area housekeeping requirements 2.8. Arrange any required supplementary equipment for product quality testing or routine equipment maintenance and/or adjustments.
3. Set up and check printing and decorating equipment	3.1. Comply with equipment information, required quality specifications and setup procedures 3.2. Set up equipment in accordance with required specifications and procedures 3.3. Check printing and decorating equipment settings and adjustments and conformity to procedures 3.4. Check materials are correct 3.5. Check that surface preparation operations provide for an even and consistent surface for printing 3.6. Discard non-conforming materials or make adjustments to processing operations in accordance with workplace procedures.
4. Monitor printing and decorating operation	4.1. Start up, operate and shut down equipment as required by procedures 4.2. Monitor printing and decorating operations 4.3. Make adjustments to remedy faults and non-conformity to production standards where applicable 4.4. Collect material which is able to be reprocessed and reused, and dispose of waste and scrap in accordance with procedures 4.5. Clean up equipment, lubricate, and adjust in accordance with workplace procedures.
5. Respond to problems.	5.1. Identify possible routine and non-routine problems in the equipment, materials or process 5.2. Determine problems needing action 5.3. Determine possible fault causes 5.4. Rectify problems using appropriate solutions within area of responsibility 5.5. Report problems outside area of responsibility to designated person.

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RANGE OF VARIABLES:

This competency applies to all printing and decorating of rigid products within the plastics and rubber industries. It includes the operation of all relevant additional equipment where that equipment is integral to the printing and decoration process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- hand carts and trolleys
- knives and other bag opening equipment
- hoists/lifting equipment not requiring any special permits or licences
- basic hand tools required for opening of material packaging
- relevant personal protective equipment.

Typical hazards include:

- spills
- dusts/vapours
- hazardous materials
- manual handling hazards
- knife hazards.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems include:

- variations in materials
- contamination of materials in product to be decorated
- out of specification equipment operation
- variations in materials and/or contamination of materials
- processing problems.

Key variables to be monitored include:

- equipment operating conditions
- condition of graphics and lettering film
- colour
- output rate
- product integrity and general conformance to specification/sample
- product quality
- ink adherence
- production outputs
- equipment operating pressures
- colour
- thickness
- product integrity.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - impact of incorrect or faulty materials
  - production workflow sequences and materials demand
  - focus of operation of work systems and equipment
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures
- distinguish between causes of faults such as:
  - wrong raw materials/additives/catalyst
  - incorrect quantity of materials/additives/catalyst
  - contaminated materials/additives/catalyst
  - impact of variations in raw materials and equipment operation in relation to final product
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check equipment for correct setup to job specifications and implement adjustments or report deviations immediately
- safely shut down equipment in normal or abnormal circumstances
- identify factors which may affect product quality or production output and appropriate remedies
  - incorrect quantity of materials
  - contaminated materials.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and printing and decoration process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

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Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg, to determine that 16 units and 46 units are equal to a total of 62 units.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

UNIT TITLE

PMBPROD318B - Build first stage tyres

UNIT DESCRIPTOR

This competency covers the production of first stage tyre carcasses through the operation of the first stage tyre building machine.

This competency is typically performed by operators working independently.

This competency in practice

This competency applies to operators who are involved in the assembly of basic tyre components from intermediate production stages into a first stage carcass. The key factors are the monitoring of the production process and resolving routine problems. It includes:

- checking job sheets for work to be done
- conducting pre-start checks of setup
- starting up and shutting down of equipment
- monitoring equipment during production process
- resolving routine production problems and notifying appropriate persons of non-routine problems.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify job requirements of tyre to be built (PSR, LVR, TBR) 1.2. Identify any special requirements 1.3. Identify product, materials and equipment requirements for job(s) 1.4. Recognise hazards and adopt steps required to ensure safety 1.5. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check machine setup according to specification sheets 2.2. Check safety gates and guards are located in their correct working positions 2.3. Check available materials (tubeless liner, first and second ply, beadwire) are assembled 2.4. Inspect to ensure materials assembled are to specifications for job 2.5. Adjust length of overlay to ensure conformity with documented procedures 2.6. Check raw materials are correct 2.7. Undertake other pre-start checks in accordance with procedures.

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ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Start machine safely and correctly in accordance with procedures 3.2. Check holding chuck locked into place 3.3. Lay tubeless inner on the building drum, and then first and second ply 3.4. Cut each layer to length: first ply bias cut to left, second ply bias cut to right 3.5. Place bead wire in position and fold fabric over to lock bead wire into place 3.6. Unload carcass from machine and store in trolleys for next stage of processing 3.7. Communicate with second stage tyre building operators when carcass supply sufficient 3.8. Maintain supply of material(s) as required 3.9. Complete logs and records when required 3.10. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.11. Clean up equipment and work area in accordance with procedures 3.12. Shut down machine safely and correctly in accordance with procedures.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency unit includes the use of first stage type building machines. It includes the operation of all relevant additional equipment where that equipment is integral to the first stage tyre building process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- hand tools as required
- knives for bias cutting different component layers
- relevant personal protective equipment.

Typical hazards include:

- manual handling
- cut hazards
- noise, light, energy sources
- humidity, air temperatures, radiant heat
- stationary and moving machinery, parts and components.

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Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Routine problems include:

- equipment
  - poorly aligned guides
  - mould incorrectly placed on machine
- materials
  - contaminated materials
  - lack of adhesion
- process
  - rotation speed
  - temperature
- product
  - protecting from contamination and damage
  - protecting from distortion.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - the function of the tyre building equipment and machine components
  - different components used in the building process, eg tubeless liner, first and second (or third) ply, beadwire
  - the function of different components
  - range of products made using this method
  - reasons for differences in types and number of components used in different products
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the first stage tyre building process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances

- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between types of faults arising from:
  - materials
  - equipment
  - process.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- production standards are met consistently
- upstream and down stream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

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KEY COMPETENCIES						
1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	1	2

UNIT TITLE

PMBPROD319B - Build up rollers

UNIT DESCRIPTOR

This unit applies to employees required to apply knowledge of materials, product purpose and processes to the operation of roller building equipment. It typically applies to the rubber sector.

This competency is typically performed by all operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who build rubber (or similar) rollers. The key factors are the use of the right materials and the building of a roller of the right density and dimensions. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- collecting a range of materials and assembling them close to the start of the process and in the same sequence as the job is to be done
- building the roller in a consistent manner and to specification
- identifying possible building faults and correcting them as part of the building process
- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking materials for conformity to job requirements
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Select appropriate compound, adhesives and solvent type to meet product specifications 1.3. Identify other materials required 1.4. Recognise hazards and follow appropriate hazard control/minimisation methods 1.5. Identify and check emergency stops, guards and controls 1.6. Identify requirements for materials, quality, production and equipment checks 1.7. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Check roller building process setup and materials	2.1. Identify equipment information, required quality specifications and standard operating procedures 2.2. 2.2 Check roller building settings, stop bars and pressure wheel adjustments for conformity to procedures 2.3. Check materials for conformity with requirements 2.4. Measure and cut rubber sheet 2.5. Discard or re-sand non-conforming materials in accordance with procedures.
3. Build rubber rollers.	3.1. Number rollers in accordance with workplace procedures 3.2. Sand off excess rubber to ensure a good metal surface for adhesion 3.3. Take measurements and compare with specifications 3.4. Trim edges flush with rollers and minimise waste 3.5. Use plates to restrict flow of rubber during curing 3.6. Monitor roller building operations, noting adhesion, rubber buildup, overlap, product quality, production outputs, equipment operating temperatures 3.7. Make adjustments to remedy faults and non-conformity to production standards 3.8. Collect and reuse material which is able to be reprocessed and deal with waste and scrap in accordance with procedures 3.9. Complete equipment cleanup, lubrication, adjustment and waste management in accordance with procedures 3.10. Compare product quality including thickness and product integrity with process specifications for green rubber product.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problems using appropriate solutions within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to the production/building of rubber rollers in the rubber industry. It includes the operation of all relevant additional equipment where that equipment is integral to the roller building process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

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This competency includes tools and equipment such as:

- hand carts and trolleys
- knives and other sheet cutting equipment
- hoists/lifting equipment not requiring any special permits or licences
- solvent application/wiping gear
- hand tools used in the roller building process
- relevant personal protective equipment.

Typical hazards include:

- solvent vapours
- hazardous materials
- manual handling hazards
- knife hazards.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems include:

- variations in materials
- contamination of materials
- contamination of core/spindle
- porous, damaged or unsuitable core/spindle
- processing problems.

Key variables to be monitored include:

- operating temperatures
- speed
- colour
- cushion specification
- cycle time
- output rate
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- identify the function of roller building equipment, machine components and the materials used
- identify faulty cores/mandrels
- describe changes to materials at the stages of production conducted by the employee
- explain the impact of roller building machine temperature, pressure and adhesive flash off time on product quality and production output
- identify and describe own role and the roles of others involved directly in the roller building process
- decide if they (the operator) are able to rectify the fault or if assistance is required
- explain the effect of unauthorised or emergency shutdown of equipment on the roller building process
- plan own work sequence including identification of key checkpoints for equipment monitoring, product quality checks and monitoring of supplies and downstream operations monitor equipment operation and product quality
- identify factors which may influence product quality and production output and appropriate remedies
- make appropriate authorised alterations to own work plan and equipment to maintain both product quality and required production output
- locate, interpret and apply relevant information and maintain workplace records
- identify and safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- apply and/or explain:
  - impact of incorrect or faulty materials
  - production workflow sequences and materials demand
  - focus of operation of work systems and equipment
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures
  - the nature of the mechanical, hydraulic, pneumatic, electrical and electronic principles which influence the roller building equipment operation and product development
  - the impact that chemical reactions/mechanical processes have on changing the state, form and condition of the materials
  - production workflow schedule requirements
  - focus of operation of work systems and equipment
  - identification and correct use of equipment, processes and procedures
  - plan own work including predicting consequences and identifying improvements
- distinguish between causes of faults such as:
  - wrong raw materials
  - incorrect building
  - contaminated materials/core/spindle
  - core/spindle fault.

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Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and roller building process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required to interpret specifications and lay out geometric shapes

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

UNIT TITLE

PMBPROD320B - Produce foam injected mouldings

UNIT DESCRIPTOR

This competency covers the application of knowledge of materials, product purpose and processes to the production of foam injected mouldings.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators of foam injection moulding equipment. The key factors are the adequate planning of the process stages, preparation of the equipment, checking on performance of the equipment and making approved adjustments and equipment corrections. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- ensuring the equipment and materials are appropriate for the job
- producing the product
- checking the product for conformance with specification
- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine foam injection moulding equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

ELEMENT	PERFORMANCE CRITERIA
2. Check foam injection moulding process setup.	2.1. Determine equipment requirements 2.2. Set process to specifications as required 2.3. Check foam injection moulding equipment settings and adjustments are as required 2.4. Check materials are correct 2.5. Discard, or make adjustments to the process for, non-conforming materials 2.6. Set up date, batch and materials markings to specifications, as required 2.7. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments as required to the foam injection moulding process.	3.1. Operate foam injection moulding equipment, noting key variables 3.2. Monitor controls/displays/terminals for production/process data 3.3. Monitor product/process quality in accordance with procedures 3.4. Make adjustments to remedy faults and nonconformity to standard as required 3.5. Maintain continuity of process 3.6. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.7. Clean, adjust and lubricate equipment as required 3.8. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problems using appropriate solutions within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to the production of foam injected moulded products in the plastics and rubber industries. It includes the operation of all relevant additional equipment where that equipment is integral to the foam injected moulding process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

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This competency includes tools and equipment such as:

- hand carts and trolleys
- knives and other bag opening equipment
- hoists/lifting equipment not requiring any special permits or licences
- basic hand tools required for opening of material packaging
- relevant personal protective equipment
- hand tools used in the foam injected product moulding process
- material loading equipment used for loading of raw materials.

Typical hazards include:

- spills
- dusts/vapours
- hazardous materials
- manual handling hazards
- knife hazards.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems include:

- variations in materials
- contamination of materials
- out of specification machine operation
- machine malfunction
- mould/tooling problems
- processing problems.

Key variables to be monitored include:

- operating temperatures
- speed
- colour
- cycle time
- output rate
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - impact of incorrect or faulty materials
  - production workflow sequences and materials demand
  - focus of operation of work systems and equipment
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures
- distinguish between causes of faults such as:
  - wrong raw materials/additives/catalyst
  - incorrect quantity of materials/additives/catalyst
  - contaminated materials/additives/catalyst
- apply and/or explain:
  - quality requirements at each production stage
  - nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which affect machine operation and product development
  - foam injection moulding cycle and the importance of machine setup and warm-up for effective processing of materials
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check foam injection moulding machine for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control.

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Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and foam injection moulding process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg, to determine that 16 units and 46 units are equal to a total of 62 units.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

UNIT TITLE

PMBPROD321A - Produce rotational moulded products

UNIT DESCRIPTOR

This competency covers the operation and adjustment of rotational moulding processes and the solving of non-routine problems. This does not cover open flame equipment.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of rotational moulding equipment. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine rotational moulding equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit of competency has the prerequisite of:

- PMB PROD 221 A Operate rotational moulding equipment.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, safety gates, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

ELEMENT	PERFORMANCE CRITERIA
2. Check rotational moulding process setup.	2.1. Determine equipment requirements 2.2. Set process to specifications as required 2.3. Check rotational moulding equipment settings and adjustments are as required 2.4. Check materials are correct 2.5. Discard, or make adjustments to the process for, non-conforming materials 2.6. Set up date, batch and materials markings to specifications, as required 2.7. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments as required to the rotational moulding process.	3.1. Operate rotational moulding equipment, noting key variables 3.2. Monitor controls/displays/terminals for production/process data 3.3. Monitor product/process quality in accordance with procedures 3.4. Make adjustments to remedy faults and nonconformity to standard as required 3.5. Maintain continuity of process 3.6. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.7. Clean, adjust and lubricate equipment as required 3.8. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problems using appropriate solutions within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to rotomoulding systems including fixed spindle, single spindle, multiple spindle and shuttle, swing and carousel type machines. It includes the operation of all relevant additional equipment where that equipment is integral to the rotational moulding process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- hand tools used in the rotational moulding process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

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Typical hazards include:
- noise, light, energy sources
- manual handling
- humidity, air temperatures, radiant heat, hot moulds
- stationary and moving machinery, parts and components.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems include:
- routine and non-routine product rotational moulding faults
- machine malfunction
- mould/tooling problems
- variations in materials and/or contamination of materials
- processing problems.

Key variables to be monitored include:
- cycle time according to external temperatures and humidity
- operating temperatures
- type of heating used
- cooling time
- speed of rotation/movement
- pattern of movement
- colour of product
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:
- apply and/or explain:
  - products, materials and material characteristics
  - behaviour of materials in relation to heat, rotation and time
  - quality requirements at each production stage
  - function and operating principles of rotational moulding equipment, machine components and ancillary equipment
  - impact of machine speed, temperature, time during heating and cooling cycles on product quality and production output
  - nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which affect machine operation and product development
  - rotational moulding cycle and the importance of machine setup and warm-up for effective processing of materials
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up

- the hierarchy of control including engineering controls
- impact of variations in raw materials and equipment operation in relation to final product
- changes to materials at various stages of production
- waste management and importance of non-conforming materials

ν plan own work including predicting consequences and identifying improvements
ν interpret from production requests the correct selection and use of equipment, materials, processes and procedures
ν maintain output and product quality using appropriate instruments, controls, test information and readings
ν make adjustments to equipment operation to rectify variations in equipment operation or product quality
ν check rotational moulding machine for correct setup to job specifications and implement adjustments or report deviations immediately
ν start up equipment and make appropriate adjustments to bring process on line
ν take samples when required and identify product out of specification
ν safely shut down equipment in normal or abnormal circumstances
ν identify and describe own role and role of others involved directly in the rotational moulding process
ν identify factors which may affect product quality or production output and appropriate remedies
ν identify when the operator is able to rectify faults and when assistance is required
ν identify hazards of the materials and process
ν implement appropriate procedures for hazard control
ν use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
ν distinguish between causes of faults such as:

- routine faults – short mouldings, sink marks, voids, burn marks, mica, splash marks, warping, silver streaking, blistering, flow marks, poor surface finish, windows, erratic cycles, poor colour dispersion, rotation damage, colour contamination, black spots
- incorrect quantity of materials
- contaminated materials.

Critical aspects:

It is essential that competence is demonstrated in the ability to

ν identify critical materials properties and rotational moulding process characteristics in relation to the process requirements and the end product
ν plan own work process within workplace procedures and explain the reasons for the steps in the process
ν take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

ν production quality and output standards are met consistently
ν problems are anticipated from process observations
ν problems are efficiently resolved
ν the process runs consistently and smoothly.

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Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

UNIT TITLE

PMBPROD323B - Produce powder coated products

UNIT DESCRIPTOR

This competency covers the operation of powder (dry) coating equipment, including pretreatment, racks, overhead tracks, hand and automatic spray equipment and ovens, and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement..

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of powder coating equipment. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine powder coating equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials colour, grade and quantity required 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

ELEMENT	PERFORMANCE CRITERIA
2. Check powder coating process setup.	2.1. Determine equipment requirements 2.2. Set up and adjust powder coating equipment, racks, overhead tracks, spray equipment, oven 2.3. Check equipment, powder coat material and settings all match requirements 2.4. Discard, or make adjustments to the process for, non-conforming materials 2.5. Set up date, batch and materials markings to specifications, as required 2.6. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments as required to the powder coating process.	3.1. Start equipment safely and correctly in accordance with standard procedures 3.2. Operate equipment, noting key variables 3.3. Compare measures of powder build, colour and final coat match requirements 3.4. Monitor controls including speeds, operating temperatures and spray conditions, as required 3.5. Monitor controls/displays/terminals for production/process data 3.6. Make adjustments to remedy faults and nonconformity to standard as required 3.7. Maintain continuity of process 3.8. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.9. Clean, adjust and lubricate equipment as required 3.10. Pause equipment, or stop equipment in an emergency, following procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problems using appropriate solutions within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to all powder coating processes within the plastics and rubber industries. It includes the operation of all relevant additional equipment where that equipment is integral to the powder coating process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

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This competency includes equipment and tools such as:

- powder coating spray equipment and ancillaries
- racks, baskets and supports, including overhead tracks and drives
- curing ovens and controls
- hand tools used in the powder coating process
- powder handling equipment
- relevant personal protective equipment.

Typical hazards include:

- hazardous chemicals, pretreatment chemicals and powder coating material
- humidity, air temperatures, radiant heat, hot surfaces
- stationary and moving machinery, parts and components
- temperature
- manual handling hazards
- equipment operations.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems include:

- poor pretreatment coverage, drainage or compatibility
- colour variation
- blemishes
- uneven coating
- over/under cured coating
- variations in materials and/or contamination of materials
- processing problems.

Key variables to be monitored include:

- spray application and coverage
- operating temperatures
- speed
- colour
- cycle time
- coating integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - coatings, materials and material characteristics
  - behaviour of materials in relation to heat, pressure and time
  - quality requirements at each production stage
  - different types of powders
  - use and purpose of pretreatments
  - suitability of powders for range of substrate materials in components
  - affect of heat on powders
  - function and operating principles of powder coating equipment, machine components and ancillary equipment
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final coating
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check powder coating process for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- make measurements when required and identify coating out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect coating quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - substrate surface condition
  - pretreatment effectiveness
  - spray application
  - powder
  - oven conditions
  - incorrect quantity of materials
  - contaminated materials.

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Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and powder coating process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

UNIT TITLE

PMBPROD324A - Inspect tyres for retreading

UNIT DESCRIPTOR

This competency covers the inspection of (normally) used tyres to determine the suitability for retreading. It applies to the rubber sector of the industry.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who gather tyres from second hand stock to inspect for faults that would exclude them from being used as base stock for retreaded tyres. The key factors are the identification of faults and deciding whether the number and type of faults are critical. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- inspecting tyres by eye and possibly also electronically for defects that would preclude use as a retread
- repairing minor holes and cracks in the casing
- discarding non-conforming products ensuring they are disposed of in accordance with workplace instructions.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify work requirements from workplace approved operating procedures 1.2. Identify hazards connected with testing of tyres from observation of the equipment, workplace reference materials including materials safety data sheets and equipment instructions 1.3. Identify appropriate measures to minimise risks 1.4. Identify equipment emergency stops, gauges, guards and controls 1.5. Plan task sequences within scope of authority including identifying: 1.6. stages in the inspection process to check product quality 1.7. waste management and work area housekeeping requirements 1.8. any required supplementary equipment for product quality testing or routine lubrication and adjustments.

ELEMENT	PERFORMANCE CRITERIA
2. Inspect tyre casings.	2.1. Establish methods for checking casing size, construction, compound and defects in casing 2.2. Identify specific considerations for inspection based on the type of tyre 2.3. Check inspection equipment settings and adjustments for conformity to documented procedures 2.4. Identify quality specifications and standard operating procedures for rejecting tyres for retreading (eg, number of allowable side wall cracks) 2.5. Check casings for conformity with specification requirements 2.6. Discard non-conforming tyres in accordance with workplace procedures.
3. Complete work requirements.	3.1. Repair minor holes in casings 3.2. Tag tyres suitable for retreading following workplace procedures 3.3. Clean up equipment and lubricate 3.4. Complete equipment adjustments and waste management in accordance with workplace procedures.

RANGE OF VARIABLES:

The competency covers all forms of inspection. In most workplaces this will include visual inspection. In some workplaces, including all those having adopted the 'Bandag' process, NDI or non destructive inspection by scanning will be included after preparing the case ('buffing'). It includes the operation of all relevant additional equipment where that equipment is integral to the tyre inspection process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- manual handling aids such as handcarts and overhead tracks
- lights
- basic hand tools required for inspecting holes in the tyre casing
- NDI scanning equipment
- relevant personal protective equipment.

Typical hazards include:

- dust
- manual handling hazards
- noise.

Typical problems include:

- failure to pick up all defects/cracks
- distinguishing between repairable and non-repairable faults.

All operations are performed in accordance with procedures.

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EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - characteristics of finished and second hand tyres in relation to the impact of the retread process on product quality and safety
  - importance of tyre size, speed rating and aspect ration markings of tyres on inspection decisions
  - equipment and components used at each stage of inspection and retreading
  - impact of significantly faulty tyres falsely passing inspection
  - production workflow sequences and materials demand
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and quantities
- plan own work process within workplace procedures and explain the reasons for the steps in the process.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from observations
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	1	1	2	1

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UNIT TITLE

PMBPROD325A - Lay on tyre retreads

UNIT DESCRIPTOR

This competency covers the laying of retread on casings prepared from used tyres. It applies to the rubber sector of the industry.

This competency is typically performed by operators working independently.

This competency in practice

This competency applies to operators engaged in fitting the retread stock to casings prepared in prior 'buffing' operations. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- discussing work progress with other workers
- inspecting cases for defects that would preclude use as a retread
- laying retread on casings.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify work requirements from job sheet or other workplace approved operating procedure 1.2. Identify hazards connected with laying of tread on tyres from observation of the equipment, workplace reference materials including materials safety data sheets and equipment instructions 1.3. Identify appropriate measures to minimise risks 1.4. Locate equipment emergency stops, gauges, guards and controls 1.5. Plan task sequences within scope of authority including identifying: 1.6. stages in the process to check product quality 1.7. waste management and work area housekeeping requirements 1.8. any required supplementary equipment for product quality testing or routine lubrication and adjustments.
2. Lay retread.	2.1. Apply layer of gum/adhesive to casing 2.2. Place retread accurately so that it is aligned appropriately with casing edge 2.3. Remove excess retread, buff edges and staple firm 2.4. Identify quality specifications and standard operating procedures for rejecting tyres after retreading 2.5. Check casings for conformity with specification requirements 2.6. Discard non-conforming tyres in accordance with workplace procedures

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ELEMENT	PERFORMANCE CRITERIA
3. Complete work requirements.	3.1. Check cards/tags for required relevant information 3.2. Clean up equipment and lubricate 3.3. Complete equipment adjustments and waste management in accordance with workplace procedures.

RANGE OF VARIABLES:

This competency applies to tyre retreading. It includes the operation of all relevant additional equipment where that equipment is integral to the tread layup process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include, but are not limited to:

- Bandag retreading
- hot cap
- laying on green tread.

This competency includes tools and equipment such as:

- manual handling aids such as hand carts and trolleys
- powered equipment/aids such as compression rollers, staplers, cutting instruments and stone grinders
- guide lights
- cutting tools
- basic hand tools required for roughing the surface of tread, cutting and stapling tread
- relevant personal protective equipment.

Typical hazards include:

- fumes/vapours
- cutting tools
- manual handling hazards
- noise.

Respond to/rectify ‘non-routine problems’ means ‘apply known solutions to a variety of predictable problems’.

Typical problems include:

- failure to pick up all defects/cracks
- poorly aligned tread
- tread too long/short
- wrong tread profile.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise’s procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

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Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - characteristics of finished and second hand tyres in relation to the impact of the retread process on product quality and safety
  - importance of tyre size, speed rating and aspect ration markings of tyres on inspection decisions
  - tyre retread processes and the differences between mould cure and pre-cure retreading
  - equipment and components used at each stage of retreading
  - adhesives used when fitting retreads
  - impact of significantly faulty tyres falsely passing inspection
  - production workflow sequences and materials demand
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures
- identify requirements for checking
  - casing size
  - buffing head contact pressure
  - construction
  - tyre inflation
  - compound
  - contour template
  - defects in casing
- distinguish between causes of faults such as:
  - wrong raw materials
  - wrong size/profile
  - poorly prepared casing.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and quantities
- plan own work process within workplace procedures and explain the reasons for the steps in the process.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

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Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
1	1	2	1	1	2	1

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UNIT TITLE

PMBPROD326A - Inspect tyres

UNIT DESCRIPTOR

This competency covers the testing and inspection of tyres.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to inspect and test tyres, either manually or by machine, prior to the finishing process. The key factors are the identification of different tyre types and the recognition of a range of routine and non-routine faults. It includes:

- identifying and planning own work requirements
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- monitoring equipment operation and correcting variations
- sorting conforming and non-conforming products ensuring discarded products are repaired where possible and scraped tyres are disposed of in accordance with workplace instructions
- recognise routine and non-routine faults, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for inspection and testing process 1.2. Identify different tyre types, identification codings and quality standards required 1.3. Recognise hazards and determine hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify repair, scrap tyre and housekeeping needs.
2. Set up tyres for testing process.	2.1. Manually locate bumps or dips 2.2. Determine equipment requirements 2.3. Load tyre into machine 2.4. Set up x-ray machine to undertake checks 2.5. Complete other pre-start checks in accordance with procedures.

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ELEMENT	PERFORMANCE CRITERIA
3. Operate tyre testing machines.	3.1. Inflate tyre 3.2. Operate machine to rotate and test tyre 3.3. X-ray tyre following standard operating procedures and State OH&S requirements 3.4. Monitor product quality in accordance with procedures 3.5. Clean, adjust and lubricate equipment as required 3.6. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Respond to faults.	4.1. Identify possible routine and non-routine faults in the tyre 4.2. Determine tyres needing action 4.3. Determine possible fault causes 4.4. Report faults outside area of responsibility to designated person 4.5. Maintain appropriate records and log books to meet procedures/ work instructions.
5. Stamp, label and sort tyres.	5.1. Stamp identification number on each tyre 5.2. Label tyres with weekly code 5.3. Sort passed tyres by coding 5.4. Sort tyres for repair or scrap.

RANGE OF VARIABLES:

This competency applies to the inspection and testing of tyres within the rubber industry. It includes the operation of all relevant additional equipment where that equipment is integral to the inspection/testing process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- x-ray machines
- hand tools used in the inspection/testing process
- material loading equipment used for loading of tyres
- relevant personal protective equipment.

Typical hazards include:

- manual handling hazards
- equipment operations.

Typical process and product faults include:

- variations in materials and/or contamination of materials
- processing problems.

Key variables to be monitored include:

- colour
- product weight
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

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EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and testing process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - quality requirements of different types of tyres
  - function and operating principles of tyre testing equipment, machine components and ancillary equipment
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - waste management and importance of repairing non-conforming products
- plan own work including predicting consequences and identifying improvements
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation
- check machine for correct set up to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the inspection/testing process
- identify factors which may affect product quality and appropriate remedies
- identify what faults the operator is able to recognise manually and when assistance by equipment is required
- identify hazards of the materials and process and take appropriate hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - routine faults – short mouldings, sink marks, voids, burn marks, mica, splash marks, warping, silver streaking, blistering, flow marks, poor surface finish, windows, erratic cycles, poor colour dispersion, ejection damage, colour contamination, black spots
  - incorrect quantity of materials
  - contaminated materials.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and process characteristics in relation to the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process.

Consistent performance should be demonstrated. In particular look to see that:

- quality and output standards are met consistently
- faults are anticipated from observations
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

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UNIT TITLE

PMBPROD327A - Produce finished tyres

UNIT DESCRIPTOR

This competency covers the operation and adjustment of processes and the solving of non-routine problems. This competency is for the finishing of tyres.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of processes. The key factors are the production of tyres meeting quality standards and requirements, and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking tyres for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required 1.3. Recognise hazards and determine hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Check process setup.	2.1. Determine equipment requirements 2.2. Set process to specifications as required 2.3. Check equipment settings and adjustments are as required 2.4. Check materials are correct 2.5. Discard, or make adjustments to the process for, non-conforming materials 2.6. Set up date, batch and materials markings to specifications, as required 2.7. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments to the process as required.	3.1. Operate process equipment, noting key variables 3.2. Monitor controls/displays/terminals for production/process data 3.3. Monitor product quality in accordance with procedures 3.4. Make adjustments to remedy faults and nonconformity to standard as required 3.5. Maintain continuity of process 3.6. Collect and reprocess/discard scrap/trim and other materials as well as disposing of reject tyres in accordance with procedures 3.7. Clean, adjust and lubricate equipment as required 3.8. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. 4.2 Determine problems needing action 4.3. 4.3 Determine possible fault causes 4.4. 4.4 Rectify problem using appropriate solution within area of responsibility 4.5. 4.5 Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to the operation of tyre finishing processes within the tyre sector. It includes the operation of all relevant additional equipment where that equipment is integral to the process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency may include equipment and tools such as:

- process electrical/mechanical machine and its major components, eg, radial runout machine, x-ray console (manual/auto), vulcaniser, spreader, force variation machine, camera throw out unit, radial run out and lateral run out peak unit, grinders, high point tape, harmonic balance
- process equipment and its major components, eg, digital measuring equipment, visual display unit, printer, labelling equipment, inflation panel, inspection station, trimming tools, power tools for tyre repair, repair table, foot pedal, marking chalk and table

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- hand tools used in the process, eg, hand held trimmers
- material loading machine/equipment used for loading/unloading of tyres may include mechanical crane, chucks, push trolleys, stillages, conveyors, etc
- relevant personal protective equipment, eg, radiation discs for x-ray inspection
- relevant protective clothing which may include gloves, safety glasses and appropriate footwear.

This competency includes repair materials such as:

- cement
- paint
- silicone.

Typical hazards include:

- dusts/vapours
- slip and fall
- temperature
- hazardous materials
- manual handling hazards, eg, loading and unloading tyres from machines/equipment
- machine/equipment operations, eg, hand held trimmers, x-ray machines, inflating panels.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems include:

- routine and non-routine product faults, eg, excess flash
- machine malfunction
- mould/tooling/die problems
- variations in materials and/or contamination of materials
- processing problems, eg, flow-through of tyres.

Typical tyre information includes:

- mould numbers
- tread patterns and codes
- running serial numbers
- other relevant numbers and codes
- tyre sizes
- coloured tread identification lines.

Key variables to be monitored include:

- temperatures
- speed
- pressures
- colour
- tyre components
- repair standards
- limits for repair
- tyre construction/integrity and general conformance to specification/sample, eg, bumps/dips on tyres.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - behaviour of materials in relation to key process variables
  - quality requirements at each production stage
  - function and operating principles of equipment, machine components and ancillary equipment
  - impact of key process variables on product quality and production output
  - nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which affect machine operation and product development
  - the importance of machine setup and startup procedure for effective processing of materials
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up, eg, maximum number of tyres to be stacked per stillage
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of reusing non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check machine for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process and take appropriate hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - routine faults

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- incorrect quantity of materials
- contaminated materials

ν complete accurately necessary workplace documents (manually and/or electronically) which may include:
- input data into computer system
- grading record sheets, etc

ν Liaise with and/or disseminate information regarding updates and changes to other colleagues who may include:
- other operators and/or forklift drivers
- records personnel

supervisors.

Critical aspects:

It is essential that competence is demonstrated in the ability to
ν identify critical materials properties and process characteristics in relation to the process requirements and the end product
ν plan own work process within workplace procedures and explain the reasons for the steps in the process
ν take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:
ν production quality and output standards are met consistently
ν problems are anticipated from process observations
ν problems are efficiently resolved
ν the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

For operation of force variation machine, basic statistical knowledge is required to understand concepts of variance and process control as well as to recognise and interpret process control charts.

Assessment method and context:

Competence in this unit may be assessed:
ν on an operating plant allowing for operation under all normal and a range of abnormal conditions
ν by use of a suitable simulation and/or a range of case studies/scenarios
ν by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

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UNIT TITLE

PMBPROD328B - Produce sheet feed vacuum forming products

UNIT DESCRIPTOR

This competency covers the production of sheet feed vacuum forming products using sheet feed vacuum forming equipment.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are involved in the operation of sheet feed fabrication vacuum forming equipment, monitoring production, maintaining person safety and the safety of others within the context of required production output and product quality standards. The key factors are the setting up of sheet feed fabrication vacuum forming equipment, monitoring production and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine vacuum forming equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs 1.7. Plan vacuum forming operations within scope of authority.

ELEMENT	PERFORMANCE CRITERIA
2. Check process setup.	2.1. Determine equipment requirements 2.2. Check vacuum forming settings and adjustments for conformity to documented procedures 2.3. Check materials for conformity 2.4. Set process to specifications as required 2.5. Discard non-conforming materials or adjust processing operations in accordance with procedures/ workplace instructions 2.6. Set up (where applicable) date and/or batch markings, materials identification for the appropriate information 2.7. Undertake other pre-start checks in accordance with procedures/ work instructions.
3. Operate and make adjustments to the process as required.	3.1. Start machine safely and correctly in accordance with procedures/work instructions 3.2. Monitor sheet feed vacuum forming operations in accordance with procedures/work instructions, noting key variables 3.3. Monitor controls/displays/terminals for production/process data 3.4. Monitor product/process quality in accordance with procedures 3.5. Make adjustments to remedy faults and non-conformity to standard as required 3.6. Maintain continuity of process 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean, adjust and lubricate equipment as required 3.9. Pause equipment or stop equipment in an emergency, following workplace and emergency procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problems using appropriate solutions within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency unit includes the use of sheet feed fabrication vacuum forming equipment. It includes the operation of all relevant additional equipment where that equipment is integral to the vacuum forming process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- hand tools as required
- relevant personal protective equipment.

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Typical hazards include:
- manual handling
- fumes/vapours
- stationary and moving machinery, parts and components.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:
- apply and/or explain:
  - the impact of chemical reactions/mechanical processes on the condition of materials
  - products, materials and material characteristics
  - quality requirements at each production stage
  - function and operating principles of sheet feed vacuum forming equipment, machine components and ancillary equipment
  - sheet feed vacuum forming cycle and the importance of machine set up and warm up for effective processing of materials
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check machine for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the vacuum forming process

- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - routine faults
  - incorrect quantity of materials
  - contaminated materials.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

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Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

UNIT TITLE

PMBPROD329B - Produce polystyrene shape moulded products

UNIT DESCRIPTOR

This competency covers the application of knowledge of materials, product purpose and processes to the production of polystyrene foam shape moulded products.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators of polystyrene shape moulding equipment. The key factors are the planning of the process stages, checking on performance of the equipment and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit has the prerequisite competency of:

- PMB PROD 229 A Operate polystyrene shape moulding equipment.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Plan the stages in the process and ensure these comply with the quality requirements for product 1.2. Identify and allow for changes in materials at each stage of the polystyrene shape moulding process 1.3. Plan the availability of the equipment and components for each production stage 1.4. Anticipate the impact of the process on product characteristics and product quality and usability 1.5. Plan work requirements based on workplace approved operating procedures 1.6. Recognise hazards and follow appropriate hazard control/minimisation methods 1.7. Identify and check emergency stops, guards and controls 1.8. Identify equipment and processes to be used for materials preparation, production process and downstream operations 1.9. Plan the task sequences including times and locations for product quality checks, equipment operation and required production outputs 1.10. Identify materials, waste management and housekeeping needs.
2. Check polystyrene shape moulding process setup.	2.1. Read and comply with equipment information, required quality specifications and setup cards 2.2. Check equipment setup is in accordance with required quality specifications and standard operating procedures 2.3. Check polystyrene shape moulding equipment settings and adjustments for temperature, compression and pressure conformity to documented procedures 2.4. Inspect materials for conformity with workplace operational requirements 2.5. Check materials are correct 2.6. Discard, or make adjustments to the process for, non-conforming materials 2.7. Set up date, batch and materials markings to specifications, as required 2.8. Complete other pre-start checks in accordance with procedures.

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ELEMENT	PERFORMANCE CRITERIA
3. Operate and make adjustments as required to the polystyrene shape moulding process.	3.1. Operate equipment, noting key variables 3.2. Monitor polystyrene shape moulding operations noting product quality, production outputs, steam temperatures, weight, polystyrene density and product integrity 3.3. Monitor product/process quality in accordance with procedures 3.4. Make adjustments to remedy faults and non-conformity to production standards where applicable 3.5. Collect material which is able to be reprocessed and reused, and dispose of waste and scrap in accordance with workplace procedures 3.6. Maintain continuity of process 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean, adjust and lubricate equipment as required 3.9. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problems using appropriate solutions within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to polystyrene shape moulding within the plastics sector. It includes the operation of all relevant additional equipment where that equipment is integral to the polystyrene shape moulding process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include, but are not limited to:

- movement of materials
- opening of packages or boxes
- stacking and storing of materials
- basic checking of materials and equipment
- basic machine operations.

This competency includes tools and equipment such as:

- hand carts and trolleys and other manual handling aids
- knives and other bag opening equipment
- hoists/lifting equipment not requiring any special permits or licences
- basic hand tools required for opening of material packaging
- relevant personal protective equipment.

Typical hazards include:
- ν spills
- ν dusts/fumes
- ν hazardous materials
- ν manual handling hazards
- ν knife hazards.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical problems include:
- ν variations in materials
- ν contamination of materials
- ν out of specification machine performance.

Key variables to be monitored include:
- ν operating temperatures
- ν speed
- ν colour
- ν output rate
- ν product weight
- ν product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:
- ν apply and/or explain:
  - impact of incorrect or faulty materials
  - production workflow sequences and materials demand
  - focus of operation of work systems and equipment
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures
  - products, materials and material characteristics
  - quality requirements at each production stage
  - function and operating principles of polystyrene shape moulding equipment, machine components and ancillary equipment
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials

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- plan own work including predicting consequences and identifying improvements

- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check polystyrene shape moulding machine for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - routine faults
  - incorrect quantity of materials
  - contaminated materials.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and polystyrene shape moulding process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

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UNIT TITLE

PMBPROD331B - Produce printed and decorated film

UNIT DESCRIPTOR

This competency covers the production of product from film printing and decorating equipment.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators of film printing and decorating equipment. The key factors are the adequate planning of the process stages, preparation of the equipment, checking on performance of the equipment and making approved adjustments and equipment corrections. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- planning which jobs have the higher priority
- ensuring the equipment and materials are appropriate for the job
- producing the product
- checking the product for conformance with specification
- identifying and planning own work requirements from production requests
- checking settings and adjustments of equipment
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Plan the process stages for printing and decorating on flexible films.	1.1. Plan the stages in the printing process and ensure these comply with the quality requirements for product printing 1.2. Identify and allow for changes in materials at each stage of the printing and decorating process 1.3. Plan the availability of the equipment and components for each production stage 1.4. Anticipate the impact of the process on product characteristics and product quality and usability 1.5. Plan work requirements based on workplace approved operating procedures 1.6. Identify equipment and processes to be used for materials preparation, production process and for downstream operations.

ELEMENT	PERFORMANCE CRITERIA
2. Prepare for flexible printing and decorating operations.	2.1. Prepare materials including base raw materials and additives 2.2. Identify and address hazards connected with both production materials and process 2.3. Check base materials inputs and outputs, dyes and print chemical colours, ancillary supplies and equipment 2.4. Check product quality requirements for the relevant process stage(s) 2.5. Identify and locate equipment emergency stops, gauges, guards and controls 2.6. Plan the task sequences including times and locations for product quality checks, equipment operation and required production outputs 2.7. Provide for ongoing materials input, waste management and work area housekeeping requirements 2.8. Arrange any required supplementary equipment for product quality testing or routine equipment maintenance and/or adjustments.
3. Set up and check printing and decorating equipment.	3.1. Set up equipment in accordance with required quality specifications and standard operating procedures 3.2. Check printing and decorating settings and equipment adjustments for conformity to documented procedures 3.3. Inspect materials for conformity with workplace operational requirements including surface condition and materials thickness 3.4. Discard non-conforming materials or make adjustments to processing operations in accordance with workplace procedures.
4. Monitor printing and decorating operation.	4.1. Start up, operate and shut down operation as required by procedures 4.2. Monitor printing and decorating operations noting product quality, ink adherence, production outputs, equipment operating pressures, colour, thickness and product integrity 4.3. Make adjustments to remedy faults and non-conformity to production standards where applicable 4.4. Collect material which is able to be reprocessed and reused, and dispose of waste and scrap in accordance with workplace procedures 4.5. Clean up equipment, lubricate and adjust in accordance with workplace procedures.
5. Respond to problems.	5.1. Identify possible routine and non-routine problems in the equipment, materials or process 5.2. Determine problems needing action 5.3. Determine possible fault causes 5.4. Rectify problems using appropriate solutions within area of responsibility 5.5. Report problems outside area of responsibility to designated person.

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RANGE OF VARIABLES:

This competency applies to all printing and film decorating equipment within the plastics and rubber industries. It includes the operation of all relevant additional equipment where that equipment is integral to the printing and film decorating process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- hand carts and trolleys
- knives and other package opening equipment
- hoists/lifting equipment not requiring any special permits or licences
- relevant personal protective equipment
- hand tools used in the printing and decorating process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

Typical hazards include:

- dusts/vapours/fumes
- hazardous materials
- manual handling hazards
- knife hazards.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems include:

- variations in materials
- contamination of materials
- equipment operation problems
- machine malfunction
- product anomalies such as sticking, 'veining', misprints.

Key variables to be monitored include:

- speed
- colour
- production time
- output rate
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - impact of incorrect or faulty materials
  - production workflow sequences and materials demand
  - focus of operation of work systems and equipment
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures
- distinguish between causes of faults such as:
  - wrong raw materials
  - incorrect quantity of materials
  - contaminated materials
- apply and/or explain:
  - function and operating principles of film printing and decorating equipment
  - impact of variations in raw materials and equipment operation in relation to final product
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- start up equipment and make appropriate adjustments to bring equipment on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- distinguish between causes of faults such as:
  - incorrect quantity of materials
  - contaminated materials.

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Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and printed and decorated film process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg, to determine that 16 units and 46 units are equal to a total of 62 units.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
1	1	1	1	1	1	1

UNIT TITLE

PMBPROD332B - Produce thermally bent products

UNIT DESCRIPTOR

This competency covers the use of thermal bending equipment.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are involved in the operation of thermal bending equipment (eg, for acrylic, PET or PVC), monitoring production, maintaining personal safety and the safety of others within the context of required production output and product quality standards. The key factors are the setting up of sheet feed fabrication vacuum forming equipment, monitoring production and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- solving routine and non-routine equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Plan thermal bending operations within scope of authority 1.7. Identify materials, waste management and housekeeping needs.

ELEMENT	PERFORMANCE CRITERIA
2. Check thermal bending process setup.	2.1. Determine equipment requirements 2.2. Set process to specifications as required 2.3. Check thermal bending equipment settings and adjustments are as required 2.4. Check materials are correct 2.5. Discard, or make adjustments to the process for, non-conforming materials 2.6. Set up date, batch and materials markings to specifications, as required 2.7. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments as required to the thermal bending process.	3.1. Operate thermal bending equipment, noting key variables 3.2. Monitor controls/displays/terminals for production/process data 3.3. Monitor product/process quality in accordance with procedures 3.4. Make adjustments to remedy faults and nonconformity to standard as required 3.5. Maintain continuity of process 3.6. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.7. Clean, adjust and lubricate equipment as required 3.8. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problems using appropriate solutions within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency unit covers the use of thermal bending equipment. It includes the operation of all relevant additional equipment where that equipment is integral to the thermal bending process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- hand tools as required
- relevant personal protective equipment.

Typical hazards include:

- spills
- dusts/vapours
- stationary and moving machinery, parts and components.

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Key variables to be monitored include:

- operating temperatures
- speed
- colour
- output rate
- product weight
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - difference between materials such as PVC, acrylic and/or PET materials
  - products, materials and material characteristics
  - behaviour of materials in relation to heat, pressure and time
  - quality requirements at each production stage
  - function and operating principles of thermal bending equipment, machine components and ancillary equipment
  - impact of machine speed, temperature, pressure, time during cycles on product quality and production output
  - nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which affect machine operation and product development
  - thermal bending cycle and the importance of machine setup and warm-up for effective processing of materials
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - the hierarchy of control including engineering controls
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check thermal bending machine for correct setup to job specifications and implement adjustments or report deviations immediately

- start up equipment and make appropriate adjustments to bring process on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the thermal bending process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - incorrect angle,
  - sag
  - distortion
  - change in appearance
  - contaminated materials
  - contaminated equipment.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and thermal bending process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

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Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

UNIT TITLE

PMBPROD333A - Convert plastic film

UNIT DESCRIPTOR

This competency covers the operation and adjustment of film converting processes and the solving of non-routine problems. It does not cover film printing or decorating (see PMB PROD 331 *Produce printed and decorated film*).

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of film converting equipment. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine injection moulding equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit of competency has the prerequisite of:

- PMB PROD 233 A Operate film conversion equipment.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives, if appropriate 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Check film conversion process setup.	2.1. Determine equipment requirements 2.2. Set process to specifications as required 2.3. Check film conversion equipment settings and adjustments are as required 2.4. Check materials are correct 2.5. Discard, or make adjustments to the process for, non-conforming materials 2.6. Set up date, batch and materials markings to specifications, as required 2.7. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments as required to the film conversion process.	3.1. Operate film conversion equipment, noting key variables 3.2. Monitor controls/displays/terminals for production/process data 3.3. Monitor product/process quality in accordance with procedures 3.4. Make adjustments to remedy faults and nonconformity to standard as required 3.5. Maintain continuity of process 3.6. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.7. Clean, adjust and lubricate equipment as required 3.8. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problems using appropriate solutions within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to all film conversion within the plastics and rubber industries. It includes the operation of all relevant additional equipment where that equipment is integral to the film conversion process. It does not cover film printing or decorating (see PMB PROD 331 *Produce printed and decorated film*).

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- hand tools used in the film conversion process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

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Typical products include:

- bags - taped, loose, gusseted, perforated-on-reel
- seals - bottom, side, mixed, longitudinal, running, square bottom, angle seal, pouch
- setups - lay flat film, no registration, single seal, centre folded film, registered, with one attachment.

Typical hazards include:

- cut hazards
- nip hazards
- compressed air
- vapours
- slip and fall
- temperature
- hazardous substances
- moving equipment
- manual handling hazards.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process problems include:

- equipment malfunction
- registration
- blocking
- seal bar temperature or wear/damage.

Typical product problems include:

- contamination
- seal appearance
- seal strength
- bag dimensions
- variations in materials and/or contamination of materials.

Key variables to be monitored include:

- operating temperatures
- cooling
- speed
- time/timing
- seal head condition
- cutter condition
- cycle time
- output rate
- product weight
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - behaviour of materials in relation to heat, pressure and time
  - quality requirements at each production stage
  - function and operating principles of film conversion equipment, machine components and ancillary equipment
  - impact of machine speed, temperature, pressure, time during cycles on product quality and production output
  - nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which affect machine operation and product development
  - film conversion cycle and the importance of machine setup and temperature/time/pressure interaction for effective processing of materials
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check film conversion machine for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the film conversion process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task

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- distinguish between causes of faults such as:
  - incorrect materials
  - contaminated materials
  - equipment faults
  - seal bar damage
  - machine failure
  - incorrect quantity of materials
  - contaminated materials
  - temperature/time pressure faults.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and film conversion process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES						
1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

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UNIT TITLE

PMBPROD335B - Build second stage tyres

UNIT DESCRIPTOR

This competency covers the production of 'green' tyres through the operation of the second stage tyre building machine.

This competency is typically performed by operators working independently.

This competency in practice

This competency applies to operators who are involved in the assembly of basic tyre components from intermediate production stages into a completed green tyre ready for curing. The key factors are the monitoring of the production process and resolving routine problems. It includes:

- checking job sheets for work to be done
- conducting pre-start checks of setup
- starting up and shutting down equipment
- monitoring equipment during production process
- resolving routine production problems and notifying appropriate persons of non-routine problems.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify job requirements of tyre to be built (PSR, LVR, TBR) 1.2. Identify any special requirements 1.3. Plan task sequence within scope of authority 1.4. Identify product, materials and equipment requirements for job(s) 1.5. Recognise hazards and adopt steps required to ensure safety 1.6. Check with supervisor/appropriate person if requirements are not in accordance with usual practice.
2. Conduct pre-start checks as required.	2.1. Check machine setup according to specification sheets, including shaping pressure and mould squeeze 2.2. Set loader arm and stripper arms to specification 2.3. Check safety gates and guards are located in their correct working positions 2.4. Check available materials (steel belt, cap-ply, tread ring) are assembled 2.5. Inspect to ensure materials assembled are to specifications for job 2.6. Adjust length overlay to ensure conformity with documented procedures 2.7. Undertake other pre-start checks in accordance with procedures.

ELEMENT	PERFORMANCE CRITERIA
3. Operate equipment.	3.1. Load carcass onto building drum (inflated into fixed position) 3.2. Start machine safely and correctly in accordance with procedures 3.3. Check holding chuck is locked into place 3.4. Check tread centre light and overlay applier is operating correctly 3.5. Adjust tyre loader arm to allow for stretch height and roundness 3.6. Apply steel belt and tread layers as per job specifications and using guide lights 3.7. Unload green tyre from machine and store appropriately for next stage of processing 3.8. Communicate to next stage operators when carcass supply sufficient 3.9. Shut down machine safely and correctly in accordance with procedures/work instructions.
4. Resolve routine problems.	4.1. Identify likely faults that occur during the operation 4.2. Identify and take action on causes of routine faults in accordance with procedures 4.3. Make sure appropriate records and log books of equipment operations are maintained to meet procedures 4.4. Identify non-routine problems and report to designated person.

RANGE OF VARIABLES:

This competency unit covers the use of second stage type building machines. It includes the operation of all relevant additional equipment where that equipment is integral to the tyre building process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- hand tools as required
- knives for bias cutting different component layers
- relevant personal protective equipment.

Typical hazards include:

- manual handling
- cut hazards
- fumes/vapours
- noise, light, energy sources
- humidity, air temperatures, radiant heat
- stationary and moving machinery, parts and components.

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Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Routine problems include:

- equipment
  - poorly aligned guides
  - mould incorrectly placed on machine
- materials
  - contaminated materials
  - distorted/misshaped components
  - poor adhesion
- process
  - rotation speed
  - temperature
- product
  - protecting from contamination
  - protecting from damage.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - the function of the tyre building equipment and machine components
  - the terms radial force, inflation pressure, lateral force, internal force harmonics and concentricity
  - different components used in the building process, eg steel belts, treads
  - the function of different components, especially different tread compounds
  - range of products made using this method
  - reasons for differences in types and number of components used in different products
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the tyre building process

- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- distinguish between possible causes of routine faults such as:
  - materials
  - equipment
  - process.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg, to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

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Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	1	2

UNIT TITLE

PMBPROD343B - Shut down plant or plant area

UNIT DESCRIPTOR

This competency covers the shutting down of equipment for maintenance or end of production run for a defined area. It extends beyond just the shutting down of an item of equipment. It applies to all sectors of the industry.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This unit of competency may be designated for a stream – see the range of variables.

This competency in practice

This competency applies to individuals who shut down equipment or a work area for maintenance, end of a production run or permanent closure of a production line. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- confirming the shutdown instruction
- advising personnel of the decision
- ensuring that production capacity is not damaged elsewhere by the closure
- tagging or isolating the equipment
- ensuring the equipment and area is clean and free of hazards
- covering equipment to resist dust encroachment and corrosion
- completing appropriate workplace documentation
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Respond to requests for equipment shutdown.	1.1. Identify the nature of the shutdown required and the circumstances leading to the decision 1.2. Establish the impact of the shutdown on production capabilities and where necessary reassign work 1.3. Contact appropriate personnel and advise of the shutdown 1.4. Plan the level of shutdown activity required to suit the reasons given for taking the equipment/area out of service.

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ELEMENT	PERFORMANCE CRITERIA
2. Close down equipment or work area.	2.1. Identify specific plant and equipment affected by the shutdown and ensure that no further raw materials are provided 2.2. Ensure equipment and site is cleaned up with all waste removed for recycling or disposal 2.3. Tag or isolate equipment and ensure personnel are advised that the equipment and/or area is off-line 2.4. Supervise personnel in equipment shutdown procedures.
3. Prepare equipment for idle period.	3.1. Ensure that suitable guards, locks, tags or notices are placed on equipment to prevent inadvertent startup 3.2. Ensure that any adjustments, control alterations, lubrication or application of corrosion inhibitors are undertaken by appropriate personnel in accordance with workplace procedures 3.3. Arrange for appropriate coverage of equipment and security of area in the case of prolonged idleness.
4. Complete workplace documentation.	4.1. Complete equipment or area records detailing the nature of the shutdown activity and dates equipment is taken out of service 4.2. Notify management of conclusion of shutdown procedures 4.3. Complete required regulatory documentation and obtain any external certification that may be necessary.
5. Respond to problems.	5.1. Identify possible routine and non-routine problems in the equipment, materials or process 5.2. Determine problems needing action 5.3. Determine possible fault causes 5.4. Rectify problems using appropriate solutions within area of responsibility 5.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to the shutdown and removal from service of equipment or lines. This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It includes the removal from operation of all relevant ancillary equipment.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This unit of competency may be designated for one of the following streams where workers use that unit substantially only in that stream area:

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- cablemaking
- blow moulding
- blown film
- calendering
- composites
- compounding
- extrusion
- fabrication
- injection moulding
- polystyrene
- expanded foam polyurethane
- rotational moulding
- thermoforming
- belt splicing
- rubber lining
- tyre manufacture
- tyre retreading
- surface coating.

The processes covered by this unit include, but are not limited to:

- ensuring that equipment and/or processes are fully shut down
- isolation and/or tagging of equipment
- removal and storage of dies, moulds or ancillary equipment
- conveying information to personnel and management
- ensuring equipment is adequately protected against corrosion.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical problems include:

- inappropriate isolation practices
- site contamination.

This competency includes tools and equipment such as:

- hoists/lifting equipment not requiring any special permits or licences
- spanners and similar hand tools
- relevant personal protective equipment.

Typical hazards include:

- equipment hazards
- hazardous materials
- manual handling hazards.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - correct equipment isolation techniques
  - appropriate employee communication practices
  - appropriate shutdown procedures
  - correct storage/disposal of raw materials
  - hazards of the materials and process and appropriate hazard control procedures
  - nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which affect machine operation

- safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
- the hierarchy of control including engineering controls
- waste management and importance of non-conforming materials

νplan own work including predicting consequences and identifying improvements
νidentify and describe own role and role of others involved directly in the production process
νidentify hazards of the materials and process
νimplement appropriate procedures for hazard control
νuse PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task.

Critical aspects:

It is essential that competence is demonstrated in the ability to
νidentify critical equipment characteristics, hazards and procedures to minimise risk
νplan own work process within workplace procedures and explain the reasons for the steps in the process
νtake appropriate action to observe equipment, components and processes, and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:
νproduction requirements are understood and incorporated in plans
νproblems are anticipated from process and equipment observations
νproblems are efficiently resolved
νthe shutdown procedure runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:
νon an operating plant allowing for operation under all normal and a range of abnormal conditions
νby use of a suitable simulation and/or a range of case studies/scenarios
νby a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

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Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

UNIT TITLE

PMBPROD347A - Produce composites using hand lamination

UNIT DESCRIPTOR

This competency covers the production of composite products using hand lamination of composite materials and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are involved in the production of composite products by hand lamination. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- setting up equipment, moulds and formers
- checking materials for conformity to job requirements
- preparing materials to specifications
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine composites forming equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit has the prerequisite competency of PMB PROD 247 Hand lay up composites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify requirements for materials, quality, production and equipment checks 1.5. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Set up mould and materials as required.	2.1. Determine equipment requirements 2.2. Check materials, resins and fibres are correct 2.3. Check mould for cracks, chips and cleanliness 2.4. Prepare materials to specifications 2.5. Discard, or make adjustments to the process for, non-conforming materials 2.6. Set up date, batch and materials markings to specifications, as required 2.7. Complete other pre-start checks in accordance with procedures.
3. Hand layup composites.	3.1. Apply materials to the mould to specification 3.2. Monitor product quality, thickness, colour and integrity 3.3. Remedy faults and non-conformances by adjusting the application of materials as required 3.4. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problem using appropriate solution within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency unit includes the use of equipment and materials to form composite products using hand lamination processes. It includes the operation of all relevant additional equipment where that equipment is integral to the hand layup process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include, but are not limited to:

- setting up moulds
- selection and preparation of resins, including mixing as required
- selection and preparation of fibre reinforcement, including cutting and trimming
- use of composites materials including gel coats, resins and fibres
- use and application of cores, fillers and surface finishes
- application of composite materials to the mould by hand layup.

This competency includes tools and equipment such as:

- open moulds for composite products
- hand mixing equipment and stirrers
- knives and cutters to trim fibres
- hand application tools, rollers, trowels, etc
- relevant personal protective equipment.

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Typical hazards include:

- hazardous materials and vapours
- manual handling hazards
- knife hazards.

Typical problems include:

- cracks, dents or imperfections of the mould
- use of incorrect materials
- variations in materials, colour, consistency or mix
- contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - properties of the materials required to form a composite structure of the required strength and surface finish
  - pot life of the resins used
  - quality requirements at each production stage
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and application in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- make measurements when required and identify product out of specification
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task

- distinguish between causes of faults such as:
  - wrong raw materials/additives/catalyst
  - incorrect quantity of materials/additives/catalyst
  - contaminated materials/additives/catalyst.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and hand lamination process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is required to the level of determining required weights/volumes of materials in a resin mix for different circumstances (say using a data sheet), number of layers of impregnated matrix required to yield the required product laminate thickness, and similar activities..

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

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KEY COMPETENCIES						
1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

UNIT TITLE

PMBPROD349A - Produce liquid surface coated products

UNIT DESCRIPTOR

This competency covers hand, spray gun or immersion liquid surface coating and the solving of non-routine problems. It applies to all sectors of the industry.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the application of surface coatings by hand, spray gun or immersion. The key factors are the application of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit of competency has the prerequisite of:

- PMB PROD 249 B Apply liquid surface coatings.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Check surface coating process setup.	2.1. Determine equipment requirements 2.2. Set process to specifications as required 2.3. Check surface coating equipment settings and adjustments are as required 2.4. Check materials are correct 2.5. Discard, or make adjustments to the process for, non-conforming materials 2.6. Set up date, batch and materials markings to specifications, as required 2.7. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments as required to the surface coating process.	3.1. Make trial applications of surface materials to check equipment operation 3.2. Establish the sequence of work maximising potential of the applied finish for the production operation 3.3. Monitor controls/displays/terminals for production/process data 3.4. Monitor product/process quality in accordance with procedures 3.5. Make adjustments to remedy faults and nonconformity to standard as required 3.6. Maintain continuity of process 3.7. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.8. Clean, adjust and lubricate equipment as required 3.9. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problems using appropriate solutions within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It includes the operation of all relevant additional equipment where that equipment is integral to the coating process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

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The processes covered by this unit include, but are not limited to:

- movement of materials
- opening of bags, drums, etc
- handling of semi-bulk materials
- stacking and storing of materials
- basic pre-blending of materials
- application of coatings.

This competency includes tools and equipment such as:

- hand carts and trolleys and other manual handling aids
- hoists/lifting equipment not requiring any special permits or licences
- brushes, spray guns and/or immersion equipment
- ventilation and other fume/vapour removal equipment
- relevant personal protective equipment.

Typical hazards include:

- spills and splashes
- toxic fumes or vapours
- hazardous materials
- manual handling hazards.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical problems include:

- incorrect selection of materials
- variations in materials
- contamination of materials or product surface
- inappropriate application of coatings
- drying rates
- uniformity of film thickness
- appropriate film thickness.

Key variables to be monitored include:

- spray patterns
- materials consistency
- finished colour
- surface finish
- product integrity and general conformance to specification.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - quality requirements of different liquid surface coating techniques
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check liquid surface coating equipment for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the coating process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- identify sources and results of contamination
  - contaminated materials/surface
  - contamination from air/environment
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - solvent/suspension/dispersion agent
  - drying time/temperature/air flow
  - incorrect quantity of materials.

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Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and liquid surface coating process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

UNIT TITLE

PMBPROD353A - Compound materials using an internal mill blender

UNIT DESCRIPTOR

This competency covers the operation and adjustment of compounding processes and blending equipment and the solving of non-routine problems.

This competency is typically performed by senior operators working either independently or as part of a work team.

This competency in practice

This competency applies to Banbury and similar internal mill operators who are required to apply knowledge of materials, product purpose and processes to the operation of internal blenders. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation, materials or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit of competency has the prerequisite of:

- PMB PROD 253 A Operate an internal mill blender.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and determine hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

ELEMENT	PERFORMANCE CRITERIA
2. Check process setup.	2.1. Determine machine/equipment requirements 2.2. Set process to specifications as required 2.3. Check machine/equipment settings and adjustments are as required 2.4. Check materials are correct 2.5. Discard, or make adjustments to the process for, non-conforming materials 2.6. Set up date, batch and materials markings to specifications, as required 2.7. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments as required to the process.	3.1. Operate process machine/equipment, noting key variables 3.2. Monitor controls/displays/terminals for production/process data 3.3. Monitor product quality in accordance with procedures 3.4. Make adjustments to remedy faults and nonconformity to standard as required 3.5. Maintain continuity of process 3.6. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.7. Clean, adjust and lubricate machine/equipment as required 3.8. Pause machine/equipment, or stop machine/equipment in an emergency, following workplace and emergency procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problems using appropriate solutions within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to the operation of Banbury and similar processes in the plastics and rubber sectors. It includes the operation of all relevant additional equipment where that equipment is integral to the process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Respond to/rectify ‘non-routine problems’ means ‘apply known solutions to a variety of predictable problems’.

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This competency may include machine, equipment and tools such as:

- process electrical/mechanical machine and its major components, eg, skid shifter/ wigwags, bale loader, overhead rubber feed
- hand tools used in the process, eg, knives
- material loading equipment used for loading of raw materials, eg, forklift, lift, hook, takeaway belt
- monitoring equipment and tools, eg, scales for weighing powders, rubber; digital sensors, computer control settings and displays; recipe cards; 2C plates; tickets of unused material; wheel marker
- relevant personal protective equipment (PPE).

Typical hazards include:

- chemical spills
- dusts/vapours/rubbish
- slip and fall
- temperature
- hazardous materials
- manual handling hazards
- equipment operations.

Typical process and product problems include:

- routine and non-routine product faults
- machine malfunction, eg, caused by incorrect dip solution/rubber levels
- mould/tooling/die problems
- variations in materials, eg, allowable tolerances of cut-up materials
- contamination of compounds and/or materials
- processing problems
- dust stop leakage.

Key variables to be monitored include:

- temperatures
- speed
- pressures
- colour
- mixing differences/mixing steps/plasticity
- cycle steps/cycle time/process timing
- output rate/machine inactivity
- product weight
- product integrity and general conformance to specification/sample, eg, rubber batch differences, batch dump indicators

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of all compounds, materials, equipment and process sufficient to recognise compound, material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements (eg, quality system and standards, current operating standards) along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - behaviour of materials in relation to key process variables
  - quality requirements at each production stage
  - function and operating principles of equipment, machine components and ancillary equipment
  - impact of key process variables on product quality and production output
  - nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which affect machine operation and product development
  - the importance of safe machine setup and startup procedure for effective processing of materials, including safety trips and resets
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup as well as working in confined space
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of reusing non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check machine for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process and follow appropriate hazard control procedures

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- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - routine faults
  - incorrect quantity of materials
  - contaminated materials.
- complete necessary documentation accurately including:
  - batch report sheets
  - stock tickets
  - extruder check sheets
  - work schedule.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported
- communicate with other operators effectively, check stock with laboratory, supervisor or leading hand and promote teamwork actively.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Basic statistical knowledge is required to construct histograms and control charts as well as to interpret results and recommend actions.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

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UNIT TITLE

PMBPROD354A - Compound materials using an open mill blender

UNIT DESCRIPTOR

This competency covers the operation and adjustment of open mill blenders to compound materials and the solving of non-routine problems.

This competency is typically performed by senior operators working either independently or as part of a work team.

This competency in practice

This competency applies to open mill operators who are required to apply knowledge of materials, product purpose and processes to the operation of process equipment. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit of competency has the prerequisite of:

- PMB PROD 254 A Operate an open mill blender.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and determine hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Check process setup.	2.1. Determine equipment requirements 2.2. Set process to specifications as required 2.3. Check equipment settings and adjustments are as required 2.4. Check materials are correct 2.5. Discard, or make adjustments to the process for, non-conforming materials 2.6. Set up date, batch and materials markings to specifications, as required 2.7. Complete other pre-start checks in accordance with procedures.
3. Operate and make minor adjustments to the process.	3.1. Operate process equipment, noting key variables 3.2. Monitor controls/displays/terminals for production/process data 3.3. Monitor product quality in accordance with procedures 3.4. Make adjustments to remedy faults and nonconformity to standard as required 3.5. Maintain continuity of process 3.6. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.7. Clean, adjust and lubricate equipment as required 3.8. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problems using appropriate solutions within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to the operation of open mill equipment in the plastics and rubber sectors. It includes the operation of all relevant additional equipment where that equipment is integral to the process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Respond to/rectify ‘non-routine problems’ means ‘apply known solutions to a variety of predictable problems’.

This competency may include equipment and tools such as:

- process electrical/mechanical mill and its major components,
- hand tools used in the process, eg, mill knives
- material loading equipment used for loading of raw materials, eg, stock loaders and conveyors, overhead crane arms and hooks
- relevant personal protective equipment.

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Typical hazards include:
- dusts/vapours
- slip and fall
- temperature
- hazardous materials
- manual handling hazards
- equipment operations.

Typical process and product problems include:
- routine and non-routine product faults.
- machine malfunction caused by, eg, part wear, electrical/mechanical faults
- variations in materials and/or contamination of materials
- processing problems.

Key variables to be monitored include:
- temperatures
- speed
- pressures
- colour
- cycle time/process timing
- product/stock/material flow and quality
- output rate
- product weight
- product integrity and general conformance to specification/sample
- setting of stop guide.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements (e.g. quality system and standards, current operating standards, etc) along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:
- apply and/or explain:
  - products, materials and material characteristics
  - behaviour of materials in relation to key process variables
  - quality requirements at each production stage
  - function and operating principles of equipment, machine components and ancillary equipment
  - impact of key process variables on product quality and production output
  - nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which affect machine operation and product development

- the importance of machine setup and startup procedure for effective processing of materials
- safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
- the hierarchy of control including engineering controls
- impact of variations in raw materials and equipment operation in relation to final product
- changes to materials at various stages of production

ν waste management and importance of reusing non-conforming materials
ν plan own work including predicting consequences and identifying improvements
ν interpret from production requests the correct selection and use of equipment, materials, processes and procedures
ν maintain output and product quality using appropriate instruments, controls, test information and readings
ν make adjustments to equipment operation to rectify variations in equipment operation or product quality
ν check machine for correct setup to job specifications and implement adjustments or report deviations immediately
ν start up equipment and make appropriate adjustments to bring process on line
ν take samples when required and identify product out of specification
ν safely shut down equipment in normal or abnormal circumstances
ν identify and describe own role and role of others involved directly in the process
ν identify factors which may affect product quality or production output and appropriate remedies
ν identify when the operator is able to rectify faults and when assistance is required
ν identify hazards of the materials and process and take appropriate hazard control
ν use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
ν distinguish between causes of faults such as:

- routine faults
- incorrect quantity of materials
- contaminated materials

ν complete accurately necessary documentation which may include:

- batch report sheets
- stock tickets
- operator check sheets
- work schedule
- process control chart.

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Critical aspects:

It is essential that competence is demonstrated in the ability to:

- identify critical materials properties and process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported
- communicate with other operators effectively, conduct on-the-job training and promote teamwork actively.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

UNIT TITLE

PMBPROD355A - Make pattern/plug for composites moulds

UNIT DESCRIPTOR

This competency covers planning, preparation and operations for making a plug/pattern, suitable for a full range of moulds for composite products. The competency includes the making of plugs and patterns used for the manufacture of composites moulds.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to make tooling for composite products. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- checking specifications or design for work to be done
- converting the specification or design into a plan for the tooling and mould
- planning the process required to make the tooling, and mould
- assembling and preparing materials for the plug or pattern
- applying materials as required
- checking finished tooling meets specifications
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- completing logs and reports.

PREREQUISITES

This unit has the prerequisite competencies:

- PMB PROD 247 B Hand lay up composites
- MEM 9.2A A Interpret technical drawing.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify requirements for materials, quality, production and equipment checks 1.5. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Plan plug/pattern construction.	2.1. Produce a plan for the plug/pattern construction according to specification 2.2. Have design approved according to enterprise requirements 2.3. Plan all steps of the plug/pattern construction 2.4. Examinre check points for measurements and tests 2.5. Locate a suitable work area.
3. Set up equipment, tools and materials.	3.1. Clear and set up work area 3.2. Identify and locate tools and equipment for the plug/pattern construction 3.3. Identify and locate materials for the construction of the plug/pattern, where necessary.
4. Construct plug/pattern.	4.1. Construct plug/pattern to meet the requirements of the design or specifications 4.2. Check the dimensions of the plug/pattern against the design or specifications 4.3. Adjust the tooling where required to meet requirements 4.4. Treat, prepare and repair the surface of the plug/pattern as necessary.
5. Respond to problems.	5.1. Identify possible routine and non-routine problems in the equipment, materials or process 5.2. Determine problems needing action 5.3. Determine possible fault causes 5.4. Rectify problem using appropriate solution within area of responsibility 5.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency unit includes the use of equipment and materials to construct plugs/patterns from which composite moulds will be made. It includes the operation of all relevant additional equipment where that equipment is integral to the plug making process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include, but are not limited to:

- construction of plugs or patterns
- use of composites materials including gel coats, resins and fibres
- use of other materials including timber and sheet metal, and fittings, fasteners, surface coatings and fillers.

This competency includes tools and equipment such as:

- hand tools and power tools for use with composite and other materials such as sheet metal and timber
- hand mixing equipment and stirrers
- hand application tools, rollers, trowels, brushes, etc
- relevant personal protective equipment.

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Typical hazards include:
- ν hand and power tools
- ν temperature
- ν hazardous materials
- ν manual handling hazards
- ν equipment operations.

Typical process and product problems include:
- ν structural strength, rigidity and stability of the tooling
- ν dimensional accuracy of the tooling
- ν allowances in the design for shrinkage, deformations and alterations in the process from tooling to mould to finished composite product
- ν placement of flanges, closures, fitments, supports, struts and stiffeners
- ν variations in materials and/or contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:
- ν apply and/or explain:
  - selection of materials for construction of tooling
  - steps in the construction process
  - aspects of the plug construction to meet the dimensional and production requirements of the mould and final product
  - key requirements of the product which impact on the mould and the tooling construction
  - hazards of the materials and process and appropriate hazard control procedures
  - products, materials and material characteristics
  - quality requirements at each production stage
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - waste management and importance of non-conforming materials
  - cost considerations
  - construction procedures
  - specialist tools/equipment, eg, filleting tools
  - use, care and maintenance of hand tools and portable equipment used for manufacturing plugs

- surface textures and finishing: preparation, painting, advantages and disadvantages of polyurethane, shellac, gelcoat and acrylic finishes
- safe use of wood working machinery
- design of timber plugs
- methods of fixing and joining timber
- timber selection: timber types, sizes, timber based products, eg, chipboard, craftwood
- plug manufacture procedures
- timber finishing techniques
- paint finishes for use on plugs
- application of paint finishes to plugs
- definition and use of plugs
- alternate materials for plug manufacture
- plug design: increased stiffness, minimise shrinkage, shrinkage allowance, ease of laminating, part removal

ν use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task

ν distinguish between causes of faults such as:

- wrong materials
- materials incorrectly used.

Critical aspects:

It is essential that competence is demonstrated in the ability to produce a pattern/plug which will provide the most suitable model to enable the required mould to be made.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Numeracy is required to the level of determining required weights/volumes of materials in a resin mix for different circumstances (say using a data sheet), number of layers of impregnated matrix required to yield the required product laminate thickness, and similar activities.

Assessment method and context:

Competence in this unit may be assessed:

ν on an operating plant allowing for operation under all normal and a range of abnormal conditions

ν by use of a suitable simulation and/or a range of case studies/scenarios

ν by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

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Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office, lunchroom, etc. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	3	3	3	3	3	3

UNIT TITLE

PMBPROD356B - Construct composite moulds

UNIT DESCRIPTOR

This competency covers planning, preparation and operations for making of moulds, suitable for a full range of composite products. The mould will be made on a suitable plug/pattern.

This competency is typically performed by operators demonstrating relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to make moulds for composite products. It includes:

- converting the specification or design into a plan for the mould
- planning the process required to make the mould
- assembling and preparing materials for the moulds
- applying materials as required
- checking finished mould meets specifications.

PREREQUISITES

This unit has the prerequisite competencies:

- PMB PROD 247 B Hand lay up composites
- PMB PREP 201 A Prepare moulds for composites production.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify requirements for materials, quality, production and equipment checks 1.5. Identify materials, waste management and housekeeping needs.
2. Plan mould construction	2.1. Produce a plan for the mould construction to specification 2.2. Have design approved as necessary according to enterprise specifications 2.3. Plan all steps of the mould production 2.4. Check points are examined for measurements and tests according to specifications.
3. Set up equipment, tools and materials.	3.1. Clear and set up work area 3.2. Identify and locate materials and equipment for the mould construction according to job specification.

ELEMENT	PERFORMANCE CRITERIA
4. Construct mould.	4.1. Apply mould materials as per specification 4.2. Check dimensions, structural reinforcements, supports and flanges to the specifications or design 4.3. Cure mould and release as per procedures 4.4. Recheck dimensions of the finished mould 4.5. Check fit with other matching mould parts and adjust where necessary.
5. Respond to problems.	5.1. Identify possible routine and non-routine problems in the equipment, materials or process 5.2. Determine problems needing action 5.3. Determine possible fault causes 5.4. Rectify problem using appropriate solution within area of responsibility 5.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency unit includes the use of equipment and materials to form moulds for composite products.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include, but are not limited to:

- construction of moulds
- use of composites materials including gel coats, resins and fibres.

This competency includes tools and equipment such as:

- plugs/patterns
- hand tools and power tools for use with composite and other materials such as metal and timber
- hand mixing equipment and stirrers
- hand application tools, rollers
- relevant personal protective equipment.

Typical hazards include:

- hand and power tools
- temperature
- hazardous materials
- manual handling hazards
- equipment operations.

Typical process and product problems include:

- structural strength, rigidity and durability of the mould
- dimensional accuracy of the mould
- placement of flanges, closures and fitments
- attachment of substructures.

Specifications may include:

- engineering drawings or model/product.

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All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Essential knowledge may include:-

- polyester resin materials knowledge: basic ingredients and their functions; types and uses; grades; fillers; shelf life; storage and safety; cure process; exotherm graph; factors affecting the cure process; post curing
- epoxy resin materials knowledge: uses; cure reaction; exotherm graph; effects of temperature; effects of hardener; advantages and disadvantages; safety precautions
- vinylester resin materials knowledge: uses; cure reaction; catalyst/promoter systems, types and effects; advantages and disadvantages compared with other resins; safety precautions
- dicyclopentadiene (DCPD) – filled resin system, eg, Reichhold
- catalysts and promoters materials knowledge: terminology; types; grades; uses; storage and safety.
- reinforcements materials knowledge: basic characteristics and property differences of E Glass, S2 Glass, Carbon, Aramid; formulations; manufacture; terminology; types of finish and binders; common weights available; resin to glass ratios; glass content and comparative strength of the basic forms; the effect of increasing fibre content on reducing thickness and flexural properties; basic effect of proportion and direction of fibre orientation.

Competence includes the ability to:

- apply and/or explain:
  - selection of materials for mould construction
  - steps in the construction process
  - aspects of the mould construction to meet the dimensional and production requirements of the mould
  - key requirements of the product which impact on the mould construction
  - hazards of the materials and process and appropriate hazard control procedures
  - products, materials and material characteristics
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - impact of variations in raw materials and equipment operation in relation to final product
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - wrong materials for the mould construction
  - materials incorrectly used
  - lack of rigidity of the mould
  - contaminated materials.

Critical aspects:

It is esential that competence is demonstrated in the ability to complete moulds to specifications.

Language, literacy and numeracy requirements:

This competency requires the ability to communicate with a wide range of personnel and to interpret product specifications and mould requirements.

Numeracy is required to the level of determining required weights/volumes of materials in a resin mix for different circumstances (say using a data sheet), number of layers of impregnated matrix required to yield the required product laminate thickness, and similar activities.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	3	3	3	3	3	3

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UNIT TITLE

PMBPROD357B - Construct jigs and fixtures

UNIT DESCRIPTOR

This competency covers preparation and operations for making jigs and fixtures suitable for use in the manufacture of plastics and polymer products, and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the making of jigs and fixtures. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- checking specifications or design for work to be done
- converting the specification or design into a plan for the jigs and fixtures
- planning the process required to make the jigs and fixtures
- a checking materials for conformity to job requirements
- assembling and preparing materials
- applying materials as required
- checking finished jigs and fixtures meet specifications
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Identify the purpose of the jigs and fixtures.	1.1. Identify the purpose of the jigs and fixtures 1.2. Identify the performance requirements of the jigs and fixtures 1.3. Establish the service life of the jigs and fixtures 1.4. Establish availability of sample products, prototypes or existing jigs and fixtures for the specified duty.
2. Plan construction of jigs and fixtures.	2.1. Produce a plan for the jigs and fixtures 2.2. Have design approved as necessary 2.3. Plan all steps of the production of the jigs and fixtures, noting check points for measurements and tests 2.4. Locate a suitable work area.

ELEMENT	PERFORMANCE CRITERIA
3. Set up equipment, tools and materials.	3.1. Clear and set up work area 3.2. Identify and locate materials for the construction of the jigs and fixtures 3.3. Identify and locate sample products, prototypes or existing jigs and fixtures associated with the duty.
4. Construct jigs and fixtures.	4.1. Construct jigs and fixtures 4.2. Check dimensions, structural strength and operability are to the specifications or design 4.3. Install jigs and fixtures to the production area and recheck features to the requirements 4.4. Modify the jigs and fixtures to suit the requirements.
5. Respond to problems.	5.1. Identify possible routine and non-routine problems in the equipment, materials or process 5.2. Determine problems needing action 5.3. Determine possible fault causes 5.4. Rectify problems using appropriate solutions within area of responsibility 5.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency unit includes the use of equipment and materials to construct jigs and fixtures. It includes the operation of all relevant additional equipment where that equipment is integral to the making of jigs and fixtures.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include, but are not limited to:

- plan design and construction of the jigs and fixtures to suit the purpose
- construction of jigs and fixtures
- use of a range of materials as required.

This competency includes equipment and tools such as:

- hand tools and power tools for use with materials required
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

Typical hazards include:

- manual handling hazards
- power and hand tools temperature
- hazardous materials
- manual handling hazards
- equipment operations.

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Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems include:

- structural strength, rigidity and durability of the jigs and fixtures
- dimensional accuracy of the jigs and fixtures
- placement of components to allow convenient application
- variations in materials and/or contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - selection of materials for construction of jigs and fixtures
  - steps in the construction process
  - aspects of the construction to meet the dimensional and production requirements of the product
  - key requirements of the product which impact on the jig and fixture construction
  - quality requirements at each production stage
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- make measurements when required and identify product out of specification
- identify and describe own role and role of others involved directly in the production process
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task

- distinguish between causes of faults such as:
  - wrong materials for the jigs and fixtures construction
  - materials incorrectly used
  - lack of rigidity of the jigs and fixtures
  - difficulties in operation of the jigs and fixtures in the production environment
  - incorrect quantity of materials.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- identify critical materials properties and process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

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Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

UNIT TITLE

PMBPROD358B - Develop patterns

UNIT DESCRIPTOR

This unit applies to employees required to develop patterns for production processes from workplace drawings. This unit applies particularly to the fabrication, thermoforming, composites and rubber lining sectors. It applies primarily to patterns which are essentially two dimensional (although the final product may be three dimensional) and may also be applied where a pattern is used to develop a mould or die or other applications of patterns. It does NOT include patterns such as are used for casting metals, nor plugs for making composite moulds.

All operators working either independently or as part of a work team typically perform this competency.

This competency in practice

This competency applies to experienced operators who develop patterns from drawings and/or specifications. The key factors are the interpretation of dimensions into a physical pattern and ensuring the pattern is suitable for its intended use. It includes:

- interpreting drawings and specifications
- 'developing' solid objects into a two dimensional pattern
- dimensioning patterns
- making allowances for working - joins, bends, etc.

PREREQUISITES

This unit of competency has the prerequisite of:

- MEM 9.1A A Draw and interpret a sketch **OR**
- MEM 9.2A A Interpret technical drawing.

ELEMENT	PERFORMANCE CRITERIA
1. Determine dimensions of finished patterns.	1.1. Establish required size(s) of finished products from customer orders 1.2. Check size requirements in relation to the production process and finishing capacity of the workplace.
2. Plan process.	2.1. Identify material for pattern from approximate size and characteristics 2.2. Identify, locate and assemble required instruments and equipment 2.3. Interpret drawings and related specifications 2.4. Check procedures for using pattern development instruments and tools, and prepare equipment for use.
3. Plot dimensions.	3.1. Use equipment and tools following workplace procedures 3.2. Measure, explode and plot each dimension, maintaining appropriate angles, arcs and curves 3.3. Compare pattern dimensions and shapes with drawings and specifications, both visually and using measurements.

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ELEMENT	PERFORMANCE CRITERIA
4. Complete pattern.	4.1. Complete pattern ensuring that the pattern indicates completion date and original drawing details 4.2. Obtain required approvals of pattern 4.3. Mark plans with notations for workplace requirements including authorship, process or customer requirements, authorisation and any review dates 4.4. Copy and file plans as required according to procedures.

RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It includes the operation of all relevant ancillary equipment.

Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include:

- hand development of patterns
- CAD/CAM assisted pattern development
- using other pattern developing tools
- use of powered hand and bench tools as required.

Typical hazards include:

- eye strain
- repetitive strain injury
- posture hazards.

Respond to/rectify ‘non-routine problems’ means ‘apply known solutions to a variety of predictable problems’.

Typical problems include:

- making adequate allowances for manufacture
- balancing cost of pattern with required pattern life
- stability of pattern in use
- damage to pattern in use.

All operations are performed in accordance with procedures.

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EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to apply them to the patternmaking process.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- interpret drawings and extrapolate to physical dimensions
- select appropriate mediums and materials
- identify product, materials and work processes appropriate for the individual work role
- locate, interpret and apply relevant information
- maintain workplace records
- identify and safely handle relevant equipment, substances, other products and materials
- apply safety precautions appropriate to the task.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- develop patterns which are easy to use in the workplace and which produce in-specification products with minimal modification to pattern or product.

Consistent performance should be demonstrated. In particular look to see that:

- quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved.

the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret customer requirements, technical specifications and technical drawings/sketches.

Writing is required to the level of completing workplace forms and reports.

Numeracy is also required, eg, to interpret specifications and drawings, and conceptually manipulate three and two dimensional shapes and determine pattern size/shape to give the correct final size/shape.

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Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	2	3	2	3	3	2

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UNIT TITLE

PMBPROD360A - Produce centrifugally cast polyurethane products

UNIT DESCRIPTOR

This competency covers the centrifugal casting of polyurethane products. It applies to both the rubber and plastics industry.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who centrifugally cast polyurethane products in horizontal or vertical rotating machinery. The key factors are the appropriate setting up of the equipment and the mould, temperature control and casting of the product, and troubleshooting. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- setting up the equipment and ensuring the equipment functions as planned
- planning the job sequence and time from material supply to stripping of the product
- preparation of material prior to conducting casting operations
- conducting casting operations
- removing and inspecting the product
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding waste and scrap in accordance with workplace instructions
- solving routine and non-routine casting equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit of competency has the prerequisite of:

- PMB PROD 246 B Hand mix materials.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare to centrifugally cast polyurethane materials.	1.1. Interpret materials specifications 1.2. Identify required materials including additives and curatives 1.3. Identify required equipment including handling, control and material preparation equipment 1.4. Identify materials and process hazards and plan for their elimination 1.5. Locate and make ready appropriate safety equipment.

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ELEMENT	PERFORMANCE CRITERIA
2. Plan centrifugal casting operations.	2.1. Confirm product and process parameters 2.2. Ensure environmental controls are valid and in place according to operational procedures 2.3. Identify product to be made and calculate quantity of material required to produce product of correct shape and physical dimensions 2.4. Determine product colour and obtain appropriate agents 2.5. Plan the sequence of events from availability of the material to stripping of the final product 2.6. Obtain appropriate mould coating and releasing agents.
3. Set up and check centrifugal casting equipment.	3.1. Inspect and set up centrifugal casting equipment 3.2. Ensure that mould is secured or adequately restrained to prevent separation of mould and rotational equipment 3.3. Test run horizontal cylindrical moulds to ensure vibration free running 3.4. Ensure work area is clean and free from hazards, and check operational sequence and procedures, particularly OH&S procedures, codes and practices 3.5. Test and confirm that equipment control settings, stop and emergency stop functions are operational 3.6. Test run rotational equipment to assess equipment conformance to specification.
4. Centrifugally cast polyurethane products.	4.1. Following the planned sequence, identify and operate equipment according to temperature, time, rotational speed and emergency procedures 4.2. Pour materials at the appropriate rate per minute, angle and quantity using necessary aids and assistance to ensure pour is completed within required times and distribution requirements and using techniques to prevent excessive aeration. 4.3. Check product quality including thickness, weight and product integrity, against specifications 4.4. Deal with material waste and scrap in accordance with workplace procedures 4.5. Store unused materials, clean up equipment, apply lubricants, make adjustments and manage waste in accordance with workplace procedures.
5. Identify faults and troubleshoot the causes.	5.1. Identify and investigate production problems on a routine basis 5.2. Check product colour 5.3. Inspect products to determine nature of any visual faults at specific production stages 5.4. Measure products to check conformity with specifications 5.5. Conduct routine testing of products and materials in accordance with workplace practices 5.6. Take samples for analysis and check mixing of materials for conformance to specification.

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ELEMENT	PERFORMANCE CRITERIA
6. Make process adjustments or propose rectification and retests.	6.1. Make repairs, adjustments or modifications to processes as required by test results 6.2. Isolate any faulty materials and ensure integrity of raw materials supply 6.3. Propose process adjustments where authority to make those adjustments personally does not exist.

RANGE OF VARIABLES:

This competency applies to production of cast polyurethane products within the plastics and rubber industries. It includes the operation of all relevant additional equipment where that equipment is integral to the polyurethane products casting process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- lifting equipment such as cranes an hoists not requiring licensed operators
- spanners, hammers, wrenches and other hand tools
- vertical or horizontal axis centrifugal rotational equipment
- cylindrical and other moulds
- relevant personal protective equipment
- hand tools used in the casting process
- material loading equipment used for loading of raw materials

It does not include the use of powered equipment/aids.

Typical hazards include:

- spills
- noxious fumes or vapours
- hazardous materials
- manual handling hazards
- rotational equipment hazards
- temperature hazards
- mechanical lifting hazards.

Respond to/rectify ‘non-routine problems’ means ‘apply known solutions to a variety of predictable problems’.

Typical process and product problems include:

- variations in materials
- contamination of materials
- mechanical failures or disruptions
- incorrect casting temperatures
- physical anomalies such as variations to wall thickness
- inappropriate setting up of the mould for spinning
- machine malfunction
- mould/tooling problems
- processing problems.

Key variables to be monitored include:

- operating temperatures
- speed of rotation or cure
- colour
- location of pouring basin
- cycle time
- use of separating agents
- product weight
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - impact of incorrect or faulty materials
  - production workflow sequences and materials demand
  - focus of operation of work systems and equipment
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures
- distinguish between causes of faults such as:
  - wrong raw materials/additives/catalyst
  - incorrect quantity of materials/additives/catalyst
  - contaminated materials/additives/catalyst
  - variations in section thickness
  - difficult product removal
  - material 'shuts' and other material problems
- apply and/or explain:
  - products, materials and material characteristics
  - behaviour of materials in relation to heat, pressure and time
  - quality requirements at each production stage
  - function and operating principles of centrifugal casting equipment and ancillary equipment
  - impact of machine speed, temperature, pressure, time during cycles on product quality and production output
  - the importance of machine setup and warm-up for effective processing of materials

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- safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
- the hierarchy of control including engineering controls
- impact of variations in raw materials and equipment operation in relation to final product
- changes to materials at various stages of production
- waste management and importance of non-conforming materials

ν plan own work including predicting consequences and identifying improvements
ν interpret from production requests the correct selection and use of equipment, materials, processes and procedures
ν maintain output and product quality using appropriate instruments, controls, test information and readings
ν make adjustments to equipment operation to rectify variations in equipment operation or product quality
ν check centrifugal casting equipment for correct setup to job specifications and implement adjustments or report deviations immediately
ν take samples when required and identify product out of specification
ν safely shut down equipment in normal or abnormal circumstances
ν identify factors which may affect product quality or production output and appropriate remedies
ν identify when the operator is able to rectify faults and when assistance is required
ν identify hazards of the materials and process
ν implement appropriate procedures for hazard control
ν use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
ν distinguish between causes of faults such as:

- incorrect quantity of materials
- contaminated materials.
- incorrectly or improperly prepared materials
- inadequately mixed materials.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

ν identify critical materials properties and centrifugal casting process characteristics in relation to the process requirements and the end product
ν plan own work process within workplace procedures and explain the reasons for the steps in the process
ν take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

ν production quality and output standards are met consistently
ν problems are anticipated from process observations
ν problems are efficiently resolved
ν the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg, to determine that one 30 kg batch of material and one 15 kg batch of material are required to produce a 45 kg product

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	2	2	2	1	2	1

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UNIT TITLE

PMBPROD362A - Produce gravity cast polyurethane products

UNIT DESCRIPTOR

This competency covers the production of components through the gravity casting of polyurethane into moulds. It applies to the plastics and rubber industry.

This competency is typically performed by all operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who prepare moulds and gravity casting equipment and gravity cast polyurethane. The key factors are the selection of the appropriate mould, maintenance of the correct temperature and ensuring there is no contamination of the materials. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- setting up the required moulds
- establishing correct mould temperatures
- preparation of material prior to gravity casting
- gravity casting polyurethane
- curing products and stripping moulds
- identifying faults and adjusting the process
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking materials for conformity to job requirements
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding waste and scrap in accordance with workplace instructions
- solving routine and non-routine gravity casting equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit of competency has the prerequisite of:

- PMB PROD 246 B Hand mix materials.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare to gravity cast polyurethane materials.	1.1. Interpret materials specifications 1.2. Identify required materials including additives and curatives 1.3. Identify required equipment including handling, control and material preparation equipment 1.4. Identify materials and process hazards and plan for their elimination 1.5. Locate and make ready appropriate safety equipment.

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ELEMENT	PERFORMANCE CRITERIA
2. Plan gravity casting operations.	2.1. Confirm product and process parameters 2.2. Ensure environmental controls are valid and in place according to procedures 2.3. Identify product to be made and calculate quantity of material required to produce product of correct shape and physical dimensions 2.4. Determine product colour and obtain appropriate agents 2.5. Plan the sequence of events from availability of the material to stripping of the final product 2.6. Identify appropriate measures to minimise risks from identified hazards.
3. Set up and check gravity casting equipment.	3.1. Set up equipment following procedures and confirm these are within recommended specifications 3.2. Check time, degasser, temperature and allowable adjustments for conformity to documented procedures 3.3. Check moulds for conformity with customer order and workplace operational requirements 3.4. Report and discard or make adjustments for non-conforming materials in accordance with procedures 3.5. Obtain appropriate mould coating and releasing agents.
4. Conduct gravity casting operations.	4.1. Follow planned sequence and workplace procedures 4.2. Ensure equipment operating temperatures and times are within specification 4.3. Pour materials at the appropriate rate per minute and quantity using techniques to minimise air entrapment and aeration 4.4. Check product quality including thickness, weight and product integrity, against specifications 4.5. Make adjustments to gravity casting equipment to remedy product non-conformity where applicable 4.6. Produce required quantity of product, check for quality and place in holding areas 4.7. Deal with material waste and scrap in accordance with workplace procedures 4.8. Clean up equipment, store lubricants and manage waste in accordance with procedures.
5. Identify faults and troubleshoot the causes.	5.1. Identify and investigate production problems on a routine basis 5.2. Inspect products to determine nature of any visual faults at specific production stages 5.3. Check product colour 5.4. Measure products to check conformity with specifications 5.5. Conduct routine testing of products and materials in accordance with workplace practices 5.6. Take samples for analysis and check mixing of materials for conformance to specification.

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ELEMENT	PERFORMANCE CRITERIA
6. Make process adjustments or propose rectification and retests.	6.1. Make repairs, adjustments or modifications to processes as required by test results 6.2. Isolate any faulty materials and ensure integrity of raw materials supply 6.3. Propose process adjustments where authority to make those adjustments personally does not exist.

RANGE OF VARIABLES:

This competency applies to all polyurethane gravity casting within the plastics and rubber industries. It includes the operation of all relevant additional equipment where that equipment is integral to the polyurethane gravity casting process. This competency unit includes the use of both manually operated equipment and moulds and mechanized processes for longer production runs.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- moulds and dies
- surface coatings and stripping agents
- hoists/lifting equipment not requiring any special permits or licences
- hand tools such as spanners, wrenches and hammers
- temperature sensing equipment
- relevant personal protective equipment
- hand tools used in the gravity casting process
- material loading equipment used for loading of raw materials.

Typical hazards include:

- spills/splashes
- noxious fumes/vapours
- hazardous materials
- manual handling hazards
- temperature hazards
- equipment operations.

Respond to/rectify ‘non-routine problems’ means ‘apply known solutions to a variety of predictable problems’.

Typical process and product problems include:

- variations in materials
- contamination of materials
- mould or die problems
- temperature related difficulties
- product release difficulties
- machine malfunction
- mould/tooling problems
- processing problems.
- excessive aeration of materials
- inadequately mixed materials.

Key variables to be monitored include:

- operating temperatures
- speed of cure
- colour
- location of pouring basin
- cycle time
- use of separating agents
- product weight
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - impact of incorrect or faulty materials
  - production workflow sequences and materials demand
  - focus of operation of work systems and equipment
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures
- distinguish between causes of faults such as:
  - wrong raw materials/additives/curative
  - incorrect quantity of materials/additives/curative
  - contaminated materials/additives/curative
  - variations in section thickness
  - difficult product removal
  - material 'shuts' and other material problems
  - excessive aeration
  - voids
- apply and/or explain:
  - products, materials and material characteristics
  - behaviour of materials in relation to heat, pressure and time
  - quality requirements at each production stage
  - function and operating principles of centrifugal casting equipment and ancillary equipment
  - impact of machine speed, temperature, pressure, time during cycles on product quality and production output
  - the importance of machine setup and warm-up for effective processing of materials

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- safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
- the hierarchy of control including engineering controls
- impact of variations in raw materials and equipment operation in relation to final product
- changes to materials at various stages of production
- waste management and importance of non-conforming materials

ν plan own work including predicting consequences and identifying improvements
ν interpret from production requests the correct selection and use of equipment, materials, processes and procedures
ν maintain output and product quality using appropriate instruments, controls, test information and readings
ν make adjustments to equipment operation to rectify variations in equipment operation or product quality
ν check centrifugal casting equipment for correct setup to job specifications and implement adjustments or report deviations immediately
ν take samples when required and identify product out of specification
ν safely shut down equipment in normal or abnormal circumstances
ν identify factors which may affect product quality or production output and appropriate remedies
ν identify when the operator is able to rectify faults and when assistance is required
ν identify hazards of the materials and process
ν implement appropriate procedures for hazard control
ν use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
ν distinguish between causes of faults such as:

- incorrect quantity of materials
- contaminated materials.

Critical aspects:

It is essential that competence is demonstrated in the ability to

ν identify critical materials properties and gravity casting process characteristics in relation to the process requirements and the end product
ν plan own work process within workplace procedures and explain the reasons for the steps in the process
ν take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

ν production quality and output standards are met consistently
ν problems are anticipated from process observations
ν problems are efficiently resolved
ν the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg, to determine the percentage of rejects if 16 out of 65 products are failed at inspection.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	2	2	2	1	2	1

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UNIT TITLE

PMBPROD363A - Splice conveyor belts on site

UNIT DESCRIPTOR

This competency covers mechanical splicing of conveyor belts in a field situation, as distinct from in a repair facility.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who mechanically splice conveyor belts in the field, often in support of a fully operational raw materials production facility. The key factors are the ability to safely access the belt and determine the nature of the cause of the failure and the extent to which the belt can be rejoined and put safely back into service. It includes:

- identifying and planning own work requirements from production requests
- advising and informing other site personnel and gaining clearance to enter the site
- transporting repair equipment into the field
- determining the extent of the damage and the cause
- stabilising the broken belt and gaining sufficient length to work with
- splicing the belt and curing the join on site
- inspecting the repair and either approving the work or redoing the splice
- retensioning the belt and putting the conveyor back in service
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking materials for conformity to job requirements
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- completing logs and reports.

PREREQUISITES

This unit of competency has the prerequisite of:

- PMB PROD 265 B Operate portable vulcanising equipment.

ELEMENT	PERFORMANCE CRITERIA
1. Identify location of belt repair.	1.1. Identify equipment and tools needed to undertake on-site belt splice 1.2. Arrange transportation of equipment to site location 1.3. Determine availability of on-site power and arrange portable power supply as required 1.4. Advise site supervisor before proceeding to site of repair.

ELEMENT	PERFORMANCE CRITERIA
2. Identify belt damage.	2.1. Review belt specifications and work order documentation 2.2. Identify power supply and tag locations and isolate belt system 2.3. Identify cause of belt separation and damage and inspect belt for repairability, including testing for rubber breakdown and pull/adhesion of cord or ply 2.4. Identify belt faults and make decisions as to the feasibility of the splice based on the intended use of the belt 2.5. Plan order of work to identify required work sequences, times, work process stages, engineering controls and personal protection requirements 2.6. Design intended splice to conform to quality specification, minimise time and economically use consumable materials.
3. Select materials and repair process.	3.1. Examine the site in which the splice will take place 3.2. Identify and match appropriate fasteners to belt material and intended use 3.3. Select equipment and consumables appropriate for the splicing operation 3.4. Assemble and check materials and tools for suitability for purpose 3.5. Locate manufacturer's information and safety instructions on equipment and use to plan the work 3.6. Establish appropriate height and width clearance for safe work.
4. Conduct splicing operations and repairs.	4.1. Isolate and tag/lock out equipment as required 4.2. Examine the conveyor system for and eliminate sources of potential belt damage 4.3. Remove tension from belt and anchor, and support belt to ensure safe and effective working environment 4.4. Strip and remove damaged belt material 4.5. Cut belt surfaces to the appropriate shape and angle 4.6. Prepare surfaces to be joined in accordance with manufacturer's instructions and workplace requirements 4.7. Lay up cords in sequence following manufacturer's instructions 4.8. Conduct splicing operation in accordance with belt manufacturer's instructions 4.9. Cure the splice as appropriate 4.10. Check splice for conformity with job specifications.

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ELEMENT	PERFORMANCE CRITERIA
5. Clean work area and check belt repair.	5.1. Sharpen cutting implements, clean equipment used and inspect for serviceable condition 5.2. Stow equipment appropriately and safely 5.3. Tag unserviceable equipment, identify other faults and inform appropriate personnel 5.4. Inspect repaired belt, repair further or tag for further treatment 5.5. Approve belt splice when suitable for customer use 5.6. Clean work area and return to approved condition 5.7. Follow all waste and recycling procedures 5.8. Complete workplace documentation.

RANGE OF VARIABLES:

This competency applies to on-site work environments and sectors typically within the minerals industry. However, it includes all users of conveyor belts. It includes the operation of all relevant additional equipment where that equipment is integral to the belt splicing process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- manual handling aids
- hand winches
- portable power generators and vulcanising equipment
- knives and other cutting instruments
- portable hoists/lifting equipment not requiring any special permits or licences
- spanners, wrenches, hammers, etc
- power operated hand tools such as drills, cutting disks, sanders
- relevant personal protective equipment.

Typical hazards include:

- ragged edges and exposed metal cord material
- dust and debris from the belt and material being transported
- hazardous materials arising from the splicing process
- manual handling hazards
- knife, cutting and grinding disk hazards.

Respond to/rectify ‘non-routine problems’ means ‘apply known solutions to a variety of predictable problems’.

Typical process and product problems include:

- weight of the belting to be moved and repaired
- variations in materials
- contamination of materials
- lack of accessibility
- equipment malfunctions
- tooling problems
- variations in materials and/or contamination of materials.

Key variables to be monitored include:

- belt condition
- belt location
- degree of damage
- weight of the belt
- forces acting on the conveyor belt
- environmental conditions
- lock-out of equipment.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - impact of incorrect or faulty joining processes
  - production workflow sequences and inherent hazards with conveyors
  - stresses and tensions on working belts and the common failure causes
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures
- distinguish between causes of faults such as:
  - mechanical equipment failures versus wear failure in belts
  - product damage and internal belt damage
  - wear and impact damage
- apply and/or explain:
  - products, materials and material characteristics
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - the hierarchy of control including engineering controls
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check conveyors for correct setup to specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances

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- Identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the conveyor situation and take appropriate hazard control measures
- apply safety precautions appropriate to the task.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and conveyor operating characteristics in relation to the condition of the belt
- plan own work process within organisational procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make repairs and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the repair runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is also required, eg, to determine stresses and forces on cords and plys under load.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

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KEY COMPETENCIES						
1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	2	3	2	2	2	1

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UNIT TITLE

PMBPROD367A - Remove and replace belts

UNIT DESCRIPTOR

This competency covers the removal and replacement of conveyor belts in contracted site locations.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who remove and replace conveyor belts, often in remote locations and with limited facilities. The key factors are the safe removal of any burden or materials from the belt, identification of any factors which might inhibit belt removal or replacement, safe removal and storage of the existing belt and replacement with the new belt. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- discussing work progress with other workers
- planning the sequence of work events leading to removal and replacement of the belt
- ensuring the site is safe and the conveyor under control
- removing any hazards and/or obstructions
- de-tensioning the belt, removing any pins, clamps or joining materials and removing the belt
- tracking on, splicing and testing the new belting
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

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ELEMENT	PERFORMANCE CRITERIA
1. Identify work requirements.	1.1. Identify belt type, manufacturer and model from customer order and on-site inspection of belt 1.2. Ensure equipment is safe, inspect belt for faults identified in work order and confirm feasibility of (any) repair 1.3. Check equipment setup and operation against workplace information and own knowledge of requirements 1.4. Obtain information from the contracting enterprise's employees, identifying any special requirements or variances to usual equipment setup 1.5. Check machine settings and adjustments for conformity with specifications 1.6. Inspect conveyor noting key areas where catching, poor tracking or obstacles may inhibit removal or replacement 1.7. Check variations and discrepancies in documentation and physical condition with appropriate personnel 1.8. Identify factors which will influence safe work, efficiency and contract deadlines.
2. Plan belt removal and replacement.	2.1. Plan key features of the belt replacement process 2.2. Make arrangements to move required tools and equipment to appropriate work location 2.3. Plan the sequence for safe belt removal and replacement considering: 2.4. safe manual handling for storage and transfer of belt 2.5. disassembly requirements and procedures for mechanical, hydraulic, pneumatic, electrical and electronic connections 2.6. Estimate requirements for additional labour and equipment from contracting enterprise 2.7. Sequence belt removal/replacement noting times and locations where checks against specifications and customer order are required, including timing and procedures.
3. Remove and replace belt.	3.1. Facilitate removal of conveyed materials from the belt and identify and eliminate any residual dangerous or hazardous substances or contaminants 3.2. Disengage and lock out any mechanical components and ancillary connections 3.3. Post appropriate warning notices 3.4. Remove belt from rollers and appropriately support to ensure no unnecessary twisting or bending 3.5. Store removed belt appropriately and/or track replacement belt onto frame.

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ELEMENT	PERFORMANCE CRITERIA
4. Commission conveyor belt.	4.1. Inspect belt condition for imperfections or irregularities 4.2. Confirm worksite is clear and notify personnel of belt startup 4.3. Start belt system and monitor and adjust tracking, speed and tensions as necessary 4.4. Identify faults and equipment malfunctions and predict possible causes 4.5. Identify relationships between faults and equipment and belt operation 4.6. Identify the impact of any fault(s) in relation to serviceability of the system 4.7. Recommend alterations to adjustments and/or settings to appropriate personnel 4.8. Complete records of approved and completed variations and forward to appropriate personnel, incorporating any further recommendations 4.9. Maintain workplace records.
5. Follow equipment shut down procedures.	5.1. Observe belt in operation and identify conditions which may require emergency shutdown of equipment 5.2. Give appropriate notice of any impending shut down according to workplace practice 5.3. Follow shutdown procedures in accordance with the contracting enterprise's requirements.

RANGE OF VARIABLES:

This competency applies to the removal and replacement of conveyor belts. It includes the operation of all relevant additional equipment where that equipment is integral to the belt removal and replacement process. The competency unit includes the use of manual handling aids such hand winches and portable lifting gear, and of powered equipment/aids for some aspects.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- portable power generators and vulcanising equipment
- knives and other cutting instruments
- portable hoists/lifting equipment not requiring any special permits or licences
- spanners, wrenches, hammers, etc
- power operated hand tools such as drills, cutting disks, sanders
- relevant personal protective equipment.

Typical hazards include:

- unpredicted belt movements
- equipment malfunctions
- manual handling hazards
- lifting, tracking and securing hazards
- equipment operation hazards
- damaged material hazards.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems include:

- weight of the belting to be removed and replaced
- obstructions and impediments to removal and fitting on new belt
- worn or malfunctioning rollers, drums or propulsion equipment
- lack of accessibility
- lack of required human resources
- tool problems
- variations in materials and/or contamination of materials
- processing problems.

Key variables to be monitored include:

- belt condition
- belt location
- degree of damage
- weight of the belt
- forces acting on the conveyor belt
- environmental conditions
- lock-out of equipment.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - impact of incorrect or faulty joining processes
  - production workflow sequences and inherent hazards with conveyors
  - stresses and tensions on working belts and the common failure causes
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures
- distinguish between causes of faults such as:
  - mechanical equipment failures versus wear failure in belts
  - product damage and internal belt damage
  - wear and impact damage
  - belt alignment and running problems
- apply and/or explain function and operating principles of conveyor systems and ancillary equipment
- plan own work including predicting consequences and identifying improvements

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- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check conveyor equipment for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring conveyor on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the conveyor system and take appropriate hazard control measures
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and belt removal and replacement process characteristics
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the removal and replacement process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is also required, eg, to determine the number of belt sections required to form a continuous belt for a given length of that conveyor.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	2	3	2	2	2	1

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UNIT TITLE

PMBPROD368A - Repair conveyor belt carcass

UNIT DESCRIPTOR

This competency covers the repair of conveyor belt carcasses and includes all belt types and steel cord or fabric plys. The competency may be demonstrated on-site or in a repair facility.

This competency is typically performed by all operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who undertake the repair of conveyor belt carcasses, test them and return them to service. The key factors are the identification of the damage, planning and conducting repairs, cleaning up and checking the repairs for accuracy and serviceability. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- planning the job to minimise time and material loss
- collecting the a range of materials necessary for the repair at the start of the process
- determining the nature of the damage and making decisions about belt repairability
- making repairs
- ensuring the repairs are carried out effectively
- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking repairs for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- solving routine belt carcass problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit of competency has the prerequisite of:

- PMB PROD 265 B Operate portable vulcanising equipment.

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ELEMENT	PERFORMANCE CRITERIA
1. Identify damage and select materials and repair process.	1.1. Examine belt specifications and work order documentation 1.2. Inspect belt for repairability including testing for rubber breakdown and pull/adhesion of cords, plys or belt covers (as required) 1.3. Identify belt faults and make decisions as to the feasibility of the repairs in terms of the intended use of the belt 1.4. Select appropriate repair materials and match to fault and repair method 1.5. Select equipment and consumables appropriate for the repair 1.6. Locate and use manufacturer's information and safety advice on products to be used, and plan work 1.7. Minimise time and economically use consumable materials.
2. Plan the repair process.	2.1. Plan the order of work to identify work sequences, times, work process stages, engineering controls and personal protective equipment needs 2.2. Select a well ventilated work area for the repair and remove any contaminants 2.3. Identify equipment isolation systems, points and tag locations 2.4. Design repair to conform to quality specification, minimise time and economically use consumable materials.
3. Conduct repairs.	3.1. Isolate and tag/lock out equipment in accordance with workplace safety procedures 3.2. Identify and eliminate sources of contamination and strip and remove damaged material 3.3. Cut belt covers to the appropriate shape, and angle and buff edges 3.4. Cut replacement cords to length allowing for joining 3.5. Lay out cord material to the appropriate length and pattern and coat cords with appropriate cement 3.6. Group and separate replacement cords 3.7. Apply cords, covers and fill-in following manufacturer's specifications and workplace procedures 3.8. Prepare and finish surfaces to be joined in accordance with manufacturer's instructions and workplace requirements 3.9. Check repairs for conformity with job specifications.

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ELEMENT	PERFORMANCE CRITERIA
4. Clean work area and check belt repair.	4.1. Clean and inspect equipment used for serviceable condition and store appropriately 4.2. Tag unserviceable equipment, identify faults and inform appropriate personnel 4.3. Inspect and approve repaired belts for suitability for customer use 4.4. Repair products which do not meet quality specifications or tag for further treatment 4.5. Clean work area and return to approved condition 4.6. Dispose of or recycle waste using appropriate procedures 4.7. Assemble and sort repaired belts for storage or delivery in accordance with workplace procedures 4.8. Complete appropriate documentation.

RANGE OF VARIABLES:

This competency applies to belt carcass repair activities in either on-site or repair facility circumstances and may include the use of portable power generating equipment. It includes the operation of all relevant additional equipment where that equipment is integral to the conveyor belt carcass repair process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- knives and cutting tools
- hoists/lifting equipment not requiring any special permits or licences
- pliers, brushes and other ancillary hand tools
- vulcanising equipment
- relevant personal protective equipment
- belt restraining devices.

Typical hazards include:

- damaged rubber and cords
- dusts/vapours
- manual handling hazards
- cutting hazards
- working on belts in-situ (where appropriate).

Respond to/rectify ‘non-routine problems’ means ‘apply known solutions to a variety of predictable problems’.

Typical process and product problems include:

- difficulties arising from the location
- contamination of materials
- communication problems (on-site)
- tool problems
- variations in materials and/or contamination of materials
- vulcanising problems.

Key variables to be monitored include:

- belt condition
- belt location
- degree of damage
- mass of the belt
- forces acting on the conveyor belt
- environmental conditions
- lock-out of equipment.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - impact of incorrect or faulty materials
  - workflow sequences and materials requirements
  - causes of damage to belt carcasses
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures
- distinguish between causes of faults such as:
  - abrasion, impact, tearing or other damage
  - mechanical problems
  - materials failure
- apply and/or explain:
  - products, materials and material characteristics
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - the hierarchy of control including engineering controls
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check conveyor belts for correct setup to specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify factors which may affect product quality or production output and appropriate remedies

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- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the conveyor situation and take appropriate hazard control measures
- apply safety precautions appropriate to the task.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- identify critical materials properties and conveyor operating characteristics in relation to the condition of the belt
- plan own work process within organisational procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make repairs and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the repair runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is also required, eg, to determine stresses and forces on cords and plies under load.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

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KEY COMPETENCIES						
1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	2	3	2	2	2	1

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UNIT TITLE

PMBPROD369A - Repair conveyor belt covers

UNIT DESCRIPTOR

This competency covers repairs to lateral, longitudinal, edge and hole damage on lightweight or rubber conveyor belt covers reinforced with fabric, metal or composites.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who repair conveyor belt covers during belt refurbishment activities either in a repair facility or on site. The key factors are the identification of the damage, conducting of the repairs, inspecting the belt and then cleaning up the site. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- planning the job to minimise time and material loss
- collecting the range of materials necessary for the repair at the start of the process
- determining the nature of the damage and making decisions about belt repairability
- making repairs
- ensuring the repairs are carried out effectively
- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking materials for conformity to job requirements
- correcting materials, equipment or process variations and making appropriate adjustments
- ensuring discarded materials is disposed of in accordance with workplace instructions
- solving routine and non-routine belt cover problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit of competency has the prerequisite of:

- PMB PROD 265 B Operate portable vulcanising equipment.

ELEMENT	PERFORMANCE CRITERIA
1. Identify damage, and select materials and repair process.	1.1. Examine belt specifications and work order documentation 1.2. Inspect belt cover for repairability including testing for rubber breakdown and pull/adhesion of cords and plys 1.3. Identify belt surface faults and make decisions as to the feasibility of the repair in terms of the intended use of the belt 1.4. Identify appropriate repair materials and match to fault and repair method 1.5. Select equipment and consumables appropriate for the repair, matching cement and solvent types to required manufacturer's specifications.
2. Plan belt cover repairs.	2.1. Assemble and check materials, tools and facilities for suitability for purpose 2.2. Locate manufacturer's information and safety advice on products and equipment and use to plan work 2.3. Plan order of work to identify required work sequences, times, work process stages, engineering controls and personal protective equipment requirements 2.4. Select an appropriate ventilated work area 2.5. Identify equipment or process isolation systems, points and tag locations 2.6. Design the repair to conform to quality specification, minimise time and economically use consumable materials.
3. Conduct repairs.	3.1. Isolate equipment and tag as required by safe working practices and workplace instructions 3.2. Identify and eliminate sources of contamination and strip and remove damaged material 3.3. Buff damaged area edges and strip (any) exposed cords of rubber and prepare in accordance with manufacturer's instructions and workplace requirements (steel cord belts) 3.4. Use appropriate material to return belt to serviceable condition 3.5. Vulcanise belt repair (where required) 3.6. Check repairs for conformity with job specifications.

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ELEMENT	PERFORMANCE CRITERIA
4. Clean work area and check belt repair.	4.1. Clean and inspect for serviceability tools and equipment used and store appropriately 4.2. Tag unserviceable equipment, identify faults and inform appropriate personnel 4.3. Inspect and approve repaired belts for suitability for customer use 4.4. Further repair products which do not meet quality specifications or tag for further treatment 4.5. Clean work area and return to approved condition 4.6. Dispose of waste or recycle according to workplace procedures 4.7. Assemble repaired belts and sort for storage or delivery in accordance with workplace procedures (where applicable) 4.8. Complete appropriate workplace documentation.

RANGE OF VARIABLES:

This competency applies to activities in either on-site or repair facility circumstances and may include the use of portable power generating equipment. It includes the operation of all relevant additional equipment where that equipment is integral to the repair of conveyor belt covers.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- knives and cutting tools
- hoists/lifting equipment not requiring any special permits or licences
- pliers, brushes and other ancillary hand tools
- vulcanising equipment
- relevant personal protective equipment.

Typical hazards include:

- damaged rubber and cords
- dusts/vapours
- manual handling hazards
- cutting hazards
- working on belts in-situ (where appropriate).

Respond to/rectify ‘non-routine problems’ means ‘apply known solutions to a variety of predictable problems’.

Typical process and product problems include:

- difficulties arising from the location
- contamination of materials
- communication problems (on-site)
- tool problems
- variations in materials and/or contamination of materials
- vulcanising problems.

Key variables to be monitored include:

- belt cover condition
- belt location
- degree of damage
- weight of the belt
- forces acting on the conveyor belt
- environmental conditions
- lock-out of equipment.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - impact of incorrect or faulty materials
  - workflow sequences and materials requirements
  - causes of damage to belt covers
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures
- distinguish between causes of faults such as:
  - abrasion, impact, tearing or other damage
  - mechanical problems
  - materials failure
- apply and/or explain:
  - products, materials and material characteristics
  - the hierarchy of control including engineering controls
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check conveyor belts for correct setup to specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the conveyor situation and take appropriate hazard control measures
- apply safety precautions appropriate to the task

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- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - incorrect quantity of materials
  - contaminated materials/belt surfaces.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and conveyor operating characteristics in relation to the condition of the belt
- plan own work process within organisational procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make repairs and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the repair runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg, to determine quantities of materials required.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES						
1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	2	3	2	2	2	1

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UNIT TITLE

PMBPROD370A - Produce injection blow moulded products

UNIT DESCRIPTOR

This competency covers the operation and adjustment of injection blow moulding processes and the solving of non-routine problems. It does not cover die setting.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of injection blow moulding equipment. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine injection blow moulding equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit of competency has the prerequisite of:

- PMB PROD 270 A Operate injection blow moulding equipment.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Check injection blow moulding process setup.	2.1. Determine equipment requirements 2.2. Set process to specifications as required 2.3. Check injection blow moulding equipment settings and adjustments are as required 2.4. Check materials are correct 2.5. Discard, or make adjustments to the process for, non-conforming materials 2.6. Set up date, batch and materials markings to specifications, as required 2.7. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments as required to the injection blow moulding process.	3.1. Operate injection blow moulding equipment, noting key variables 3.2. Monitor controls/displays/terminals for production/process data 3.3. Monitor product/process quality in accordance with procedures 3.4. Make adjustments to remedy faults and nonconformity to standard as required 3.5. Maintain continuity of process 3.6. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.7. Clean, adjust and lubricate equipment as required 3.8. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problems using appropriate solutions within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to all injection blow moulding within the plastics and rubber industries. It includes the operation of all relevant additional equipment where that equipment is integral to the injection blow moulding process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

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This competency includes equipment and tools such as:

- electrical, pneumatic, mechanical, electromechanical and hydraulic injection blow moulding machines and components such as base, frame, feed hoppers and material supply mechanisms, barrel and screw plastification unit, injection blow units, die/mould tool
- additional equipment including chillers/cooling towers, die heating equipment, hopper driers, mixing hoppers, dehumidifying driers, air compressors, dosing machines, colour blending equipment and conveyors
- hand tools used in the injection blow moulding process
- material loading equipment used for loading of raw materials
- relevant personal protective equipment.

Typical hazards include:

- spills
- dusts/vapours
- slip and fall, particularly due to spilt granules
- temperature
- hazardous materials
- manual handling hazards
- equipment operations.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems include:

- routine and non-routine product injection blow moulding faults - short mouldings, sink marks, voids, burn marks, mica and splash marks, silver streaking, blistering, flow marks, poor surface finish, warping, windows, erratic cycles, poor colour dispersion, ejection damage, colour contamination, black spots and other defects
- machine malfunction
- mould/tooling problems
- variations in materials and/or contamination of materials
- processing problems.

Key variables to be monitored include:

- operating temperatures
- speed
- hunt or sprue break pressures
- colour
- cushion specification
- cycle time
- output rate
- product weight
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - behaviour of materials in relation to heat, pressure and time
  - quality requirements at each production stage
  - function and operating principles of injection blow moulding equipment, machine components and ancillary equipment
  - impact of machine speed, temperature, pressure, time during cycles on product quality and production output
  - nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which affect machine operation and product development
  - injection blow moulding cycle and the importance of machine setup and warm-up for effective processing of materials
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check injection blow moulding machine for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line

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- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the injection blow moulding process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - routine faults – short mouldings, sink marks, voids, burn marks, mica, splash marks, warping, silver streaking, blistering, flow marks, poor surface finish, windows, erratic cycles, poor colour dispersion, ejection damage, colour contamination, black spots
  - incorrect quantity of materials
  - contaminated materials.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and injection blow moulding process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

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UNIT TITLE

PMBPROD372A - Produce fibre optic preforms

UNIT DESCRIPTOR

This competency covers the operation and adjustment of fibre optic preform equipment and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of fibre optic preform equipment. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine fibre optic preform equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Check equipment setup.	2.1. Determine equipment requirements 2.2. Set process to specifications as required 2.3. Check materials are correct 2.4. Check speed, time, tension and wind-off speed to requirements 2.5. Check fibre optic winding equipment settings and adjustments, including tensions and spool loading, to specifications 2.6. Discard, or make adjustments to the process for, non-conforming materials 2.7. Set up date, batch and materials markings to specifications, as required 2.8. Complete other pre-start checks to procedures.
3. Operate and make adjustments as required to fibre optic preform equipment.	3.1. Check and load materials using correct manual handling methods 3.2. Start up equipment and make adjustments to reach required settings 3.3. Monitor controls/displays/terminals for production/process data 3.4. Monitor product/process quality to procedures 3.5. Maintain continuity of process 3.6. Make adjustments to remedy faults and nonconformity to standard as required 3.7. Collect and reprocess/discard scrap/trim and other materials to procedures 3.8. Complete required workplace documentation/records. 3.9. Clean, adjust and lubricate equipment as required 3.10. Pause equipment, or stop equipment in an emergency, following procedures.
4. Shut down equipment .	4.1. Shut down equipment to procedures 4.2. Complete equipment cleanup, adjustments and waste management to procedures 4.3. Place suitable guards, locks and notices to prevent inadvertent startup.
5. Respond to problems.	5.1. Identify possible routine and non-routine problems in the equipment, materials or process 5.2. Determine problems needing action 5.3. Determine possible fault causes 5.4. Rectify problems using appropriate solutions within area of responsibility 5.5. Report problems outside area of responsibility to designated person.

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RANGE OF VARIABLES:

This competency applies to fibre optic preform equipment for the cablemaking industry. It includes the operation of all relevant additional equipment where that equipment is integral to the fibre optic preform process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include, but are not limited to:

- fibre optic soots
- sintered glass bodies
- preforms.

This competency includes equipment and tools such as:

- fibre optic preform equipment including multi-mode or single mode
- associated equipment including
  - hand tools used in production process
  - relevant personal protective equipment.

Typical hazards include:

- spills
- dusts/vapours
- temperature
- hazardous materials
- manual handling hazards
- equipment operations.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical problems include:

- routine and non-routine product fibre optic preform faults – contamination, flaws in preform cores, incorrect processes and temperatures
- machine malfunctions
- variations in materials and/or contamination of materials
- processing problems.

Key variables to be monitored include:

- operating temperatures
- operating speed
- temperature
- tension
- wind-off speed
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - function of fibre optic preform equipment, components and ancillary equipment
  - fibre optic preform equipment and manufacturing processes
  - behaviour of materials in relation to speed, temperature and tension
  - importance of target rod alignment, weight, straightness on the final product
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - impact of contamination, flaws in preform cores and equipment operation in relation to final product
  - changes to materials in fibre optic preform equipment and manufacturing process
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - the hierarchy of control including engineering controls
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check fibre optic preform equipment for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on equipment
- make measurements when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the cable making process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - routine faults – effects of contamination, flaws in preform cores, incorrect temperature and process
  - incorrect quantity of materials.

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Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and fibre optic preform equipment characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

UNIT TITLE

PMBPROD373A - Draw optical fibre

UNIT DESCRIPTOR

This competency covers the operation and adjustment of optical fibre drawing machines and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of optical fibre drawing machines. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine optical fibre drawing machine and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Check equipment setup.	2.1. Determine equipment requirements 2.2. Set process to specifications as required 2.3. Check materials are correct 2.4. Select appropriate dies (number and sizes) and arrange in correct production sequence 2.5. Coat drawing rollers with alcohol to procedures 2.6. Check speed, time, tension and wind-off speed to requirements 2.7. Check optical fibre winding equipment settings and adjustments, including tensions and spool loading, to specifications 2.8. Discard, or make adjustments to the process for, non-conforming materials 2.9. Set up date, batch and materials markings to specifications, as required 2.10. Complete other pre-start checks to procedures.
3. Operate and make adjustments as required to optical fibre drawing machine.	3.1. Check and load materials using correct manual handling methods 3.2. Start up equipment and make adjustments to reach required settings 3.3. Monitor controls/displays/terminals for production/process data 3.4. Monitor product/process quality to procedures 3.5. Maintain continuity of process 3.6. Make adjustments to remedy faults and nonconformity to standard as required 3.7. Collect and reprocess/discard scrap/trim and other materials to procedures 3.8. Complete required workplace documentation/records. 3.9. Clean, adjust and lubricate equipment as required 3.10. Pause equipment, or stop equipment in an emergency, following procedures.
4. Shut down equipment .	4.1. Shut down equipment to procedures 4.2. Complete equipment cleanup, adjustments and waste management to procedures 4.3. Place suitable guards, locks and notices to prevent inadvertent startup.
5. Respond to problems.	5.1. Identify possible routine and non-routine problems in the equipment, materials or process 5.2. Determine problems needing action 5.3. Determine possible fault causes 5.4. Rectify problems using appropriate solutions within area of responsibility 5.5. Report problems outside area of responsibility to designated person.

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RANGE OF VARIABLES:

This competency applies to optical fibre drawing machines for the cable making industry. It includes the operation of all relevant additional equipment where that equipment is integral to the optical fibre drawing process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- optical fibre drawing equipment and components including dies, threading path, spools
- associated equipment including manual handling equipment, welders, lubrication system, packaging and measuring equipment
- hand tools used in production process
- relevant personal protective equipment.

Typical hazards include:

- temperature
- fibre breakages
- hazardous materials
- manual handling hazards
- equipment operations.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical problems include:

- routine and non-routine product fibre optic drawing faults – contamination, flaws in dies and preform, incorrect processes and temperatures, incorrect thickness of optical fibre
- equipment malfunctions
- variations in materials and/or contamination of materials
- processing problems.

Key variables to be monitored include:

- roller selection
- die size, number, positioning
- line speed
- temperature
- tension
- wind-off speed
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - function of optical fibre drawing machines, components and ancillary equipment
  - optical fibre drawing equipment and manufacturing processes
  - impact of machine speed, tension and temperature during production stages on product quality and production output
  - behaviour of materials in relation to speed, temperature and tension
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
  - changes to materials in optical fibre drawing equipment and manufacturing process
  - waste management and importance of non-conforming materials
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check optical fibre drawing equipment for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- make measurements when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the cable making process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - process problems
  - incorrect quantity of materials/contaminated materials
  - equipment malfunction.

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Critical aspects:

It is essential that competence is demonstrated in the ability to:

- identify critical materials properties and optical fibre drawing equipment characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

UNIT TITLE

PMBPROD374A - Splice new belts or used belts off site

UNIT DESCRIPTOR

This competency covers the splicing of conveyor belts in a repair facility situation.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who splice new or used conveyor belts in a repair facility. The key factors are the ability to safely handle the belts, rejoin and cure the join. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- ensuring the belt ends are true and square and of the same width, thickness and ply type
- stabilising the belts and gaining sufficient length to work with
- splicing the belts and curing the join
- inspecting the repair and either approving the work or redoing the splice
- placing the belt in storage or arranging loading for transport to the customer
- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking materials for conformity to job requirements
- correcting materials, equipment or process variations and making appropriate adjustments
- ensuring discarded materials are disposed of in accordance with workplace instructions
- solving routine and non-routine belt splicing problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit of competency has the prerequisite of:

- PMB PROD 265 B Operate portable vulcanising equipment.

ELEMENT	PERFORMANCE CRITERIA
1. Identify work requirements.	1.1. Identify belt type, manufacturer and model from customer order and inspection of belt 1.2. Locate specifications to match belt and identify required dimensions and materials 1.3. Identify work area hazards or conditions where belt is to be spliced 1.4. Identify type of vulcanising to be used based on customer's intended belt use 1.5. Check for availability of tools and equipment including personal protective equipment 1.6. Select materials to meet specification requirements and customer order, minimise waste and maximise strength.
2. Plan belt splice.	2.1. Review manufacturer's information to identify appropriate adhesive and base materials for the splice 2.2. Ensure related personal protective equipment and engineering controls are in place 2.3. Plan splice using manufacturer's information identifying: points where checks to specifications and measurements are required, (any) special requirements for joining of cords or base materials and testing requirements 2.4. Plan the sequence of work to ensure assembly and fixing is in logical order and appropriate tests and checks are noted in the plan.
3. Lay up splice.	3.1. Prepare belt interfaces for splicing 3.2. Restrain belt ends to ensure movement does not occur during splicing operation 3.3. Lay up cords in sequence following manufacturer's instructions 3.4. Cut cord materials to length 3.5. Splice belt using methods and equipment in accordance with manufacturer's instructions 3.6. Clean tools and equipment and store appropriately.
4. Join belt surface.	4.1. Butt join belt material in accordance with manufacturer's specifications 4.2. Check the splice for conformity with required specifications 4.3. Vulcanise or autoclave belt material using appropriate methods and procedures to conform to specifications.

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ELEMENT	PERFORMANCE CRITERIA
5. Check splice.	5.1. Conduct any tests required on the finished splice in accordance with manufacturer's specifications and customer requirements 5.2. Carry out any subsequent repair in event of repair failure or notify appropriate personnel 5.3. Complete workplace documentation 5.4. Store equipment, finished materials and unused consumables appropriately 5.5. Collect waste for recycling or disposal following customer/workplace procedures 5.6. Assemble spliced belts and sort for storage or delivery in accordance with workplace procedures.

RANGE OF VARIABLES:

This competency applies to the splicing of new or used belts in a repair facility. The competency unit includes the use of manual handling aids such as work benches and may include the use of power tools. It includes the operation of all relevant additional equipment required for belt splicing.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- vulcanising equipment
- knives and other cutting instruments
- hoists/lifting equipment not requiring any special permits or licences
- spanners, wrenches, hammers, etc
- power operated hand tools such as drills, cutting disks, sanders
- relevant personal protective equipment.

Typical hazards include:

- exposed metal cord material
- dust and debris from the belt and material being handled
- hazardous materials arising from the splicing process
- manual handling hazards
- knife, cutting and grinding disk hazards.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems include:

- weight of the belting to be moved and spliced
- variations in materials
- contamination of joining materials
- tool problems
- variations in materials and/or contamination of materials
- vulcanising problems.

Key variables to be monitored include:

- belt cover condition
- belt location
- degree of damage
- mass of the belt
- forces acting on the conveyor belt
- environmental conditions

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

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Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - impact of incorrect or faulty joining processes
  - production workflow sequences and inherent hazards with belts
  - stresses and tensions on working belts and the common failure causes
  - correct selection and use of equipment, materials, processes and procedures
  - hazards of the materials and process and appropriate hazard control procedures
- distinguish between causes of faults such as:
  - mechanical equipment failures versus wear failure in belts
  - product damage and internal belt damage
  - belt separation and lifting
- apply and/or explain:
  - products, materials and material characteristics
  - the hierarchy of control including engineering controls
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check conveyor belts for correct setup to specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- take samples when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the conveyor situation and take appropriate hazard control measures
- apply safety precautions appropriate to the task
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - incorrect quantity of materials
  - contaminated materials.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- identify critical materials properties and conveyor operating characteristics in relation to the condition of the belt
- plan own work process within organisational procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make repairs and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- ν production quality and output standards are met consistently
- ν problems are anticipated from process observations
- ν problems are efficiently resolved
- ν the repair runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is also required, eg, to determine stresses and forces on cords and plys under load.

Assessment method and context:

Competence in this unit may be assessed:

- ν on an operating plant allowing for operation under all normal and a range of abnormal conditions
- ν by use of a suitable simulation and/or a range of case studies/scenarios
- ν by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	2	3	2	2	2	1

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UNIT TITLE

PMBPROD375A - Vulcanise products using an autoclave

UNIT DESCRIPTOR

This unit applies to the application of knowledge of materials, product purpose and processes to the autoclave production of vulcanised rubber products.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who load green rubber products into an autoclave for curing/vulcanising. The key factors are ensuring compatible loads and the right curing time, temperatures and pressures. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- discussing work progress with other workers
- planning which jobs have the higher priority
- loading green products and removing cured products
- minor processing and finishing of products associated with autoclaving
- choosing and setting the right autoclave conditions
- monitoring autoclave temperature and pressure profiles during the curing process
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine autoclave and vulcanising problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Identify the purpose and process stages for autoclave vulcanising.	1.1. Identify purpose of the vulcanising process 1.2. Identify equipment and components used 1.3. Identify characteristics of the product produced in relation to the impact of the vulcanising process on product quality.

ELEMENT	PERFORMANCE CRITERIA
2. Identify work requirements for autoclave vulcanising operations.	2.1. Identify work requirements from workplace procedures 2.2. Identify equipment and processes used for materials preparation, vulcanising and any related production process and for the downstream operations 2.3. Identify operating principles and components of vulcanising equipment 2.4. Identify hazards connected with materials and process from workplace reference materials including materials safety data sheets and equipment instructions 2.5. Identify appropriate measures to minimise risks from the identified hazards 2.6. Identify and note requirements for checking: materials, ancillary supplies and equipment and product quality requirements for the relevant process stage(s) 2.7. Identify equipment emergency stops, gauges, guards and controls 2.8. Plan task sequences within scope of authority including: • times and locations in the production process where checks for product quality, equipment operation and required production outputs are most appropriately made • ongoing materials input, waste management and work area housekeeping requirements • any required supplementary equipment for product quality testing, routine lubrication and adjustments and housekeeping.
3. Set up autoclave vulcanising process.	3.1. Identify and read equipment information, quality specifications and standard operating procedures 3.2. Check heat and pressure settings and process adjustments for conformity to procedures 3.3. Compare equipment and material condition to known optimum condition and take appropriate action in accordance with procedures (including, where authorised, making adjustments within overall specifications to process settings to ensure product output quality is appropriate) 3.4. Check that all gauges are operating, safety features are activated or fitted, locks and guards are in place.

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ELEMENT	PERFORMANCE CRITERIA
4. Operate autoclave.	4.1. Load and close autoclave and bring on line 4.2. Observe unit noting production outputs, equipment operating temperatures and pressures 4.3. Make allowable adjustments to remedy faults and non-conformity to production standards 4.4. Shut down, vent and unload autoclave 4.5. Assess product quality and compare to required sample and/or quality documentation (as appropriate) 4.6. Note and report non-conformity to required workplace specifications, following workplace procedures 4.7. Complete equipment cleanup, lubrication and adjustment and waste management, when required within the operator's scope of authority.
5. Respond to product quality improvement requests.	5.1. Monitor vulcanising process and note conditions which may affect product quality standards 5.2. Report process variations 5.3. Note and implement changes in standard operating procedures and specifications.
6. Respond to problems.	6.1. Identify possible routine and non-routine problems in the equipment or process 6.2. Determine problems needing action 6.3. Determine possible fault causes 6.4. Rectify problems using appropriate solutions within area of responsibility 6.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to the production of vulcanised rubber products within the rubber industries. It includes the operation of all relevant additional equipment where that equipment is integral to the vulcanising autoclave process. It includes the operation of all ancillary steam equipment, but not boiler operation.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- hand carts and trolleys
- knives and other trimming equipment
- hoists/lifting equipment not requiring any special permits or licences
- basic hand tools
- relevant personal protective equipment.

Typical hazards include:

- heat
- confined spaces
- manual handling hazards
- knife hazards.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical problems include:

- air/water blinding of steam equipment
- faulty/unreliable gauges
- matching loads requiring the same cure conditions
- adjusting temperature/pressure profile to match load and product.

Key variables to be monitored include:

- operating temperatures
- stacking and loading off product for autoclaving
- material composition
- operating pressure
- cycle time
- output rate
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- identify the function of vulcanising equipment, components and the materials used
- describe changes to materials at the stages of production conducted by the employee
- explain relationship between steam pressure and temperatures and the effects this and time will have on product quality and production output
- describe the role of heat and pressure in relation to providing strength, stiffness, resistance to deformation, fatigue and abrasion
- identify and describe own role and the roles of others involved directly in the vulcanising process
- decide if they (the operator) are able to rectify the fault or if assistance is required
- explain the effect of unauthorised or emergency shutdown of equipment on the vulcanising process
- plan own work sequence including identification of key checkpoints for equipment monitoring, product quality checks and monitoring of supplies and downstream operations
- monitor equipment operation and product quality
- identify factors which may influence product quality and production output and appropriate remedies
- make appropriate authorised alterations to own work plan and equipment to maintain both product quality and required production output
- locate, interpret and apply relevant information and maintain workplace records
- identify and safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task

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- apply and/or explain:
  - impact of product section/thickness on cure requirements
  - impact of compound cure system on cure requirements
- impact of heating too quickly/slowly on final product properties
- distinguish between causes of faults such as:
  - wrong cure cycle
  - changed product cure systems/section
  - steam problems.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- identify critical materials properties and rubber vulcanising process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg, to determine required steam pressure to give necessary time/temperature cycle.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES						
1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	1	2	2	2

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UNIT TITLE

PMBPROD380A - Produce composites using chopper gun/depositor

UNIT DESCRIPTOR

This competency covers preparation and hand operation of a resin-glass depositor (chopper gun) to form a composite materials product and the solving of non-routine problems.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the hand operation of chopper guns/depositors for the production of composites. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine composites production equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Check work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

ELEMENT	PERFORMANCE CRITERIA
2. Set up equipment, mould and materials.	2.1. Determine equipment requirements 2.2. Adjust controls as required for factors such as ambient conditions, temperature and materials 2.3. Check equipment, raw material and mould all match job requirements 2.4. Check materials, resins, fibres, release agents are correct 2.5. Discard, or make adjustments to the process for, non-conforming materials 2.6. Set up date, batch and materials markings to specifications, as required 2.7. Complete other pre-start checks in accordance with procedures.
3. Hand operate chopper gun/ depositor.	3.1. Use chopper gun/depositor to apply materials to the mould to procedures 3.2. Monitor product quality, thickness, colour and integrity 3.3. Remedy faults and non-conformances by adjusting the application of materials as required 3.4. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.5. Shut off machine safely and correctly as required to procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problem using appropriate solution within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency unit includes the use of equipment and materials to form composite products using a chopper gun/depositor. It includes the operation of all relevant additional equipment where that equipment is integral to the process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- open moulds for composite products
- hand tools for mixing and application
- knives and cutters to trim fibres
- chopper gun/depositor, pots, pumps and controls
- relevant personal protective equipment.

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Typical hazards include:

- hazardous substances
- manual handling hazards
- knife hazards.
- moving equipment
- manual handling hazards.

Typical problems include:

- cracks, dents or imperfections of the mould
- variations in materials, colour, consistency or mix
- adjustment and settings of the applicator
- application of the materials to the mould as required
- contamination of materials.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise out of specification products, process problems and materials faults.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - operation of resin-glass depositor, equipment and components
  - production workflow sequences and materials demand
  - properties of the materials required to form a composite structure of the required strength and surface finish, including the importance of gel coat properties and bonding
  - requirements for correct spraying of materials to the mould surface
  - pot life of the resins used
  - cleanout procedures
  - approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - potential effects of variations in raw materials and equipment operation in relation to quality of product
  - correct selection and use of equipment, materials, processes and procedures
- plan own work including predicting consequences and identifying improvements
- monitor equipment operation and product quality
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- pause equipment, or shut down equipment in abnormal circumstances
- explain the effect of unauthorised or emergency shutdown in relation to safety and

production requirements

- distinguish between possible causes of routine faults such as:
  - incorrect quantity of materials
  - contaminated materials/additives
  - equipment faults
  - mould damage
  - wrong raw materials/additives
  - incorrect quantity of materials/additives
  - machine failure.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- composites production standards are met consistently
- upstream and downstream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators.

Writing is required to the level of completing workplace forms.

Numeracy is required to the level of determining required weights/volumes of materials in a resin mix for different circumstances (say using a data sheet), number of layers of impregnated matrix required to yield the required product laminate thickness, and similar activities.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and that the theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

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Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	1	2	1	1	1

UNIT TITLE

PMBPROD387A - Produce welded plastics materials

UNIT DESCRIPTOR

This competency covers the sequenced or continuous welding of plastic pipe, sheet and film materials to a required specification using specialised welding equipment and techniques, process machinery and ancillary equipment.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are involved in the welding of plastic pipe, films and sheet to form fabricated products to a given specification, maintaining personal safety and the safety of others within the context of production output and quality requirements. The key factors are the understanding of the processes used to weld plastic materials to permanently bond components of pipeline systems or fabricated products. It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- setting up equipment
- preparing materials as required
- ensuring that safety procedures are applied to reduce the risks.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Identify required materials and equipment.	1.1. Identify work requirements from production plan 1.2. Identify quantity and quality of product required and any special requirements, including welding specifications 1.3. Interpret plans, patterns, designs or product specifications 1.4. Recognise hazards and steps required to ensure safety 1.5. Plan welding operations for a sequence or continuous process to ensure work follows a logical procedure 1.6. Check with supervisor/appropriate person if requirements are not in accordance with usual practice 1.7. Examine process requirements to identify suitability of plastic materials for specified welding operations.
2. Set up welding equipment and materials for sequence or continuous operation.	2.1. Set up tools and equipment ready for production 2.2. Locate materials, components and consumables 2.3. Ensure safety equipment is available and fit for use 2.4. Identify non-conformances and report as required.
3. Prepare plastic materials or components for welding in a sequence or continuous operation.	3.1. Assemble components for welding processes 3.2. Remedy faults and non-conformances by correcting assembly for welding or production equipment as required 3.3. Collect material which is able to be recycled or reused, separate and dispose of waste and scrap.

ELEMENT	PERFORMANCE CRITERIA
4. Weld to specification.	4.1. Organise materials for sequence or continuous production 4.2. Weld materials to specification, using required welding techniques to procedures.
5. Respond to problems.	5.1. Identify possible routine and non-routine problems in the equipment or process 5.2. Determine problems needing action 5.3. Determine possible fault causes 5.4. Rectify problems using appropriate solutions within area of responsibility 5.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency unit includes the processes required to weld plastic pipe, sheet and film materials to a required specification, including continuous production operations on specialised welding equipment, and often involves the use of ancillary equipment.

Materials may be from a range of thermoplastic materials in the form of pipeline systems and component parts, sheet where used in sequenced production operations including vinyl product fabrication, and film where associated with continuous production operations.

It includes the operation of hot plate (heated tool), extrusion, high frequency sound (ultrasonic), electrostatic (radio frequency) and thermal induction (heat) welding systems and production machinery designed for sequenced or continuous production operations, and all relevant ancillary equipment.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- welding equipment and machinery
- hand tools as required
- relevant personal protective equipment.

Typical hazards include:

- fumes from overheating or poor ventilation
- cuts from sharp edges on components
- burns from manual handling
- eye injury
- welding equipment, ancillary plant, parts and attachments.

Respond to/rectify ‘non-routine problems’ means ‘apply known solutions to a variety of predictable problems’.

Typical problems include:

- component materials incompatible or not to specification
- incorrect alignment or assembly in welding process
- welding edge, joint, fillet, gusset or seam not suitable for welding
- material feed systems not correctly sequenced (continuous production)
- incorrect selection of welding process

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- surface moisture contacting welding or fusion points
- misalignment of welding contacts or die components
- sequencing problems, procedure too fast or too slow
- incorrect materials selected
- poor surface preparation
- bonding problems, weld does not meet specification
- surface and finish defects.

All operations are performed in accordance with standard procedures and work instructions.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production in sequenced or continuous welding of plastic pipe, sheet and film materials.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - different types of plastic materials and their suitability for welding operations
  - behaviour of different types of plastic materials in welding processes
  - different welding equipment and procedures and suitability for materials
- identify:
  - control of equipment used in welding
  - types of welding process used
- list and describe:
  - routine faults in products
  - routine problems in process
- distinguish between causes of faults such as:
  - materials, laminates
  - changes to materials during the welding process
  - equipment – adjustments/setup
  - equipment – maintenance requirements.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

Consistent performance should be demonstrated. In particular look to see that :

- welding production standards are met consistently
- upstream and down stream communication is timely and effective
- operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie, the problem is fixed or reported)
- all safety procedures are followed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required to interpret specifications and make measurements.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	1	2	2	2

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UNIT TITLE

PMBPROD390A - Produce composites using filament winding

UNIT DESCRIPTOR

This competency covers preparation and operations for forming composite products using filament winding processes and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are involved in the production of composite products by filament winding equipment. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- setting up equipment, dies, mandrels, winders, moulds and formers
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine composites forming equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit has the prerequisite competency of:

- PMB PROD 290 A Operate filament winding equipment.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

ELEMENT	PERFORMANCE CRITERIA
2. Check equipment setup.	2.1. Determine equipment requirements 2.2. Set process to specifications as required 2.3. Check filament winding equipment settings and adjustments are as required 2.4. Check materials, resins and fibres are correct 2.5. Discard, or make adjustments to the process for, non-conforming materials 2.6. Set up date, batch and materials markings to specifications, as required 2.7. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments as required to the filament winding process.	3.1. Operate equipment to form product to specification noting key variables 3.2. Monitor controls/displays/terminals for production/process data 3.3. Monitor product/process quality, thickness, colour and integrity 3.4. Make adjustments to remedy faults and nonconformity to standard as required 3.5. Maintain continuity of process 3.6. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.7. Clean, adjust and lubricate equipment as required 3.8. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problem using appropriate solution within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to the production of composite products by filament winding processes within the plastics and rubber industries. It includes the operation of all relevant additional equipment where that equipment is integral to the composites forming process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include, but are not limited to:

- setting up dies, mandrels or formers
- use of composites materials including release agents, resins and fibres
- operation of equipment including PLC controls
- curing of products including application of wraps, heat or pressure.

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This competency includes tools and equipment such as:

- dies, moulds, mandrels, formers
- hand tools, eg, knives, cutters
- equipment for filament winding equipment and curing
- relevant personal protective equipment.

Typical hazards include:

- hazardous vapours
- hazardous materials
- manual handling hazards
- moving machinery hazards
- temperature
- equipment operations.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems include:

- cracks, dents or imperfections of the mandrel, former, die
- variations in materials, colour, consistency or mix
- adjustment and settings of the equipment
- contamination of materials
- curing conditions
- variations in materials and/or contamination of materials
- processing problems.

Key variables to be monitored include:

- operating temperatures
- speed
- colour
- cycle time
- output rate
- product weight
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - properties of the materials required to form a composite structure of the required strength and surface finish
  - pot life of the resins used
  - quality requirements at each production stage
  - function and operating principles of equipment, machine components and ancillary equipment
  - impact of machine speed, temperature, pressure, time during cycles on product quality and production output
  - nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which effect machine operation and product development
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check filament winding equipment for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- make measurements when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task

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- distinguish between causes of faults such as:
  - wrong raw materials/additives/catalyst
  - incorrect equipment setup, eg, speed, tension, pressure
  - winding problems
  - curing problems, conditions or equipment
  - incorrect quantity of materials
  - contaminated materials.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and filament winding composites process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Numeracy is required to the level of determining required weights/volumes of materials in a resin mix for different circumstances (say using a data sheet), number of layers of impregnated matrix required to yield the required product laminate thickness, and similar activities.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

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UNIT TITLE

PMBPROD391A - Produce composites using resin infusion

UNIT DESCRIPTOR

This competency covers the operation of resin infusion equipment to make composite products and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of resin infusion equipment for the production of composites. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine composites production equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit has the prerequisite competencies of:

- PMBPROD291A Operate resin infusion moulding equipment.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

ELEMENT	PERFORMANCE CRITERIA
2. Check composites forming process setup.	2.1. Determine equipment requirements 2.2. Adjust control panel (eg, cycle time, heating, cooling) as required for factors such as temperature, material 2.3. Check equipment, raw material and die/tool all match job requirements 2.4. Check materials, resins, fibres, cores are correct 2.5. Discard, or make adjustments to the process for, non-conforming materials 2.6. Set up date, batch and materials markings to specifications, as required 2.7. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments as required to the resin infusion process.	3.1. Operate composites forming equipment, noting key variables 3.2. Monitor controls/displays/terminals for production/process data 3.3. Monitor product/process quality, thickness and integrity to procedures 3.4. Make adjustments to remedy faults and nonconformity to standard as required 3.5. Maintain continuity of process 3.6. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.7. Clean, adjust and lubricate equipment as required 3.8. Pause equipment, or stop equipment in an emergency, following procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problem using appropriate solution within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to manufacture of composite products using resin infusion equipment within the plastics and rubber industries.

It includes all moulds, pumps and programmable logic controllers (PLCs) if fitted and all relevant ancillary equipment integral to the composites forming process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

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This competency includes equipment and tools such as:

- moulds, closures and fittings
- vacuum pumps and fittings such as couplings, hoses, breathers, bleeders
- controller, such as PLC if fitted
- relevant personal protective equipment (PPE)
- hand tools used in the production process
- material loading equipment used for loading of raw materials.

Materials covered by this competency include:

- release films and fabrics
- sealant tapes
- preforms, cores, pre-pregs.

Typical hazards include:

- hazardous vapours and materials
- fibres, airborne and handled
- humidity, air temperatures, radiant heat, hot moulds
- stationary and moving machinery, parts and components
- manual handling hazards.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems include:

- resin, over or under supplied to mould
- release agents performance
- contamination
- temperature variations, affecting resin cure-rate
- blemishes
- missing detail
- warped moulds or dies
- worn or damaged mould parts or fittings
- variations in materials and/or contamination of materials
- processing problems.

Key variables to be monitored include:

- operating temperatures
- cycle time
- output rate
- surface finish and condition
- product weight
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - behaviour of materials in relation to heat, pressure and time
  - quality requirements at each production stage
  - function and operating principles of composites forming equipment, machine components and ancillary equipment
  - impact of temperature, pressure, time during cycles on product quality and production output
  - nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which effect machine operation and product development
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check composites forming equipment for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- make measurements when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances

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- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - heat
  - loss of vacuum
  - equipment - adjustments/setup
  - equipment - maintenance requirements, incorrect quantity of materials
  - contaminated materials.

Critical aspects:

It is essential that competence is demonstrated in the ability to:

- identify critical materials properties and composites moulding process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Numeracy is required to the level of determining required weights/volumes of materials in a resin mix for different circumstances (say using a data sheet), number of layers of impregnated matrix required to yield the required product laminate thickness, and similar activities.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

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KEY COMPETENCIES						
1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

UNIT TITLE

PMBPROD392A - Produce composites using pultrusion

UNIT DESCRIPTOR

This competency covers preparation and operations for forming composite products using pultrusion processes and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are involved in the production of composite products by pultrusion equipment. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- setting up equipment, pullers, dies and formers
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine composites forming equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit has the prerequisite competency of:

- PMB PROD 292 A Operate pultrusion equipment.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Check equipment setup.	2.1. Determine equipment requirements 2.2. Set process to specifications as required 2.3. Check pultrusion equipment settings and adjustments are as required 2.4. Check materials, resins and fibres are correct 2.5. Discard, or make adjustments to the process for, non-conforming materials 2.6. Set up date, batch and materials markings to specifications, as required 2.7. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments as required to the pultrusion process.	3.1. Operate equipment to form product to specification noting key variables 3.2. Monitor controls/displays/terminals for production/process data 3.3. Monitor product/process quality, thickness, colour and integrity 3.4. Make adjustments to remedy faults and nonconformity to standard as required 3.5. Maintain continuity of process 3.6. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.7. Clean, adjust and lubricate equipment as required 3.8. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problem using appropriate solution within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to the production of composite products by pultrusion processes within the plastics and rubber industries. It includes the operation of all relevant additional equipment where that equipment is integral to the composites forming process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include, but are not limited to:

- setting up dies, pullers or formers
- use of composites materials including release agents, resins and fibre reinforcement
- use of surface finishing equipment
- operation of equipment including PLC controls
- curing of products including application of wraps, heat or pressure.

This competency includes tools and equipment such as:

- dies, formers
- hand tools, eg, knives, cutters
- equipment for pultrusion and curing
- relevant personal protective equipment.

Typical hazards include:

- hazardous vapours
- hazardous materials
- manual handling hazards
- moving machinery hazards
- temperature
- equipment operations.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems include:

- cracks, dents or imperfections of the die
- variations in materials, colour, consistency or mix
- adjustment and settings of the equipment
- contamination of materials
- curing conditions
- variations in materials and/or contamination of materials
- processing problems.

Key variables to be monitored include:

- operating temperatures
- speed
- colour
- cycle time
- output rate
- product weight
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

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Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - properties of the materials required to form a composite structure of the required strength and surface finish
  - pot life of the resins used
  - quality requirements at each production stage
  - function and operating principles of equipment, machine components and ancillary equipment
  - impact of machine speed, temperature, pressure, time during cycles on product quality and production output
  - nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which effect machine operation and product development
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check pultrusion equipment for correct set up to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- make measurements when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task

- distinguish between causes of faults such as:
  - wrong raw materials/additives/catalyst
  - incorrect equipment setup, eg, speed, tension, pressure
  - curing problems, conditions or equipment
  - incorrect quantity of materials
  - contaminated materials.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and pultrusion composites process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Numeracy is required to the level of determining required weights/volumes of materials in a resin mix for different circumstances (say using a data sheet), number of layers of impregnated matrix required to yield the required product laminate thickness, and similar activities.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

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Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office, lunchroom, etc. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

UNIT TITLE

PMBPROD393A - Produce composites using vacuum bagging

UNIT DESCRIPTOR

This competency covers the operation of vacuum bagging equipment to make composite products and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of vacuum bagging equipment for the production of composites. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine composites production equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit has the prerequisite competencies of:

- PMB PROD 293A Operate vacuum bagging equipment.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.
2. Check composites forming process setup.	2.1. Determine equipment requirements 2.2. Adjust control panel (eg, vacuum required) as required for factors such as temperature, material 2.3. Check equipment, raw material and mould all match job requirements 2.4. Check materials, resins, fibres are correct 2.5. Discard, or make adjustments to the process for, non-conforming materials 2.6. Set up date, batch and materials markings to specifications, as required 2.7. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments as required to the vacuum bagging process.	3.1. Operate composites forming equipment, noting key variables 3.2. Monitor controls/displays/terminals for production/process data 3.3. Monitor product/process quality, thickness and integrity to procedures 3.4. Make adjustments to remedy faults and nonconformity to standard as required 3.5. Maintain continuity of process 3.6. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.7. Clean, adjust and lubricate equipment as required 3.8. Pause equipment, or stop equipment in an emergency, following procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problem using appropriate solution within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

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RANGE OF VARIABLES:

This competency applies to manufacture of composite products using vacuum bagging equipment within the plastics and rubber industries.

It includes all moulds, pumps and programmable logic controllers (PLCs) if fitted and all relevant ancillary equipment integral to the composites forming process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes equipment and tools such as:

- moulds, closures and fittings
- vacuum pumps and fittings such as couplings, hoses, breathers, bleeders
- controller, such as PLC if fitted
- relevant personal protective equipment (PPE)
- hand tools used in the production process
- material loading equipment used for loading of raw materials.

Typical hazards include:

- hazardous vapours and materials
- fibres, airborne and handled
- humidity, air temperatures, radiant heat, hot moulds
- stationary and moving machinery, parts and components
- manual handling hazards.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems include:

- resin, over or undersupplied to mould
- release agents performance
- contamination
- temperature variations, affecting resin cure-rate
- vacuum variation/leakage in vacuum system/bag
- blemishes
- missing detail
- warped, worn or damaged mould parts or fittings
- variations in materials and/or contamination of materials
- processing problems.

Key variables to be monitored include:

- operating temperatures
- cycle time
- output rate
- surface finish and condition
- product weight
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - behaviour of materials in relation to heat, pressure and time
  - quality requirements at each production stage
  - function and operating principles of vacuum bagging equipment, machine components and ancillary equipment
  - impact of temperature, pressure, time during cycles on product quality and production output
  - nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which effect machine operation and product development
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check composites forming equipment for correct set up to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- make measurements when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances

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- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - heat
  - loss of vacuum
  - equipment - adjustments/setup
  - equipment - maintenance requirements incorrect quantity of materials
  - contaminated materials.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and composites moulding process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Numeracy is required to the level of determining required weights/volumes of materials in a resin mix for different circumstances (say using a data sheet), number of layers of impregnated matrix required to yield the required product laminate thickness, and similar activities.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

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UNIT TITLE

PMBPROD394A - Produce composites using resin transfer moulding

UNIT DESCRIPTOR

This competency covers the operation of resin transfer moulding equipment to make composite products and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of resin transfer moulding equipment for the production of composites. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine composites production equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit has the prerequisite competencies of:

- PMB PROD 294 Operate resin transfer moulding equipment.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Check composites forming process setup.	2.1. Determine equipment requirements 2.2. Adjust control panel (eg, cycle time, heating, cooling) as required for factors such as temperature, material 2.3. Check equipment, raw material and die/tool all match job requirements 2.4. Check materials, resins, fibres, cores are correct 2.5. Discard, or make adjustments to the process for, non-conforming materials 2.6. Set up date, batch and materials markings to specifications, as required 2.7. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments as required to the resin transfer moulding process.	3.1. Operate composites forming equipment, noting key variables 3.2. Monitor controls/displays/terminals for production/process data 3.3. Monitor product/process quality, thickness and integrity to procedures 3.4. Make adjustments to remedy faults and nonconformity to standard as required 3.5. Maintain continuity of process 3.6. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.7. Clean, adjust and lubricate equipment as required 3.8. Pause equipment, or stop equipment in an emergency, following procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problem using appropriate solution within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to manufacture of composites products using resin transfer moulding equipment within the plastics and rubber industries.

It includes all moulds, pumps and programmable logic controllers (PLCs) if fitted and all relevant ancillary equipment integral to the composites forming process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

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This competency includes equipment and tools such as:

- moulds, closures and fittings
- resin pumps and fittings such as couplings, hoses, breathers, bleeders
- controller, such as PLC if fitted
- relevant personal protective equipment (PPE)
- hand tools used in the production process
- material loading equipment used for loading of raw materials.

Materials covered by this competency include:

- release films and fabrics
- sealant tapes
- preforms, cores, pre-pregs.

Typical hazards include:

- hazardous vapours and materials
- fibres, airborne and handled
- humidity, air temperatures, radiant heat, hot moulds
- stationary and moving machinery, parts and components
- manual handling hazards.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems include:

- resin, over or undersupplied to mould
- release agents performance
- contamination
- temperature variations, affecting resin cure-rate
- blemishes
- missing detail
- warped moulds or dies
- worn or damaged mould parts or fittings
- variations in materials and/or contamination of materials
- processing problems.

Key variables to be monitored include:

- operating temperatures
- cycle time
- output rate
- surface finish and condition
- product weight
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - behaviour of materials in relation to heat, pressure and time
  - quality requirements at each production stage
  - function and operating principles of composites forming equipment, machine components and ancillary equipment
  - impact of temperature, pressure, time during cycles on product quality and production output
  - nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which effect machine operation and product development
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check composites forming equipment for correct set up to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- make measurements when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances

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- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - heat
  - loss of pressure
  - equipment - adjustments/setup
  - equipment - maintenance requirements incorrect quantity of materials
  - contaminated materials.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and composites moulding process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Numeracy is required to the level of determining required weights/volumes of materials in a resin mix for different circumstances (say using a data sheet), number of layers of impregnated matrix required to yield the required product laminate thickness, and similar activities.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

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UNIT TITLE

PMBPROD395A - Produce composite sheet products

UNIT DESCRIPTOR

This competency covers preparation and operations for forming composite sheet products and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are involved in the production of composite sheet products by machine forming of composite materials. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- setting up the equipment line including formers
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine composites forming equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit has the prerequisite competency of:

- PMB PROD 295 A Operate composite sheeting equipment.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Check equipment setup.	2.1. Determine equipment requirements 2.2. Set process to specifications as required 2.3. Check equipment settings and adjustments are as required 2.4. Check materials, resins and fibres are correct 2.5. Discard, or make adjustments to the process for, non-conforming materials 2.6. Set up date, batch and materials markings to specifications, as required 2.7. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments as required to the composite sheet process.	3.1. Operate equipment to form product to specification noting key variables 3.2. Monitor controls/displays/terminals for production/process data 3.3. Monitor product/process quality, thickness, colour and integrity 3.4. Make adjustments to remedy faults and nonconformity to standard as required 3.5. Maintain continuity of process 3.6. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.7. Clean, adjust and lubricate equipment as required 3.8. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problem using appropriate solution within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to the production of composite sheet products (typically wall and roof sheeting) within the plastics and rubber industries. It includes the operation of all relevant additional equipment where that equipment is integral to the composites forming process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include, but are not limited to:

- setting up equipment line including formers
- use of composites materials including release agents, resins, fibres and surface treatments
- operation of equipment including PLC controls if fitted
- curing of products including application of wraps, heat or pressure.

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This competency includes tools and equipment such as:

- rollers and formers
- hand tools, eg, knives, cutters
- equipment for sheet manufacture and curing
- relevant personal protective equipment.

Typical hazards include:

- hazardous vapours
- hazardous materials
- manual handling hazards
- moving machinery hazards
- temperature
- equipment operations.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems include:

- cracks, dents or imperfections of the formers and rollers
- variations in materials, colour, consistency or mix
- adjustment and settings of the equipment
- contamination of materials
- curing conditions
- variations in materials and/or contamination of materials
- processing problems.

Key variables to be monitored include:

- operating temperatures
- speed
- colour
- cycle time
- output rate
- product weight
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - properties of the materials required to form a composite structure of the required strength and surface finish
  - pot life of the resins used
  - quality requirements at each production stage
  - function and operating principles of equipment, machine components and ancillary equipment
  - impact of machine speed, temperature, pressure, time during cycles on product quality and production output
  - nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which effect machine operation and product development
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check sheet forming equipment for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- make measurements when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task

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- distinguish between causes of faults such as:
  - wrong raw materials/additives/catalyst
  - incorrect equipment setup, eg speed, tension, pressure
  - curing problems, conditions or equipment
  - incorrect quantity of materials
  - contaminated materials.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and composite sheet process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Basic numeracy is required, eg, to determine how many 2 kg, 3 kg and 5 kg bags are needed to make up a requirement for 50 kg.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

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UNIT TITLE

PMBPROD396A - Produce composites using centrifugal casting

UNIT DESCRIPTOR

This competency covers preparation and operations for forming composite products (typically pipes) using centrifugal casting processes and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are involved in the production of composite products by centrifugal casting equipment. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- setting up equipment, sprays, dies, mandrels, winders, moulds and formers
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine composites forming equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit has the prerequisite competency of:

- PMB PROD 296 A Operate centrifugal casting equipment.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Check equipment setup.	2.1. Determine equipment requirements 2.2. Set process to specifications as required 2.3. Check centrifugal casting equipment settings and adjustments are as required 2.4. Check materials, resins and fibres are correct 2.5. Discard, or make adjustments to the process for, non-conforming materials 2.6. Set up date, batch and materials markings to specifications, as required 2.7. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments as required to the centrifugal casting process.	3.1. Operate equipment to form product to specification noting key variables 3.2. Monitor controls/displays/terminals for production/process data 3.3. Monitor product/process quality, thickness, colour and integrity 3.4. Make adjustments to remedy faults and nonconformity to standard as required 3.5. Maintain continuity of process 3.6. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.7. Clean, adjust and lubricate equipment as required 3.8. Pause equipment, or stop equipment in an emergency, following workplace and emergency procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problem using appropriate solution within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to the production of composite products (typically pipes) by centrifugal casting processes within the plastics and rubber industries. It includes the operation of all relevant additional equipment where that equipment is integral to the composites forming process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include, but are not limited to:

- setting up moulds, dies, mandrels or formers
- use of composites materials including release agents, resins and fibres
- operation of equipment including PLC controls if fitted
- curing of products including application of wraps, heat or pressure.

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This competency includes tools and equipment such as:

- dies, moulds, mandrels, formers
- sprays and fibre lay up equipment
- hand tools, eg, knives, cutters
- equipment for centrifugal casting and curing
- relevant personal protective equipment.

Typical hazards include:

- hazardous vapours
- hazardous materials
- manual handling hazards
- moving machinery hazards
- temperature
- equipment operations

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems include:

- cracks, dents or imperfections of the mould, mandrel, former, die
- adjustment of resin and fibre applicators
- variations in materials, colour, consistency or mix
- adjustment and settings of the equipment
- contamination of materials
- curing conditions
- variations in materials and/or contamination of materials
- processing problems.

Key variables to be monitored include:

- operating temperatures
- speed
- colour
- cycle time
- output rate
- product weight
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - properties of the materials required to form a composite structure of the required strength and surface finish
  - pot life of the resins used
  - quality requirements at each production stage
  - function and operating principles of equipment, machine components and ancillary equipment
  - impact of machine speed, temperature, pressure, time during cycles on product quality and production output
  - nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which effect machine operation and product development
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check centrifugal casting equipment for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- make measurements when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - wrong raw materials/additives/catalyst
  - incorrect equipment setup, eg, speed, tension, pressure
  - curing problems, conditions or equipment
  - incorrect quantity of materials
  - contaminated materials.

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Critical aspects:

It is essential that competence is demonstrated in the ability to:

- identify critical materials properties and centrifugal casting composites process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Numeracy is required to the level of determining required weights/volumes of materials in a resin mix for different circumstances (say using a data sheet), number of layers of impregnated matrix required to yield the required product laminate thickness, and similar activities.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

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UNIT TITLE

PMBPROD397A - Produce composites using moulding compounds

UNIT DESCRIPTOR

This competency covers the operation of equipment using moulding compounds (SMC, BMC, LPMC) to make composite products and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of equipment for the production of composites using moulding compounds. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine composites production equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit has the prerequisite competencies of:

- PMB PROD 297 Operate equipment using moulding compounds.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Check composites forming process setup.	2.1. Determine equipment requirements 2.2. Adjust control panel (eg, cycle time, heating, cooling) as required for factors such as temperature, material 2.3. Check equipment, raw material and die/tool all match job requirements 2.4. Check materials, moulding compounds, release agents, etc, are correct 2.5. Discard, or make adjustments to the process for, non-conforming materials 2.6. Set up date, batch and materials markings to specifications, as required 2.7. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments as required to the process.	3.1. Operate composites forming equipment, noting key variables 3.2. Monitor controls/displays/terminals for production/process data 3.3. Monitor product/process quality, thickness and integrity to procedures 3.4. Make adjustments to remedy faults and nonconformity to standard as required 3.5. Maintain continuity of process 3.6. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.7. Clean, adjust and lubricate equipment as required 3.8. Pause equipment, or stop equipment in an emergency, following procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problem using appropriate solution within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to manufacture of composites products using moulding compounds within the plastics and rubber industries.

Moulding compounds include:

- SMC - sheet moulding compound
- BMC - bulk moulding compound
- LPMC - low pressure moulding compound.

It includes all moulds, presses and programmable logic controllers (PLCs) if fitted and all relevant ancillary equipment integral to the composites forming process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

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This competency includes equipment and tools such as:

- moulds, dies, formers, closures and fittings
- equipment including presses and ancillaries
- controller, such as PLC if fitted
- relevant personal protective equipment (PPE)
- hand tools used in the production process
- material loading equipment used for loading of raw materials.

Materials covered by this competency include:

- release films and fabrics
- moulding compounds.

Typical hazards include:

- hazardous vapours and materials
- fibres, airborne and handled
- humidity, air temperatures, radiant heat, hot moulds
- stationary and moving machinery, parts and components
- manual handling hazards.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems include:

- moulding compound, over or undersupplied to mould
- release agents performance
- contamination
- temperature variations affecting resin cure-rate
- blemishes
- missing detail
- warped moulds or dies
- worn or damaged mould parts or fittings
- variations in materials and/or contamination of materials
- processing problems.

Key variables to be monitored include:

- operating temperatures
- cycle time
- output rate
- surface finish and condition
- product weight
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - behaviour of materials in relation to heat, pressure and time
  - quality requirements at each production stage
  - function and operating principles of composites forming equipment, machine components and ancillary equipment
  - impact of temperature, pressure, time during cycles on product quality and production output
  - nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which effect machine operation and product development
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check composites forming equipment for correct set up to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- make measurements when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control

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- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - heat
  - equipment - adjustments/setup
  - equipment - maintenance requirements incorrect quantity of materials
  - contaminated materials.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and composites moulding process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Numeracy is required to the level of determining required weights/volumes of materials in a resin mix for different circumstances (say using a data sheet), number of layers of impregnated matrix required to yield the required product laminate thickness, and similar activities.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

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UNIT TITLE

PMBPROD398A - Produce composites using pre-pregs

UNIT DESCRIPTOR

This competency covers the operation of equipment using pre-pregs to make composite products and the solving of non-routine problems.

This competency is typically performed by operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

This competency in practice

This competency applies to operators who are required to apply knowledge of materials, product purpose and processes to the operation of equipment for the production of composites using pre-pregs. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems. It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine composites production equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit has the prerequisite competencies of:

- PMB PROD 298A Operate equipment using pre-pregs material.

ELEMENT	PERFORMANCE CRITERIA
1. Plan own work requirements.	1.1. Identify equipment and processes used for production process and upstream and downstream operations from production plan or request 1.2. Identify materials required including additives 1.3. Recognise hazards and follow appropriate hazard control/minimisation methods 1.4. Identify and check emergency stops, guards and controls 1.5. Identify requirements for materials, quality, production and equipment checks 1.6. Identify materials, waste management and housekeeping needs.

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ELEMENT	PERFORMANCE CRITERIA
2. Check composites forming process setup.	2.1. Determine equipment requirements 2.2. Adjust control panel (eg, cycle time, heating, cooling) as required for factors such as temperature, material etc. 2.3. Check equipment, raw material and die/tool all match job requirements 2.4. Check materials, pre-pregs, release agents, etc, are correct 2.5. Discard, or make adjustments to the process for, non-conforming materials 2.6. Set up date, batch and materials markings to specifications, as required 2.7. Complete other pre-start checks in accordance with procedures.
3. Operate and make adjustments as required to the process.	3.1. Operate composites forming equipment, noting key variables 3.2. Monitor controls/displays/terminals for production/process data 3.3. Monitor product/process quality, thickness and integrity to procedures 3.4. Make adjustments to remedy faults and nonconformity to standard as required 3.5. Maintain continuity of process 3.6. Collect and reprocess/discard scrap/trim and other materials in accordance with procedures 3.7. Clean, adjust and lubricate equipment as required 3.8. Pause equipment, or stop equipment in an emergency, following procedures.
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problem using appropriate solution within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency applies to manufacture of composites products using pre-pregs within the plastics and rubber industries.

It includes all moulds, pumps and programmable logic controllers (PLCs) if fitted and all relevant ancillary equipment integral to the composites forming process.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

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This competency includes equipment and tools such as:

- moulds, formers, closures and fittings
- equipment including presses and ancillaries
- controller, such as PLC if fitted
- relevant personal protective equipment (PPE)
- hand tools used in the production process
- material loading equipment used for loading of raw materials.

Materials covered by this competency include:

- release films and fabrics
- pre-pregs.

Typical hazards include:

- hazardous vapours and materials
- fibres, airborne and handled
- humidity, air temperatures, radiant heat, hot moulds
- stationary and moving machinery, parts and components
- manual handling hazards.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems include:

- pre-preg incorrectly applied to mould
- release agents performance
- contamination
- temperature variations, affecting resin cure-rate
- blemishes
- missing detail
- warped moulds or dies
- worn or damaged mould parts or fittings
- variations in materials and/or contamination of materials
- processing problems.

Key variables to be monitored include:

- operating temperatures
- cycle time
- output rate
- surface finish and condition
- product weight
- product integrity and general conformance to specification/sample.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - products, materials and material characteristics
  - behaviour of materials in relation to heat, pressure and time
  - quality requirements at each production stage
  - function and operating principles of composites forming equipment, machine components and ancillary equipment
  - impact of temperature, pressure, time during cycles on product quality and production output
  - nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which effect machine operation and product development
  - safety procedures and the use of PPE in relation to handling materials, equipment operation and clean up
  - the hierarchy of control including engineering controls
  - impact of variations in raw materials and equipment operation in relation to final product
  - changes to materials at various stages of production
  - waste management and importance of non-conforming materials
- plan own work including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check composites forming equipment for correct setup to job specifications and implement adjustments or report deviations immediately
- start up equipment and make appropriate adjustments to bring process on line
- make measurements when required and identify product out of specification
- safely shut down equipment in normal or abnormal circumstances
- identify and describe own role and role of others involved directly in the process
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- identify hazards of the materials and process
- implement appropriate procedures for hazard control
- use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - heat
  - poor handling or storage of pre-pregs
  - equipment - adjustments/setup
  - equipment - maintenance requirements incorrect quantity of materials
  - contaminated materials.

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Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and composites moulding process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms and production reports.

Numeracy is required to the level of determining required weights/volumes of materials in a resin mix for different circumstances (say using a data sheet), number of layers of impregnated matrix required to yield the required product laminate thickness, and similar activities.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
2	1	2	2	2	2	2

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UNIT TITLE

PMBTECH301A - Use material and process knowledge to solve problems

UNIT DESCRIPTOR

This competency covers the application of a knowledge of polymers, their additives and their interactions with the process to the solving of problems. It may be applied in any sector of the industry.

This competency is typically performed by technicians working either independently or as part of a work team.

This unit of competency may be designated for a stream – see the range of variables.

This competency in practice

This competency applies to operators who recognise potential process problems and analyse process problems using their knowledge and understanding of the polymer materials they are processing. The problems are broader and/or require more knowledge of the properties of polymers than those which apply to a single work station and which may be an element of a 'PROD' competency. It includes:

- a basic knowledge of different polymer materials
- a basic knowledge of the applications of different polymers
- a basic knowledge of the different properties of polymers
- an understanding of the relationship between process conditions and polymer properties.

PREREQUISITES

This unit of competency has the prerequisite of:

- PMB PROD 235 B Use materials and process knowledge to complete work operations.

ELEMENT	PERFORMANCE CRITERIA
1. Identify and apply applications of polymer materials.	1.1. Identify typical applications for common polymer materials 1.2. Recognise physical properties of common polymers 1.3. Use additives with knowledge of the effects of using the incorrect amount/type of additive 1.4. Handle additives to minimise the associated hazards.
2. Identify and apply impacts of impurities on polymer products.	2.1. Identify major impurities of concern to product and process 2.2. Examine polymer materials for impurities 2.3. Apply corrective actions to remove/compensate for impurities.
3. Determine expected material properties from polymer type and grade.	3.1. Identify the relationship between polymer type and polymer characteristics 3.2. Identify the relationship between polymer grade and degree of polymerisation 3.3. Identify the influence of polymer structure on properties.

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ELEMENT	PERFORMANCE CRITERIA
4. Solve process problems related to polymer flow characteristics.	4.1. Use polymer flow test methods and recognise the importance of flow properties to the process. 4.2. Control critical factors leading to changes of state of the polymer during processing using knowledge of the causes 4.3. Identify the relationship between polymer flow and molecular weight 4.4. Recognise process/product signs of incorrect polymer flow characteristics 4.5. Recommend corrective actions for problems caused by polymer flow characteristics.
5. Solve process/product problems related to heating and cooling of product/ material in process.	5.1. Recognise the importance of the degree of cross linking on product properties if appropriate 5.2. Recognise the importance of the degree of crystallisation/crystal size on product properties if appropriate 5.3. Recognise the impact of shrinkage on product properties if appropriate 5.4. Recognise the impact of annealing on product properties if appropriate 5.5. Recognise process/product signs of incorrect heating/cooling 5.6. Recommend corrective actions for problems caused by heating/cooling.
6. Solve process problems related to polymer faults.	6.1. Recognise an actual or a potential process problem 6.2. Analyse that problem in a formal manner 6.3. Determine appropriate corrective action 6.4. Implement that corrective action if it is within the range of workplace authority 6.5. Make recommendations for corrective action outside range of workplace authority 6.6. Follow through on corrective action and make sure problem is resolved.

RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It includes the operation of all relevant equipment.

Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This unit of competency may be designated for one of the following streams where workers use that unit substantially only in that stream area:

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- cablemaking
- blow moulding
- blown film
- calendering
- composites
- compounding
- extrusion
- fabrication
- injection moulding
- polystyrene
- expanded foam polyurethane
- rotational moulding
- thermoforming
- belt splicing
- rubber lining
- tyre manufacture
- tyre retreading
- surface coating.

Additives include:

- anti-blocking agents
- anti-oxidants
- anti-static agents
- fillers
- flame retardants
- impact modifiers
- lubricating agents
- nucleating agents
- pigments
- plasticisers
- release agents
- slip agents
- UV stabilisers
- cross-linking agents
- blowing agents
- heat stabilisers.

Polymers include:

- thermoplastics
- thermosets
- elastomers
- linear, branched and cross linked
- crystalline, amorphous.

Physical properties include:

- rigidity
- clarity
- hardness
- density
- toughness
- softening point.

Impurities include:

- moisture/water
- foreign matter
- other polymers.

Corrective actions include drying moisture (eg, by oven, refrigerated dehumidifer, desiccant bed dehumidifier).

Flow tests include:

- melt flow
- spiral flow
- rheometry
- viscometry

as are relevant to the process and materials.

All operations are performed in accordance with standard procedures and work instructions.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Knowledge of polymers and how their properties vary and the relevance to these properties to processing and product. Descriptions of polymer molecular shape and arrangement should be limited to commonly accepted diagrammatic representations of these structures.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - type of polymer and polymer structure
  - impact of additives
  - the importance of flow and flow properties
  - the impact of temperature and heating/cooling rate on processing and properties
- distinguish between causes of faults such as:
  - wrong raw materials/additives or wrong grade
  - incorrect quantity of materials/additives
  - contaminated materials/additives
  - out of specification materials
  - process setup and/or operation.

Critical aspects:

It is essential that the principles of polymers and how these contribute to properties is known and able to be applied to the work. Competence must be demonstrated in the ability to recognise potential situations requiring action and then in implementing appropriate action.

Consistent performance should be demonstrated. In particular look to see that production standards are met consistently.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret technical specifications and similar information.

Writing may be required to the level of completing workplace reports.

Numeracy is required to the level of understanding the significance of numbers and being able to interpret numerical data.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

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Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom.

Additional resources might include samples of products requiring analysis, particularly products showing processing faults, or potential product specifications requiring the specification of polymer types and polymer compounds.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	2	2	2	2	3	3

UNIT TITLE

PMBMAINT404B – Co-ordinate the conduct of maintenance

UNIT DESCRIPTOR

This unit applies to employees required to apply knowledge of production equipment operating principles, service requirements and workplace production operations to coordinating the conduct of maintenance. It applies to all sectors of the industry.

This competency is typically performed by supervisors, maintenance coordinators, and team leaders, working either independently or as part of a team.

This competency in practice

This competency applies to supervisors who are required to apply knowledge of materials, product purpose and processes to the co-ordination of maintenance activities. The key factors are the co-ordination of maintenance activities to meet the objectives of restoring the plant/equipment condition, consistent with production requirements. It includes:

- identifying and planning maintenance work requirements consistent with production requirements
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking sources of data and information on equipment
- develop and monitor a work-plan for the maintenance activities
- organising materials, consumables and personnel to meet the maintenance objectives
- checking tools, equipment, materials and output for conformity to job requirements
- solving routine and non-routine injection moulding equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Establish maintenance requirements.	1.1. Check equipment specifications, service requirements and workplace procedures for recommended maintenance intervals and processes 1.2. Distinguish between special requirements for maintenance from normal lubrication, adjustment and maintenance schedules 1.3. Identify and make comparisons based upon previous experience, historical data, future equipment use, production requirements and standard operating procedures 1.4. Identify and develop work plan for the maintenance and work schedule 1.5. Identify maintenance providers (internal/external) 1.6. Identify and develop costings for process based on work schedule (equipment/staff offline), equipment manufacturer's recommendations, charges for materials, equipment and consumables and external/internal labour charges

ELEMENT	PERFORMANCE CRITERIA
	1.7. Document and record required production interruptions, processes and procedures 1.8. Obtain clearances for any required costs for the maintenance.
2. Organise maintenance.	2.1. Check production schedules and staff rosters and identify time(s) when the maintenance process may be scheduled including optimum timing for (any) shutdown 2.2. Obtain permission from supervisory personnel for timing of maintenance to optimise the maintenance process and production 2.3. Develop detailed work plans to accord with: production schedules, availability of expertise and scheduling of resource availability 2.4. Identify employees with the required competencies and where necessary facilitate appropriate training and assessment 2.5. Obtain approvals for production schedule, employee work pattern and maintenance schedule adjustments and refine work plan to ensure the maintenance program will maintain workplace output in terms of workplace policy.
3. Assemble maintenance requirements.	3.1. Identify This section should be read in conjunction with the range of variables for this unit of competency. Resources required (equipment, personnel and consumables) to meet work schedule 3.2. Locate and coordinate consumables, equipment and expertise to meet maintenance work schedule 3.3. Identify and externally source equipment, consumables and expertise and make appropriate arrangements for procurement.
4. Complete maintenance procedures.	4.1. Complete maintenance work schedule following the work plan 4.2. Make appropriate readings, measurements and recordings and compare to equipment, product and other relevant specification 4.3. Identify areas requiring further testing and recommend appropriate procedures to supervisory staff 4.4. Make appropriate adjustments to the work schedule plan based on experience and completed documentation 4.5. Complete records for production and other purposes and forward to appropriate personnel, noting areas where changes to equipment operation or routine maintenance are required to maintain optimum work output and equipment life.

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RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It does **not** include maintenance which would require trade level skills. It is **not** intended that this competency would cover maintenance which is carried on in a workshop.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include:

- predictive and preventative operational maintenance
- proactive maintenance
- reactive maintenance.

Typical information sources, observed data and plant records may include:

- plant data
- log sheets
- production schedules
- operational and performance reports
- physical aspects such as noise, smell, feel and pressure
- condition monitoring information
- planned maintenance schedules
- standard operating procedures
- manufacturer's instructions, specifications and service manuals
- machine circuit diagrams for hydraulic/pneumatic and electrical/electronic circuits
- plant description manuals.

This competency includes equipment and tools such as:

- hand tools specific for the task
- testing equipment
- measuring and aligning equipment
- computer equipment
- relevant personal protective equipment.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge and understanding of equipment operation, planning and maintenance practices sufficient to plan for maintenance requirements in standard and non-standard situations and then determine appropriate action which is consistent with operation guidelines is required.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - characteristics and capabilities of equipment, materials and processes used
  - functions and troubleshooting of internal components and their problems
  - routine and non-routine causes of equipment failures and the service conditions

which may increase maintenance
- urgency and timeliness factors in planning maintenance activities in relation to production requirements
- proactive, predictive, preventative and reactive maintenance principles
- implications of maintenance for production and work activities
- source requirements for maintenance
- safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
- the hierarchy of control including engineering controls

- identify factors in production schedules, time and resource requirements (including external sources) in scheduling maintenance activities
- schedule maintenance functions in the most timely and cost effective manner
- apply relevant agreements, codes of practice or other legislative requirements
- ensure workplace is safe for maintenance activities.

Critical aspects:

It is essential that the procedures be understood and that the importance of critical operational systems is known. Competence must be demonstrated in the ability to recognise potential situations requiring action and then in implementing appropriate action.

Consistent performance should be demonstrated. In particular look to see that
- early warning signs of equipment in need of attention/with potential problems are recognised
- planned work sequences are logical and conform with production schedules and work rosters
- maintenance schedules for reactive, planned and proactive maintenance are coordinated based upon the most appropriate and cost effective method to ensure equipment reliability and optimum performance
- plans are initiated and monitored, with activities modified for variations in workplace contexts and the environment, until final resolution has occurred.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical manufacturer's specifications, equipment procedures, production schedules and material labels as provided to coordinators.

Writing is required to the level of completing workplace reports and proposals.

Numeracy is also required, eg, analysing statistical information/historical data in the form of tables and graphs

Assessment method and context:

Competence in this unit may be assessed:
- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

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Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	3	3	3	3	3	3

UNIT TITLE

PMBMAINT405A – Identify problems in fluid power systems

UNIT DESCRIPTOR

This competency covers the recognition and diagnosis of control system problems in hydraulic/pneumatic control systems on polymer processing equipment. It includes the implementation of appropriate corrective action. It applies to all sectors of the industry.

This competency is typically performed by technicians working either independently or as part of a work team.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Identify pneumatic/ hydraulic control system problems.	1.1. Categorise the types of machine malfunctions due to fluid power faults 1.2. Describe the effects on product quality of fluid power problems 1.3. Isolate possible faulty components from a circuit diagram and a knowledge of the function of each component.
2. Implement appropriate corrective action.	2.1. Examine other possible faults 2.2. Shortlist possible fault causes 2.3. Conduct investigations of machine, products or data to determine most likely fault cause(s) 2.4. Take appropriate action to ensure fault is rectified 2.5. Follow up on action to ensure completion in an appropriate time frame 2.6. Recheck after corrective action to ensure fault has been rectified.
3. Identify maintenance requirements.	3.1. Check manufacturer's instructions to determine recommended maintenance schedule 3.2. Check fault and maintenance history to determine adequacy of current regime and special requirements 3.3. Determine criticality of machine to production/business 3.4. Develop maintenance schedule/requirements for machine 3.5. Liaise with all relevant stakeholders to ensure schedule is appropriate 3.6. Report outcome to appropriate personnel.

RANGE OF VARIABLES:

This competency unit includes all common equipment used in the plastics, rubber and cablemaking industry and should be able to be applied to all equipment using fluid power control systems.

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It assumes an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The components covered by this unit include, but are not limited to:

- pumps,
- pressure controls
- DCVs
- flow control actuators
- accumulators
- filters
- heat exchangers
- proportional, servo and cartridge valves.

Maintenance requirements covered by this unit include, but are not limited to:

- oil levels
- temperatures
- cavitation/aeration/noise
- cleanliness
- poor performance
- safety aspects.

Typical problems include:

- types:
  - loss of flow, power
  - power failure
- cause:
  - oil leaks (internal and external)
  - component malfunction
  - poor maintenance procedures
- remedies:
  - regular maintenance
  - shutdown
  - using accumulator as emergency source.

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Fault identification includes
- motor failure effect on cycle time:
- pressure loss
- short shots
- loss of clamp pressure
- oil temperature.

This unit does not require the actual repair of the equipment personally.

All operations are performed in accordance with standard procedures and work instructions.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Knowledge and understanding of the process and the interaction of process conditions on product quality sufficient to recognise and analyse control system faults.

Knowledge of the enterprise's procedures and policies along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Competence includes the ability for the practical completion of the job to:
- apply and/or explain:
  - principles of hydraulics/pneumatics
  - circuit diagrams
  - principles of circuit components
- distinguish between causes of faults such as:
  - control system failure
  - process condition
  - materials
  - component types.

Critical aspects:

It is essential that the equipment function and operation be understood and the importance of critical process parameters and component functions is known. Competence must be demonstrated in the ability to recognise potential situations requiring action and then in implementing appropriate action.

Consistent performance should be demonstrated. In particular look to see that machine reliability is high.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret technical specifications and manufacturer's manuals.

Writing is required to the level of writing procedures and schedules.

Basic numeracy is also required to allow the interpretation of machine and product data and the comparison of actual with desired readings.

Assessment method and context:

Competence in this unit may be assessed:
- on an operating plant allowing for operation under all normal and a range of abnormal conditions

- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom.

Additional resources might include the provision of equipment with known faults/problems to allow for assessment of the ability to identify problems.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	2	2	2	3	3	3

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UNIT TITLE

PMBMAINT406A – Identify problems in electronic control systems

UNIT DESCRIPTOR

This competency covers the recognition and diagnosis of control system problems in electrical/electronic control systems on polymer processing equipment. It includes the implementation of appropriate corrective action. It applies to all sectors of the industry.

This competency is typically performed by technicians working either independently or as part of a work team.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Identify electrical/electronic control system problems.	1.1. Categorise the types of machine malfunctions due to electrical/electronic faults 1.2. Describe the effects on product quality of electrical/electronic problems 1.3. Isolate possible faulty components from a circuit diagram and a knowledge of the function of each component.
2. Implement appropriate corrective action.	2.1. Examine other possible faults 2.2. Short list possible fault causes 2.3. Conduct investigations of machine, products or data to determine most likely fault cause(s) 2.4. Take appropriate action to ensure fault is rectified 2.5. Follow up on action to ensure completion in an appropriate time frame 2.6. Recheck after corrective action to ensure fault has been rectified.
3. Identify maintenance requirements.	3.1. Check manufacturer's instructions to determine recommended maintenance schedule 3.2. Check fault and maintenance history to determine adequacy of current regime and special requirements 3.3. Determine criticality of machine to production/business 3.4. Develop maintenance schedule/requirements for machine 3.5. Liaise with all relevant stakeholders to ensure schedule is appropriate 3.6. Report outcome to appropriate personnel.

RANGE OF VARIABLES:

This competency unit includes all common equipment used in the plastics, rubber and cablemaking industry and should be able to be applied to all equipment using electrical/ electronic control systems.

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It assumes an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The components covered by this unit include, but are not limited to:

- switches, relays and solenoids
- position and pressure transducers
- temperature controllers.

Maintenance requirements covered by this unit include, but are not limited to:

- temperatures
- cleanliness
- poor performance
- safety aspects.

Typical problems include:

- types:
  - loss of flow, power
  - power failure
- cause:
  - component malfunction
  - poor maintenance procedures
- remedies:
  - regular maintenance
  - shutdown.

Fault identification includes:

- motor failure effect on cycle time
- short shots
- loss of clamp pressure
- no power
- electronic/electrical faults
- analysis with PLC.

This unit does not require the actual repair of the equipment personally.

All operations are performed in accordance with standard procedures and work instructions.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Knowledge and understanding of the process and the interaction of process conditions on product quality sufficient to recognise and analyse control system faults.

Knowledge of the enterprise's procedures and policies along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:

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- fundamentals of electricity and electronics
- circuit diagrams
- principles of circuit components

νdistinguish between causes of faults such as:

- control system failure
- process condition
- materials
- component types.

Critical aspects:

It is essential that the equipment function and operation be understood and the importance of critical process parameters and component functions is known. Competence must be demonstrated in the ability to recognise potential situations requiring action and then in implementing appropriate action.

Consistent performance should be demonstrated. In particular look to see that machine reliability is high.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret technical specifications and manufacturer's manuals.

Writing is required to the level of writing procedures and schedules.

Basic numeracy is also required to allow the interpretation of machine and product data and the comparison of actual with desired readings.

Assessment method and context:

Competence in this unit may be assessed:

νon an operating plant allowing for operation under all normal and a range of abnormal conditions

νby use of a suitable simulation and/or a range of case studies/scenarios

νby a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom.

Additional resources might include the provision of equipment with known faults/problems to allow for assessment of the ability to identify problems.

KEY COMPETENCIES						
1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	2	2	2	3	3	3

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UNIT TITLE

PMCOPS400A – Optimise process systems

UNIT DESCRIPTOR

This competency covers the ability to optimise the performance of a complete production section. It includes ensuring production systems comply with OH&S requirements and that process, plant and equipment utilisation is planned, carried out and problems solved to fully meet operational needs and ensure that production of finished goods meets customer requirements.

This competency in practice

This competency requires the application of detailed operational and process knowledge, including the principles of operation of equipment, and the chemistry and/or physics of changes to materials occurring during processing. It embodies a breadth and depth of technical knowledge and process understanding significantly greater than the 'series 300' competencies.

Assessment of this competency should ensure that the applicant can apply this knowledge to a process, and should typically rely on the applicant undertaking, or leading, a significant process improvement project.

This competency is typically performed by a technician, team leader or front line manager.

PREREQUISITES

This unit of competency has **no** prerequisites. However, assumes the knowledge component included in the following units of competency. Evidence must be available that the specified knowledge has been acquired and is able to be applied:

- at least one appropriate PROD 300 series unit AND EITHER
- PMB PREP 301 B Set up and prepare for production OR
- PMB PREP 303 B Set up equipment for continuous operation.

ELEMENT	PERFORMANCE CRITERIA
1. Analyse and evaluate current plant and equipment.	1.1. Compare actual process, plant and equipment performance with requirements and/or historical data/records 1.2. Identify abnormal or sub-optimal process, plant and equipment performance 1.3. Collect and evaluate batch and/or historical records to determine possible causes for sub-optimal performance 1.4. Use appropriate techniques to rank possible causes from most to least probable cause.
2. Develop plan for corrective and/or optimisation action.	2.1. Analyse cause(s) to determine appropriate corrective action 2.2. Predict the impact of a change in one unit/area on other related plant units/areas 2.3. Develop measurable objectives and evaluate alternatives 2.4. Develop optimisation plan and communicate to appropriate personnel 2.5. Evaluate optimisation action to determine effectiveness.

ELEMENT	PERFORMANCE CRITERIA
3. Co-ordinate corrective and/or optimisation action plan.	3.1. Co-ordinate all appropriate unit areas and operations in order to rectify problem causes in process, plant and equipment performance 3.2. Initiate and/or implement all required corrective/optimisation actions 3.3. Communicate corrective/optimisation outcomes to all relevant personnel 3.4. Implement procedures/systems to eliminate possible future causes 3.5. Record and maintain log of all relevant information.
4. Develop continuous improvement strategies.	4.1. Review work practices and procedures to identify possible factors which contribute to the likelihood of sub-optimal performance 4.2. Identify options for removing or controlling the risk of sub-optimal performance 4.3. Assess the adequacy of existing control and quality methods and systems 4.4. Identify opportunities to continuously improve performance 4.5. Develop recommendations for continual improvement of process, plant and equipment effectiveness 4.6. Consult with appropriate personnel and implement continuous improvement strategies 4.7. Document implementation of continuous improvement strategies.

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RANGE OF VARIABLES:

This unit of competence describes the work conducted by technicians, team leaders or front line managers who optimise process systems as part of their work function. It includes all items of equipment and processes which form part of the production process of a complete area.

Typical problems will require the application of detailed operational and process knowledge over the entire production/manufacturing area including the principles of operation of the equipment and the chemistry and/or physics of the changes to materials occurring within that area.

All operations are performed in accordance with enterprise procedures, licensing requirements, legislative requirements and industrial awards and agreements.

Optimising process systems requires application of detailed operational and process knowledge to address issues such as:

- starting material quality
- yield maximisation
- throughput maximisation
- energy efficiency
- use of utilities
- labour utilisation
- overall cost
- efficient use of equipment
- reducing downtime
- minimisation of waste and rework
- improved workplace layout and workflow.

All operations are performed in accordance with enterprise procedures. These procedures include or have been prepared from:

- industry codes of practice
- materials safety data sheets
- equipment manuals
- equipment startup, operation and shutdown procedures
- calibration and maintenance schedules
- quality manuals and procedures
- enterprise recording and reporting procedures
- production and laboratory schedules
- material, production and product specifications.

All operations are subject to stringent OH&S requirements. Relevant standards may include sections of the occupational health and safety legislation, enterprise safety rules and procedures, relevant State and federal legislation, national standards or codes of practice.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Competence must be demonstrated in the ability to analyse and evaluate current production performance and develop and implement plans to optimise process systems.

Knowledge and understanding of the equipment, processes and systems should be sufficient to recognise opportunities to improve and/or enhance the quality of performance of the plant. This knowledge needs to include the relevant technical theory of the plant area and to be in depth across the entire plant area as appropriate to process system optimisation. It includes knowledge of the enterprise's standard procedures and work instructions and relevant regulatory requirements, along with the ability to implement them within appropriate time constraints and in a manner relevant to the operation of the equipment, processes and systems.

Competence includes the ability to:

- apply analytical skills which enable corrective or optimal conditions to prevail
- interpret information and make appropriate process control decisions
- distinguish between:
  - optimum and marginal performance of the plant
  - effective and marginal performance corrections and actions

as is relevant to the practical operation of all major equipment/process/systems within the area.

Critical aspects:

It is essential that the equipment/process/system be understood in depth and that the importance of critical material properties/settings/readings is known. Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action.

Consistent performance should be demonstrated. In particular look to see that:

- non-routine problems are recognised and defined;
- possible causes of complex problems are identified based on experience and the use of analytical techniques in solving the problem, including identifying variations and cause, separating single problems from multiple problems and the recognition of recurring problems;
- fundamental cause of process or equipment faults is determined
- corrective/preventative actions are developed to avoid recurrence of the problem and optimise the condition of the process, plant and equipment; and
- product quality and uniformity are maintained.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret technical specifications and data and to write technical reports and procedures.

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Assessment method, context and resource implications:

Competence in this unit may be assessed by observation over time on an operating plant. Where this is done, the time frame must allow for adequate assessment of operation under all normal and a range of abnormal conditions. Where this is not practical, additional assessment techniques must be used.

Competence may also be assessed by use of a suitable simulation and/or a range of case studies/scenarios. A combination of these techniques should be used to ensure the competency is adequately assessed.

In all cases it is expected that the practical assessment will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in such a manner as is appropriate to the language and literacy levels of the operator and reflecting the requirements of the competency.

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment which allows for appropriate and realistic simulation. A bank of case studies/scenarios will also be required where these form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunch room. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	3	3	2	3	3	3

UNIT TITLE

PMBORG403B – Conduct trials on products or processes

UNIT DESCRIPTOR

This unit applies to employees required to apply technical skills, knowledge of production techniques and communication with others to the organisation of the production of mass produced and customised fittings, equipment and assemblies. It applies to all sectors of the industry.

This competency is typically performed by technicians and team leaders working independently or as part of a work team.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Collect information.	1.1. Read job specifications and note key requirements 1.2. Identify steps and stages in the process 1.3. Clarify specifications where required.
2. Analyse job requirements.	2.1. Assess equipment capabilities in terms of meeting job specifications 2.2. Compare production run time and quantities with plant capabilities.
3. Propose requirements for production.	3.1. Report to appropriate personnel 3.2. Propose modifications/adaptation of equipment 3.3. List requirements for tooling/dies 3.4. List raw material requirements and communicate to appropriate personnel.
4. Plan and prepare for production processes.	4.1. Develop work plans noting timeframes and milestones from: • product drawings • specifications for products and materials • equipment instructions and capacity • customer timeframe requirements • relevant standards, inspection requirements and design rules • personnel availability and skills profile • standard operating or quality procedures 4.2. Plan production operations to meet customer timeframe and plan milestones ensuring availability of: • personnel • equipment • safe working spaces • consumables.

ELEMENT	PERFORMANCE CRITERIA
5. Conduct trials to monitor equipment operation.	5.1. Set up equipment to make appropriate use of guards, warning devices and safety features, 5.2. Modify standard operating procedures to suit the production 5.3. Monitor equipment operations to ensure variations or inconsistencies in output are identified, reported and rectified 5.4. Modify equipment configuration or components to meet product quality requirement 5.5. Adjust equipment controls and settings to ensure consistency and continuity in production 5.6. Plan and document equipment maintenance, setup and shutdown procedures.
6. Conduct trials to monitor consumables and production materials.	6.1. Monitor consumables and production materials for capacity to meet the requirements of the end product, cost and time parameters, product life cycle, health and safety requirements and customer or market 6.2. Document preparation procedures for consumables and production materials 6.3. Document materials ordering, storage movement and waste disposal needs.
7. Monitor product finish.	7.1. Check product finish for conformity to design specification 7.2. Note any non-conformity in product finish and investigate and document possible causes.
8. Evaluate production process.	8.1. Compare product finish with competitive products and market information, and recommend improvements to inform the planning process 8.2. Prepare cost reports (including time, maintenance, plant depreciation, on costs and profit margins) 8.3. Check all procedures for the process for conformity with trial outcomes 8.4. Ensure work procedures are authorised by appropriate personnel for implementation 8.5. Recommend variations to design specifications to appropriate personnel.

RANGE OF VARIABLES:

This competency unit covers all process and product trials. It will typically include situations where the trial is being conducted in conjunction with new product development or new equipment trials. It assumes an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry.

Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

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The trials covered by this unit include, but are not limited to:

- different materials/existing product
- process condition modification
- equipment modification
- new equipment
- new product
- process optimisation trials.

Typical problems include:

- trial logistics/coordination of people, processes, materials and equipment
- collection of relevant data
- ensuring data is uncontaminated by extraneous factors
- completion of all required paperwork before, during and after the trial.

All operations are performed in accordance with standard procedures and work instructions.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- analyse job requirements and materials and equipment capabilities
- inspect and test products
- set up equipment and monitor trial production runs
- locate, interpret and apply relevant information
- maintain workplace records
- identify and safely handle products and materials
- apply safety precautions appropriate to the task
- inspect and test products
- apply and/or explain:
  - machine processes
  - raw material capabilities
  - quality procedures, inspection and testing requirements
  - production workflow
  - focus of operation of work systems and equipment
  - identification and correct use of equipment, processes and procedures
- plan own work including predicting consequences and identifying improvements

- distinguish between causes of faults such as:
  - material/process mismatch
  - process faults
  - material faults
  - equipment faults
  - setting faults

as is relevant to the practical completion of the job.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret technical specifications and data and to write technical reports and procedures.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

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KEY COMPETENCIES						
1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	3	3	3	2	3	3

UNIT TITLE

PMBPROD430A – Trial a new die/tool

UNIT DESCRIPTOR

This competency covers the trialing of a new die or tool. It is intended to be applied to 'high pressure' dies such as might be used for injection or blow moulding.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are involved in the trialing of dies. The key factors are the monitoring of the production process and identifying routine problems. It includes:

- checking job sheets for work to be done
- conducting pre-start checks
- starting up and shutting down of equipment
- monitoring equipment during production process
- identifying routine production problems and notifying appropriate persons.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for trial.	1.1. Gather all relevant information available at the enterprise 1.2. Confirm machine/equipment suitability according to enterprise trialing procedures 1.3. Confirm die state in accordance with enterprise trialing procedures 1.4. Confirm raw materials readiness according to enterprise procedures.
2. Set die and machine.	2.1. Fit and set up die 2.2. Set up process conditions 2.3. Set control panel to cycle time, temperatures and heating/cooling rates as required 2.4. Dry cycle machine and die according to enterprise procedures.

3. Trial die, interpret data and adjust operation.	3.1. Carry out trial procedures in a systematic manner to meet trial objectives, according to enterprise procedures 3.2. Identify and record variations from normal 3.3. Monitor control panel and interpret test results for fluctuations, variations and trends 3.4. Determine process limitations with respect to product and production specifications 3.5. Adjust controls to ensure parameters are maintained to job specifications 3.6. Check that process operation has improved 3.7. Continue analysing data and making adjustments until desired level of process operation is achieved and product is within specifications in accordance with work instructions 3.8. Shut down equipment in accordance with work instructions 3.9. Record trial results according to enterprise procedures.
4. Rectify equipment and quality problems.	4.1. Identify the range of equipment and quality faults that can occur during the operation 4.2. Determine and rectify equipment and quality fault causes by established enterprise procedures 4.3. Identify and rectify equipment failure causes in accordance with established enterprise procedures 4.4. Make sure appropriate records and log books of equipment operations are maintained to meet enterprise requirements 4.5. Identify and rectify non-routine problems are within area of responsibility 4.6. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency unit includes the use of injection moulding, blow moulding and similar equipment.

This competency applies to all plastic and rubber processes which involve a die. It applies to situations such as injection or blow moulding dies. It does not apply to situations such as rotational moulding or composites (see PMBPROD431A).

Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency includes tools and equipment such as:

- hand tools as required
- relevant personal protective equipment.

Typical hazards include:

- noise, light, energy sources
- humidity, air temperatures, radiant heat
- stationary and moving machinery, parts and components.

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Routine problems include:

- tools
  - selecting the right tools for a new job
- equipment
  - using new and untried dies
- process
  - adapting the process to the new product and die
  - observing the process to obtain useful trial data
- product
  - comparing the product to the desired specification
  - determining the cause of non-compliances.

All operations are performed in accordance with standard procedures and work instructions.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Knowledge and understanding of the materials, equipment and process sufficient to recognise and rectify potential problems.

Knowledge of the enterprise's standard procedures and work instructions and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Understanding of the polymer/process interactions.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - product specifications and limitations
  - production equipment capability
  - types and grades of materials and their limitations
  - die conditions and operational limitations
  - use of ancillary equipment
- distinguish between causes of faults such as:
  - materials/heat
  - equipment adjustment/setup.

Critical aspects:

It is essential that the procedures be understood and that the importance of critical material properties and quantities is known. Competence must be demonstrated in the ability to recognise potential situations requiring action and then in implementing appropriate action.

Consistent performance should be demonstrated.

Language, literacy and numeracy requirements:

This unit requires high levels of numeracy and literacy with the ability to interpret technical specifications and reports. Advanced numeracy allowing the calculation and interpretation of statistics, product formulae and process conditions is also required.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	2	2	2	2	2	2

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UNIT TITLE

PMBPROD431A – Trial a new, advanced or complex mould

UNIT DESCRIPTOR

This competency covers the trialling of a new, advanced or complex mould. It is intended to be applied to 'low pressure' moulds and not to dies such as might be used for injection or blow moulding.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to operators who are involved in the trialling of moulds. The key factors are the monitoring of the production process and identifying routine problems. It includes:

- checking job sheets for work to be done
- conducting pre-start checks
- starting up and shutting down equipment
- monitoring equipment during production process
- identifying routine production problems and notifying appropriate persons.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for trial.	1.1. Gather all relevant information available at the enterprise 1.2. Confirm machine/equipment suitability according to enterprise trialling procedures 1.3. Confirm mould state in accordance with enterprise trialling procedures 1.4. Confirm raw materials readiness according to enterprise procedures.
2. Set mould and machine.	2.1. Fit and set up mould 2.2. Set up speed and ratios for rotation/'rock and roll' 2.3. Set control panel to cycle time according to external temperature, humidity, type of heating used, cooling time 2.4. Dry cycle machine and mould according to enterprise procedures.

3. Trial mould, interpret data and adjust operation.	3.1. Carry out trial procedures in a systematic manner to meet trial objectives, according to enterprise procedures 3.2. Identify and record variations from normal 3.3. Monitor control panel and interpret test results for fluctuations, variations and trends 3.4. Determine process limitations with respect to product and production specifications 3.5. Adjust controls to ensure parameters are maintained to job specifications 3.6. Check that process operation has improved 3.7. Continue analysing data and making adjustments until desired level of process operation is achieved and product is within specifications in accordance with work instructions 3.8. Shut down equipment in accordance with work instructions 3.9. Record trial results according to enterprise procedures.
4. Rectify equipment and quality problems.	4.1. Identify the range of equipment and quality faults that can occur during the operation 4.2. Determine and rectify equipment and quality fault causes following established enterprise procedures 4.3. Identify and rectify equipment failure causes in accordance with established enterprise procedures 4.4. Make sure appropriate records and log books of equipment operations are maintained to meet enterprise requirements 4.5. Identify non-routine problems are and rectify within area of responsibility 4.6. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This competency unit includes the use of swing, carousel, shuttle and 'rock and roll' type machines.

The processes covered by this unit include, but are not limited to:

- rotational moulding
- complex composite moulds
- complex thermoforming moulds.

This competency applies to all plastic and rubber processes which involve a mould. It applies to rotomoulding systems including fixed spindle, single spindle, multiple spindle, shuttle and open-flame machines. It does not apply to situations such as injection or blow moulding dies.

Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

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This competency includes tools and equipment such as:

- hand tools as required
- relevant personal protective equipment.

Typical hazards include:

- noise, light, energy sources
- humidity, air temperatures, radiant heat
- stationary and moving machinery, parts and components.

Routine problems include:

- tools
  - selecting the right tools for a new job
- equipment
  - using new and untried moulds
- process
  - adapting the process to the new product and mould
  - observing the process to obtain useful trial data
- product
  - comparing the product to the desired specification
  - determining the cause of non-compliances.

All operations are performed in accordance with standard procedures and work instructions.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Knowledge and understanding of the materials, equipment and process sufficient to recognise and rectify potential problems.

Knowledge of the enterprise's standard procedures and work instructions and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Understanding of the polymer/process interactions.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - product specifications and limitations
  - production equipment capability
  - types and grades of materials and their limitations
  - mould conditions and operational limitations
  - use of ancillary equipment
- distinguish between causes of faults such as:
  - materials/ heat
  - equipment adjustment/setup.

Critical aspects:

It is essential that the procedures be understood and that the importance of critical material properties and quantities is known. Competence must be demonstrated in the ability to recognise potential situations requiring action and then in implementing appropriate action.

Consistent performance should be demonstrated.

Language, literacy and numeracy requirements:

This unit requires high levels of numeracy and literacy with the ability to interpret technical specifications and reports. Advanced numeracy allowing the calculation and interpretation of statistics, product formulae and process conditions is also required.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	2	2	2	2	2	2

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UNIT TITLE

PMBPROD444B – Apply materials and process knowledge to coordinate work operations

UNIT DESCRIPTOR

This competency covers the application of an understanding of the process to the resolution of process problems and the facilitation of the required skills mix by the work team.

This unit is applicable to employees who are required to organise the work of others in relation to production operations.

This competency in practice

This competency applies to team leaders, supervisors and others who have a role requiring at least some technical expertise. These people have roles in ensuring the production process runs smoothly and delivers in full, on time and in specification (IFOTIS). It includes:

- monitoring the process and identifying critical aspects
- analysing production/process problems
- bringing about a resolution of these problems directly, by helping others solve problems and/or organising for the problem to be fixed.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Identify key features of the production process and the related materials.	1.1. Analyse information on the main physical features, functional characteristics and demand for product to inform work planning processes 1.2. Identify production process steps 1.3. Identify materials requirements/characteristics 1.4. Describe effects of processes on materials 1.5. Identify potential materials contamination points 1.6. Describe potential risks associated with the materials and process 1.7. Identify implications of (any) shutdowns of equipment in relation to materials, equipment condition, safety of employees and production schedules.
2. Describe procedures for identifying production faults.	2.1. Identify faults 2.2. Identify and separate process or materials problems 2.3. Adjust settings according to workplace procedures 2.4. Contact appropriate personnel to effect repairs.

ELEMENT	PERFORMANCE CRITERIA
3. Identify competency requirements for completing the production process.	3.1. Separate required competencies from procedural job performance 3.2. Itemise and list job tasks 3.3. Use standard operating procedures to inform the identification process 3.4. Identify competencies required by team members appropriate to undertake workplace activities 3.5. Check individual records to determine if appropriate competencies are held 3.6. Facilitate access to training and assessment 3.7. Take action to match workplace requirements with employee competency level.
4. Assist individuals to solve production problems.	4.1. Provide technical advice to team members to inform appropriate selection of work and quality checking techniques 4.2. Isolate causes of problems 4.3. Identify and use opportunities for improvement of team member performance 4.4. Assist individuals in identifying sources of expertise to assist in competency development 4.5. Bring appropriate information to the attention of relevant personnel 4.6. Predict queries and assist team members to locate and assimilate information relevant to production process 4.7. Assist personnel with routine and non-routine production process inquiries with actions taken to update information of production issues 4.8. Encourage personnel to maintain and build knowledge through accessing process related information and the application of problem solving and information analysis skills 4.9. Explain shutdown procedures for emergencies, breaks and short and long term halts to production.
5. Contribute to continuous improvement.	5.1. Determine work design from a knowledge of customer requirements 5.2. Predict potential problems and notify appropriate personnel 5.3. Identify opportunities for improvements to work organisation.

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RANGE OF VARIABLES:

This competency unit includes all such items of equipment and unit operations which form part of the production process of a complete area.

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It includes all relevant ancillary equipment.

Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The areas covered by this unit include, but are not limited to:

- all processes operated by the company on that site
- all materials used by the company on that site
- all products made by the company on that site
- process conditions
- product specifications
- material properties
- changes in materials during processing
- impact of process conditions on material and product properties.

Typical problems include:

- variations in materials
- variations in ambient conditions
- variations in process conditions
- variations in staff ability and training level.

All operations are performed in accordance with standard procedures and work instructions.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - process and materials characteristics
  - fault finding procedures and rectification methods
  - production workflow priorities, timelines and imperatives
  - focus of operation of work systems and equipment
  - identification and correct use of equipment, processes and procedures
- plann own work including predicting consequences and identifying improvements
- communicate information on products and work system requirements
- identify competency needs of team members for prescribed tasks
- support team members in problem solving activities
- locate, interpret and apply relevant information
- maintain workplace records
- identify and safely handle products and materials
- apply safety precautions appropriate to the task
- distinguish between causes of faults such as:
  - materials
  - process conditions
  - operator problems
  - equipment problems.

Critical aspects:

It is essential that competence is demonstrated in the ability to

- identify critical materials properties and process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

Consistent performance should be demonstrated. In particular look to see that:

- production quality and output standards are met consistently
- problems are anticipated
- problems are efficiently resolved
- the process runs consistently and smoothly.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret technical specifications and data and to write technical reports and procedures.

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Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	3	3	3	2	3	3

UNIT TITLE

PMBTECH401A – Predict polymer properties and characteristics

UNIT DESCRIPTOR

This competency covers the ability to apply a knowledge of polymer morphology, the properties of polymers in relation to their morphology, physical failure in polymers and test methods for polymeric materials to predict polymer properties and processing characteristics. It applies to all sectors of the industry.

This competency is typically performed by technicians working either independently or as part of a work team.

This competency in practice

This competency applies to technicians who use an understanding of polymer morphology to explain polymer properties in terms of phase diagrams, to predict polymer properties, and to organise and interpret tests on polymers. It includes:

- polymer phase change such as glass transition
- property changes due to processing conditions
- physical failure causes
- test method principles
- the relationship of test results to polymer properties and uses.

PREREQUISITES

This unit of competency has **no** prerequisites. However it assumes the knowledge component included in the following unit of competency. Evidence must be available that the specified knowledge has been acquired and is able to be applied:

- PMB TECH 301A Use material and process knowledge to solve problems.

ELEMENT	PERFORMANCE CRITERIA
1. Predict the impact of processing conditions on polymer properties.	1.1. Predict property changes due to molecular weight and temperature 1.2. Identify the glass transition temperature and melting point relative to ambient temperature 1.3. Describe the morphological changes occurring to polymers as the temperature is raised to typical moulding conditions 1.4. Describe the effect of cooling rate on polymer morphology 1.5. Predict potential product dimension/shape changes due to internal stresses resulting from molecular orientation 1.6. Determine the affect of post-mould annealing on the degree of crystallisation and crystal size.
2. Predict physical properties of polymers from their morphology.	2.1. Predict the effects on physical properties of: • temperature • crystal size • degree of crystallisation • molecular orientation • Predict shrinkage from morphology.

ELEMENT	PERFORMANCE CRITERIA
3. Determine likely physical failures of polymers.	3.1. Determine impact of physical use conditions on physical failure 3.2. Determine impact of polymer characteristics on physical failure.
4. Organise and interpret polymer tests.	4.1. Describe melt flow properties from flow data 4.2. Choose appropriate test type to measure desired criteria 4.3. Specify relevant standard test method 4.4. Interpret test result, making allowance for possible variations in test data.

RANGE OF VARIABLES:

This competency unit includes the use of phase diagrams. It does not include chemical form and structure of polymer molecules beyond a basic knowledge. It may be applied to plastics only, rubber only, thermosetting resins only or all of these.

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It requires an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The polymers and polymer properties covered by this unit include, but are not limited to:

- amorphous and crystalline polymers
- plastics such as:
  - polyolefins (polyethylene)
  - PVCs
  - polyesters
  - nylon
  - polystyrene
  - polycarbonate.
- rubbers such as:
  - natural
  - SBR
  - Neoprene
  - Nitrile
  - EPDM
  - Butyl.
- morphological effects including:
  - nucleation rate
  - crystal growth rate
  - degree of crystallisation
  - crystal size.
- physical properties including:
  - tensile strength
  - rigidity
  - impact strength
  - melting point
  - clarity
  - hardness
  - tear strength.
- factors affecting shrinkage include:
  - coefficient of thermal expansion
  - cooling rate
  - post-mould cooling,
  - molecular orientation.

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Physical conditions impacting on failure include:
- short term loading
- long term loading
- cyclic loading
- operational environment
- cut/tear failure
- environmental stress cracking (ESC).

Physical failure includes:
- impact
- tensile
- ESC.

Flow data include:
- intrinsic viscosity
- K-value
- melt flow index or rate
- rheometry data.

Tests include:
- impact
- tensile (yield strength, modulus of elasticity, percentage of elongation)
- water absorption
- density
- flow data.

International testing standards include:
- American Society for Testing and Materials (ASTM)
- British Standards (BS)
- Deutsches Institut fur Normierung (DIN)
- International Standards Organisation (ISO).

All operations are performed in accordance with standard procedures and work instructions.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Knowledge and understanding of the morphology of polymers sufficient to predict common physical properties and behaviours and to interpret test results, allowing for normal variations in data.

Knowledge of the enterprise's standard procedures and work instructions, relevant regulatory requirements and standard international and national test methods, along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - polymer morphology using phase diagrams
  - properties of polymers in relation to their morphology
  - physical failure in polymers
  - polymer materials test methods and property data
- distinguish between:
  - changes in properties and variations in test data
  - changes in physical properties due to compounding, processing or environmental conditions.

Critical aspects:

It is essential that the morphology be understood and that the importance of critical material properties and quantities is known. Competence must be demonstrated in the ability to interpret polymer properties from their morphology.

Consistent performance should be demonstrated. In particular look to see that:

- test procedures are understood
- correct tests and methods are specified
- test results are interpreted appropriately
- polymer properties are described
- changes in properties are adequately explained.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret technical literature and standard test methods. High level numeracy is also required, particularly graphical interpretation skills and data interpretation skills.

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Assessment method and context:

Competence in this unit may be assessed:

- by use of a suitable project
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	2	2	2	3	3	3

UNIT TITLE

PMBTECH402A – Set up and remove complex dies

UNIT DESCRIPTOR

This competency covers the ability to set complex dies, verify machine, die, and ancillary equipment functions and remove complex injection dies.

This competency is typically performed by technicians working either independently or as part of a work team.

This competency in practice

This competency applies to technicians typically in the injection moulding and blow moulding sectors who set complex dies and make sure they are ready for production. The key factors are the efficient setting and validation of the right die for the job and the tuning of this die for efficient production. It includes:

- understanding die/process/material/product interactions
- selecting the right die
- checking the die for wear and damage
- setting and adjusting the die
- checking the die/process for efficient operation and making appropriate adjustments.

PREREQUISITES

This unit of competency assumes the knowledge component included in the following unit of competency. Evidence must be available that the specified knowledge has been acquired and is able to be applied:

- PMB PREP 304 A – Change equipment dies.

ELEMENT	PERFORMANCE CRITERIA
1. Set complex injection dies.	1.1. Prepare the moulding machine according to procedures 1.2. Prepare die for setting according to procedures 1.3. Fit die to the machine according to procedures 1.4. Set machine to job specification.
2. Verify machine, die and ancillary equipment functions.	2.1. Verify machine and die operations according to enterprise procedures 2.2. Verify ancillary equipment operation according to enterprise procedures.
3. Remove complex injection die.	3.1. Prepare the injection moulding machine for die removal according to enterprise procedures 3.2. Prepare die for removal according to enterprise procedures 3.3. Remove die according to enterprise procedures.

RANGE OF VARIABLES:

This competency unit includes the setting and removal of complex dies. It does not include simple or advanced dies or moulds.

This competency applies typically to the injection moulding and blow moulding sectors. It requires an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The die and machine preparation may include, but are not limited to:

- hydraulic
- pneumatic and
- electrical connections.

Die operations may include:

- die temperature control
- die component stroke
- speed
- pressure
- sequencing
- interlocks.

Machine operations may include:

- machine movement stroke
- speed
- pressure
- sequencing
- interlocks.

Ancillary equipment operations may include:

- hot-runner temperature control
- hydraulic or pneumatic power supply
- mould temperature control.

All operations are performed in accordance with standard procedures and work instructions.

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EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Knowledge and understanding of complex dies and their interactions with the process, materials and products is required.

Knowledge of the enterprise's standard procedures and work instructions and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - die setting procedures
  - verification procedures
- distinguish between causes of faults such as:
  - wrong dies
  - wrongly set die
  - worn damaged die
  - process conditions
  - material type of quality.

Critical aspects:

It is essential that the procedures and the importance of critical die characteristics be understood. Competence must be demonstrated in the ability to recognise potential situations requiring action and then in implementing appropriate action.

Consistent performance should be demonstrated. In particular look to see that at least one type of complex die has been correctly set and removed and that there is evidence that other types of complex dies can also be set/removed.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret technical specifications and data.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	2	3	2	2	3	3

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UNIT TITLE

PMBTECH403A – Test fibre-composites materials and laminates

UNIT DESCRIPTOR

This competency covers the knowledge and skill applied in testing fibre reinforced plastics materials and laminates for conformance with design and product quality specification.

This competency is typically performed by operators working either independently or as part of a work team.

This competency in practice

This competency applies to technicians who will determine test specifications and carry out a variety of tests on fibre-composite materials and products according to industry codes of practice and AS/NZ standards.

PREREQUISITES

This unit of competency has **no** prerequisites. However it assumes the knowledge component included in the following unit of competency. Evidence must be available that the specified knowledge has been acquired and is able to be applied:

- PMB PROD 247 Hand lay up composites.

ELEMENT	PERFORMANCE CRITERIA
1. Determine test requirements.	1.1. Identify properties to be measured according to specification 1.2. Select appropriate test methods according to specifications 1.3. Select appropriate testing equipment according to standards and specifications.
2. Perform raw material tests.	2.1. Prepare samples according to specification 2.2. Perform tests in accordance with job specifications 2.3. Record test results according to standard procedures 2.4. Interpret test results and compare with manufacturer's material data sheets.
3. Perform moulded product tests.	3.1. Prepare samples according to specification 3.2. Perform tests in accordance with job specifications 3.3. Record test results according to standard procedures 3.4. Interpret test result and compare against quality specification.
4. Record and report test results.	4.1. Document tests to enterprise requirements 4.2. Compare results against standards 4.3. Make written recommendations.

RANGE OF VARIABLES:

Tests may be on raw materials and moulded laminates, using a range of standard testing equipment and test methods.

- raw material test may include:
  - gel-time
  - resin exotherm
  - monomer content
  - heat deflection temperature
  - styrene emission
  - resin colour
  - gelcoat water resistance
- moulded laminate tests may include:
  - barcol hardness
  - tensile strength and elongations
  - compressive strength
  - flexural strength and flexural modulus
  - impact strength
  - glass content
  - water absorption
  - product weathering capabilities
  - dielectric strength
  - flammability
  - acid and alkali resistance
  - thickness testing.
- testing equipment may include:
  - equipment as specified by AS/NZ standards (where applicable)
  - industry codes of practice
- specifications for materials and products may include:
  - manufacturing design requirements
  - enterprise quality procedures
  - AS/NZ requirements
  - manufacturer's material data sheets
- quality specifications may include product or material test performance indices within standard variation, and standard response procedures
- enterprise requirements for testing documentation may include:
  - standardised performance indices and comparisons
  - variances from specifications
  - graphical representations of results
- recommendations may include:
  - process control actions
  - raw material suitability
  - product acceptance.

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EVIDENCE GUIDE:

Essential knowledge and enterprise requirements may include:

Knowledge and understanding of the materials, equipment and process sufficient to predict their interactions and their impacts on performance.

Knowledge of the enterprise's procedures and policies along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Competence includes the ability for the practical completion of the job to apply and explain.

- the process:
  - types of tests
  - purpose and function
  - safe test procedures
  - interpretation of results for design and quality control
  - comparisons with manufacturer's data sheets
  - determining conformity with or variance from test specification
  - role of testing in quality control and quality assurance procedures
- raw material applications:
  - resin viscosity
  - specific gravity of resins and gelcoats
  - gel time
  - resin exotherm
  - monomer content
  - heat deflection temperature
  - styrene emission
  - resin colour
  - gelcoat water resistance.
- laminate applications:
  - Barcol hardness
  - tensile strength and elongation
  - compressive strength
  - flexural strength and flexural modulus
  - impact strength
  - glass content
  - water absorption
  - product weathering capabilities
  - dielectric strength
  - flammability
  - acid and alkali resistance
  - thickness testing

- test applications:
  - compare use of common resins and reinforcements in laminates
  - graph the tensile strength of given laminates and compare results with metals
  - test failure modes of laminate samples and compare with metals
  - safety factors; effects on laminate design; relevance of failure mode to FRP laminate design; effect of creep and fatigue on laminates
- relationship of laminate thickness to
  - bonding and material properties
  - span and deflection.

Critical aspects:

It is essential that competence is demonstrated in the ability to select the appropriate test methods for the job, and correctly interpret the test results.

Language, literacy and numeracy requirements:

The ability to interpret technical specifications and standard laboratory procedures, write reports, and perform required calculations on and interpret results.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom.

Additional resources might include sets of specifications from which test requirements might be determined and a range of samples of materials/products from which test samples might be prepared and then tests conducted.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	3	3	3	3	3	3

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UNIT TITLE

PMBTECH404A – Mould chemical resistant and/or fire retardant fibre-composites

UNIT DESCRIPTOR

This competency covers the knowledge and skill used in moulding fibre-composites for chemical resistant and/or fire retardant applications.

This competency is typically performed by technicians working either independently or as part of a work team.

This competency in practice

This competency applies to technicians who determine and apply the appropriate laminate and layup for special-purpose chemical-resistant/fire retardant composite products.

PREREQUISITES

This unit has the prerequisite competency:

- PMB PROD 347 A Produce composites using hand lamination **OR**
- PMB PROD 380 A Produce composites using chopper gun/depositors.

NOTE that PMA PER 200 A Work in accordance with an issued permit may also be needed in some circumstances.

ELEMENT	PERFORMANCE CRITERIA
1. Determine the special requirements of the situation.	1.1. Confirm the conditions of use of the desired composite product 1.2. Confirm the required specification of the desired composite product 1.3. Determine any other special requirements of the desired composite product 1.4. Obtain client signoff of specification/requirements.
2. Select appropriate materials/process to produce the desired composite product.	2.1. Identify the laminate properties suitable for the job 2.2. Select the appropriate resin, matrix and other materials 2.3. Select the process to be used to make product 2.4. Make trial samples where required and test or arrange testing of samples as required 2.5. Check suitability of combination of materials and process to meet all end use requirements.
3. Lay up or mould the laminate.	3.1. Prepare and apply mould release to the mould surface if required 3.2. Clean and prepare structure surface for adhesion if required 3.3. Apply laminate materials to the mould or to the structure as required 3.4. Inspect/test the laminate surface as required.

ELEMENT	PERFORMANCE CRITERIA
4. Respond to problems.	4.1. Identify possible routine and non-routine problems in the equipment, materials or process 4.2. Determine problems needing action 4.3. Determine possible fault causes 4.4. Rectify problem using appropriate solution within area of responsibility 4.5. Report problems outside area of responsibility to designated person.

RANGE OF VARIABLES:

This unit covers the making of a resistant/retardant laminate in a factory environment on a mould, or the laying up of a composite surface on a substrate such as a tank surface, which may be in the customer's plant.

This unit covers both the selection of the appropriate resin, matrix and process from the standard systems available from the technician's enterprise, and the making of the resistant/ retardant product. It does not extend to the developing of totally new products using new resin/matrix systems for new (to the enterprise) end use environments. PMB TECH 505 or TECH 601 are more appropriate units in these circumstances.

Laminate and material properties required may include:

- waterproofing
- alkali and acid resistance
- heat resistance
- fire retardancy
- smoke generation
- abrasion resistance
- AS/NZ standards as applicable
- cold weather performance and curing.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Typical hazards include:

- temperature
- hazardous materials
- manual handling hazards
- equipment operations
- working at heights
- working in confined spaces.

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical problems include:

- cracks, dents or imperfections of the mould/substrate
- variations in materials, colour, consistency or mix
- adjustment and settings of the applicator (where used)
- application of the materials to the mould/substrate as required

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- contamination of materials
- equipment malfunctions
- contamination of materials
- pin holes or other imperfections leading to barrier problems.

All operations are performed in accordance with procedures.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements may include the ability to apply and/or explain:

- chemical resistant laminates in general with regard to:
  - terminology and safety
  - standards
  - construction
  - resins
  - reinforcements
  - composition of outer layer exposed to corrosive environment weathering
  - degradation of strength over service life
  - cure and post cure procedures
  - fillers
  - thixotropes
  - problems associated with corrosion barriers
  - common manufacturing methods
  - heat distortion
  - corrosion barrier types, composition and surface defects
  - butt joining pipes
  - nozzles, flanges and fittings to tanks
  - minimum fillet radius for right angle joints
  - treatment for cut edges
- fire retardant laminates in general with regard to:
  - chemically modifying resins
  - addition of suitable fillers to enhance fire retardancy
  - selection of (phenolic) resins
- application to metal or concrete substrates:
  - techniques
  - equipment
  - applications
- application for wet-areas:
  - water proofing
  - alkali resistant flowcoat
  - cold weather curing
  - methods to prevent cracking
  - Australian Standards
  - techniques
  - equipment
  - application
  - relevant test procedures.

Critical aspects:

It is essential that competence is demonstrated in the ability to select and apply the appropriate laminate to meet the cost and performance specification for the particular job.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to technicians.

Writing is required to the level of completing workplace forms.

Numeracy is required, eg, to determine quantities required and to interpret corrosion resistance and fire retardance data/tables.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	3	3	3	3	3	3

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UNIT TITLE

PMBTECH405A - Repair damaged fibre-composites structures

UNIT DESCRIPTOR

This competency covers the repair of damaged fibre-composites products.

This competency is typically performed by technicians working either independently or as part of a work team.

This competency in practice

This competency applies to operators who identify, diagnose, and make repairs to products with in-service damage which may be cosmetic or structural damage.

PREREQUISITES

This unit has the prerequisite of:

- PMBPROD247B - Hand lay up composites.

Achievement of competency in PMAPER200A - Work in accordance with an issued permit may also be required in some workplaces for safety or other reasons before competency is achieved in this unit

ELEMENT	PERFORMANCE CRITERIA
1. Assess the product and damage.	1.1. Determine scope of repair required, such as either to original manufacturer's specifications or other needs. 1.2. Select appropriate repair technique. 1.3. Consult testing reports giving recommended areas to be repaired and extent of damage if available.
2. Make repairs.	2.1. Examine the accessibility of the damaged section(s). 2.2. Identify cosmetic repair areas and structural repair areas. 2.3. Consult original manufacturer's manual or structural repairs manual where available. 2.4. Consult product release documentation, and insurance company requirements if available. 2.5. Prepare and clean up the product prior to commencing the actual repair. 2.6. Make partial mould or prepare insert moulding as required for the type of repair. 2.7. Expose bonding surfaces, and/or structural anchor points, using tapered sanding techniques as determined. 2.8. Re-build the damaged area and finish surfaces to required standard. 2.9. Take samples for testing and inclusion with documentation as required.
3. Document the repair.	3.1. Raise repair documentation for costing, legal and insurance requirements as required. 3.2. Complete other documentation and records required.

RANGE OF VARIABLES:

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

This competency unit includes materials, equipment and tools such as:

- hoists/lifting equipment not requiring any special permits or licenses
- plastic or other filling compounds
- basic hand tools required for cosmetic repairs of products
- relevant personal protective equipment.

Typical hazards include:

- spills
- dusts/vapours
- hazardous materials
- manual handling hazards.

In some circumstances hazards may also include entry to confined spaces.

Typical process problems include:

- inappropriate materials being selected and used
- equipment failures
- effect of weather on curing time and surface finish deterioration.

Types of repair and associated repair techniques may include:

- marine
- automotive
- aerospace
- industrial
- architectural
- civil construction.

Standards of repair may include:

- AS/NZ standards
- industry codes of practice
- original manufacturers standards.

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EVIDENCE GUIDE:

Essential knowledge and enterprise requirements may include:

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job and to apply and explain:

- **Damage assessment:** both sides accessible; one side only accessible; cosmetic damage; structural damage; planning, costing and organizing job repair.
- **Repair techniques:** surface and part preparation; laminating, reinforcing and strengthening techniques; filling and joining techniques; surface preparation for top coating, painting, finishing; application procedures for gelcoat, flowcoat; air drying; detailing for customer delivery.
- **Rectification procedures for repair of:** marine; automotive; aerospace; industrial; architectural; and other FRP mouldings.
- Use of manufacturer supplied, structural repair manuals, where available.
- Release documentation, legal and insurance procedures for FRP product repairs.

Critical aspects:

It is essential that competence is demonstrated in the ability to assess the damage and apply the appropriate repair method for the job.

Language, literacy and numeracy requirements:

This unit requires the ability to read and interpret typical manufacturer's manuals, insurance documentation, technical specifications, product specifications, job sheets, procedures, material labels and safety information as provided to technicians.

Writing is required to the level of completing workplace forms.

Numeracy is required, eg, to determine quantities required, interpret technical specifications and undertake costings.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- in the field undertaking a range of repairs
- by use of a suitable simulation and/or a range of case studies/scenarios
- a combination of these techniques.

In all cases it is expected that practical assessment will be supported by targeted questioning to assess the underpinning knowledge and theoretical assessment will be supported by appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office, etc.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	3	3	3	3	3	3

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UNIT TITLE

PMBPREP508A – Produce drawings

UNIT DESCRIPTOR

This unit applies to employees required to produce drawings from models or design concepts. It applies to all sectors of the industry.

This competency is typically performed by technicians working either independently or as part of a work team.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Identify object to be drawn.	1.1. Identify purpose (and any operational characteristics) of object to be drawn 1.2. Identify production materials and method.
2. Establish design requirements and limitations.	2.1. Identify type of drawing to be completed 2.2. Identify drawings conventions and specifications to be noted on the drawing 2.3. Select appropriate media for drawings.
3. Determine dimensions and other criteria.	3.1. Establish and document design concept requirements as appropriate and identify dimensions, angles shapes, finished size 3.2. Measure model, if appropriate, to accurately reflect the dimensions, including length, width, height, depth, thickness and weight 3.3. Check dimensions against design parameters where appropriate.
4. Quantify and draft initial drawing.	4.1. Plot dimensions from prototype, sketch or model and documented specifications 4.2. Connect dimensional points to match appropriate drawing view 4.3. Note any production or special requirements 4.4. Note drawing conventions and specifications on the documentation.
5. Complete drawing.	5.1. Check angles, shapes and dimensions against specifications and model 5.2. Adjust the drawing within scope of authority 5.3. Check drawing for compliance with workplace documentation requirements.

RANGE OF VARIABLES:

This competency unit includes manual and CAD drawing and the use of drawing and measurement instruments. It does not include the design of the product.

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. It assumes an understanding of the manufacturing process and the shape requirements of that process. It does not necessarily imply that the person is competent to operate any or all of the process equipment.

Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include any process making products in the industry where a product drawing is required as part of the design/development process. This refers to formal drawings complying with drawing conventions/standards, not hand sketches.

This competency includes tools and equipment such as:

- drawing tools
- CAD tools
- measuring tools
- design specifications
- prototypes and models.

Typical problems include:

- matching process requirements (eg, adequate relief) with design concepts (eg, straight sides)
- matching realistic manufacturing tolerances with design ideals.

All operations are performed in accordance with standard procedures and work instructions.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of the materials, equipment and process sufficient to produce a product drawing which is compatible with process requirements.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- identify work procedures appropriate for the production of drawings
- interpret specifications and measurements in two and three dimensional form
- accurately measure model dimensions
- present relevant information within the production drawing
- use appropriate workplace language and communication technologies
- locate, interpret and apply relevant information when completing records
- maintain workplace records systems
- plan own work including predicting consequences and identifying improvements
- apply and/or explain:
  - impact of accurate drawings on production workflow and product quality
  - identification and correct use of drawing and measuring equipment.

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Critical aspects:

It is essential that the procedures be understood and that the importance of critical dimensions and shapes is known.

Consistent performance should be demonstrated. In particular look to see that drawing standards are met consistently.

Language, literacy and numeracy requirements:

This unit requires the ability to read, interpret and write technical specifications. Numeracy is required to be able to determine sizes, angles and shapes.

Assessment method and context:

Competence in this unit may be assessed:

- over a range of actual projects which are implemented in the workplace
- by use of a range of design assignments which are assessed against typical workplace requirements
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to drawing and related equipment. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	2	3	2	3	3	3

UNIT TITLE

PMBTECH501A – Analyse equipment performance

UNIT DESCRIPTOR

This competency covers the analysis of the performance, and performance verification, of existing equipment. It applies typically to the extrusion, injection and related sectors of the industry.

This competency is typically performed by a senior technician who will take the lead in the data gathering phase and then analyses the data.

This competency in practice

This competency applies to technicians who will set up and operate performance verification trials and then analyse the results to determine actual compared to theoretical performance of equipment and equipment components. It includes:

- calculating the theoretical performance of a screw, die, etc
- gathering data to determine the actual performance of the screw, die etc
- calculation of actual versus theoretical performance
- making recommendations as to the appropriate action to be taken based on the performance verification results.

PREREQUISITES

This unit of competency has **no** prerequisites. However, it assumes the knowledge component included in the following units of competency. Evidence must be available that the specified knowledge has been acquired and is able to be applied:

- PMB TECH 401 A Predict polymer properties and characteristics AND
- PMB ORG 403 B Conduct trails on products or processes AND
- at least one appropriate PROD 300 series unit.

ELEMENT	PERFORMANCE CRITERIA
1. Determine theoretical performance.	1.1. Identify item of plant and plant component(s) to be analysed 1.2. Locate and interpret design specification 1.3. Identify process materials being processes/to be processed during verification trial 1.4. Determine process material properties under process conditions 1.5. Calculate theoretical performance of component(s) with that material under those conditions.
2. Conduct trial.	2.1. Design verification trial to be compatible with theoretical analysis 2.2. Determine measurements needed from trial to yield required data 2.3. Select equipment suitable to give required measurements 2.4. Arrange for verification trial with relevant process personnel 2.5. Set up required measurement equipment 2.6. Supervise trial and ensure trial conditions are appropriate 2.7. Collect trial data for analysis.

ELEMENT	PERFORMANCE CRITERIA
3. Verify performance of component(s).	3.1. Compare theoretical with actual performance 3.2. Determine significance of variation between theoretical and actual performance 3.3. Investigate any suspicious results and take appropriate action.
4. Recommend required action.	4.1. Determine appropriate action to bring performance to desired level 4.2. Initiate the corrective action in accordance with company procedures. 4.3. Determine measures to increase equipment productivity 4.4. Recheck performance after corrective action is implemented.

RANGE OF VARIABLES:

This competency unit includes the analysis of equipment components such as screws and dies/tools or items of equipment or processes.

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry, but does require both a theoretical/mathematical and a practical analysis of the process at a level equivalent to a screw/die analysis.

The competency does not require a knowledge of industry sectors and materials other than that in which the technician works. It assumes an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

The processes covered by this unit include, but are not limited to:

- extrusion
- injection
- blow moulding.

Typical problems include:

- worn components
- validation of new components to design specification
- component performance analysis in order to upgrade process performance.

All operations are performed in accordance with standard procedures and work instructions.

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EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Knowledge and understanding of the materials, equipment and process sufficient to predict their interactions and their impacts on performance.

Knowledge of the enterprise's procedures and policies along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Competence includes the ability for the practical completion of the job to:

- calculate equipment and component performance from the design specification
- determine equipment and design performance from practical trials
- determine the 'limiting component' in the performance of an item of equipment or a process
- determine possible performance of an item of equipment/process if practical improvements were made to the 'limiting item'.

Critical aspects:

The critical aspect for this unit of competency is the ability to apply a thorough understanding of polymer materials, their additives and the rheological, heat and other effects of processing to the design of equipment and components to predict practical performance results. This understanding of material and process interactions should also be able to be applied interpreting data and making judgements about the state of the equipment/component.

Language, literacy and numeracy requirements:

This unit requires high levels of numeracy and literacy with the ability to interpret technical specifications and reports. Advanced numeracy allowing the calculation and interpretation of statistics, product formulae and process conditions is also required.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES						
1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	3	3	3	3	3	3

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UNIT TITLE

PMBTECH502A - Review and analyse production trials and specify retrials

UNIT DESCRIPTOR

This competency covers the reviewing of trial results, analysing and correcting trial outcomes, and specifying and carrying out retrial procedures.

This competency is typically performed by technicians/technologists in all sectors of the industry.

This competency in practice

This competency applies to technicians who analyse and review production trials. The key factors are the understanding of the purpose of the trials, and the interpretation of the trial results compared to that purpose. It includes:

- new product trials
- new process trials
- new equipment trials
- modifications to product trials
- modifications to process trials
- modifications to equipment trials.

PREREQUISITES

This unit of competency has **no** prerequisites. However, it assumes the knowledge component included in the following unit of competency. Evidence must be available that the specified knowledge has been acquired and is able to be applied:

- PMB ORG 403 B - Conduct trials on products or processes.

ELEMENT	PERFORMANCE CRITERIA
1. Review trial results.	1.1. Confirm trial objectives as a basis for comparison prior to review of results 1.2. Review trial product quality results and compare with trial objectives to identify variations 1.3. Review trial production results and compare with trial objectives to identify variations.
2. Analyse and correct trial outcome.	2.1. Analyse trial results to establish priorities for the correction of parameters which are outside specifications 2.2. Recommend changes to achieve product quality and production requirements 2.3. Make changes in accordance with enterprise procedure to achieve the required product quality and production requirements.
3. Specify and carry out retrial procedures.	3.1. Specify retrial objectives and priorities in accordance with enterprise procedure 3.2. Carry out retrial variations to achieve the trial objectives in accordance with enterprise procedure 3.3. Record trial results in accordance with enterprise procedure.

RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry, but does require both a theoretical/mathematical and a practical analysis of the trial data.

The competency does not require a knowledge of industry sectors and materials other than that in which the technician works. It assumes an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

The types of trials covered by this unit include, but are not limited to:

- trial objectives
  - preliminary product specifications (physical properties, size, weight, appearance)
  - production requirements (output, rejects, yield, practical operating window)
- trial results
  - product quality results
  - production results
- changes
  - product design and specifications
  - mould and/or tooling design and construction
  - material grade
  - machine configuration or specification
  - production specifications
  - processing parameters
- retrial objectives
  - product quality
  - production requirements
- variations
  - sample size,
  - machine parameters
  - material grade changes
  - mould, die and/or tooling changes
  - machine configurations.

All operations are performed in accordance with standard procedures and policies.

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EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Knowledge and understanding of the materials, equipment and process sufficient to interpret trial results and specify appropriate retrial conditions.

Knowledge of the enterprise's procedures and policies along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Competence includes the ability for the practical completion of the job to:

- calculate results from trial data
- interpret trial results in terms of trial objectives
- determine variations to trial procedures to overcome limitations found
- interpret results in terms of product end use requirements
- make recommendations for changes to materials, process and product based on trial results.

Critical aspects:

The critical aspect for this unit of competency is the ability to apply a thorough understanding of polymer materials and processing to the interpretation of trial results. This understanding of material and process interactions should also be able to be applied in interpreting data and making judgements about the trials in terms of the trial objectives.

Language, literacy and numeracy requirements:

This unit requires high levels of numeracy and literacy with the ability to interpret technical specifications and reports. Advanced numeracy allowing the calculation and interpretation of statistics, product formulae and process conditions is also required.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES						
1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	3	3	2	3	3	3

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UNIT TITLE

PMBTECH503A - Determine rheology and output of plastics materials from processing equipment

UNIT DESCRIPTOR

This competency covers the application of knowledge of polymer rheology to the flow of polymers through processing equipment, including extruders and injection moulding equipment and the dies and moulds fitted to that equipment.

This competency is typically performed by senior technicians.

This competency in practice

This competency applies to technicians who need to perform calculations using the rheological properties of polymers and apply that to their performance in process equipment. It includes:

- Newtonian and non-Newtonian flow
- shear force and shear rate calculations
- output calculations
- density/temperature/viscosity relationships and calculations.

PREREQUISITES

This unit of competency has **no** prerequisites. However, it assumes the knowledge component included in the following unit of competency. Evidence must be available that the specified knowledge has been acquired and is able to be applied:

- PMB TECH 401 A Predict polymer properties and characteristics.

ELEMENT	PERFORMANCE CRITERIA
1. Determine flow characteristics of polymer compound.	1.1. Calculate and describe shear and shear rates 1.2. Distinguish between Newtonian and non-Newtonian flow 1.3. Identify the characteristics of polymer structures which influence flow 1.4. Identify the relationships between density, temperature and viscosity for polymers 1.5. Identify the flow characteristics of a polymer compound based on its structure and temperature.
2. Calculate flow rate of polymer compound.	2.1. Use equipment dimensions and data to determine shear rate of polymers through that equipment 2.2. Calculate output from equipment using viscosity curves and shear rate diagrams 2.3. Calculate mean velocity at critical points in a process 2.4. Determine the characteristic curves for the screws and dies in processing equipment, and the resultant operating point for the system.

RANGE OF VARIABLES:

This competency unit includes the rheology of major polymer compounds and the temperature and shear effects on viscosity.

This competency applies to all sectors within the plastics, rubber and cablemaking industry.

Standard procedures means all relevant workplace procedures, and relevant industry and government codes and standards.

Flow characteristics include:

- Newtonian flow
- the range of non-Newtonian flow
- the relevance to material types
- the impact of varying shear rate on viscosity
- the desirability of using high/low shear rate for efficient processing.

Equipment includes:

- screws
- slit dies
- annulus dies
- compound shapes including:
  - hot and cold runners
  - straight and curved flow channels.

All operations are performed in accordance with standard procedures and policies.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Knowledge and understanding of the principles of rheology, how rheological properties vary with temperature and how they impact on process efficiency and equipment design.

Knowledge of the enterprise's procedures and policies along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - Newtonian flow
  - non-Newtonian flow
  - density/temperature/viscosity relationships

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ν quantitatively determine:
- shear
- shear rate
- output
- viscosity/density changes with temperature.

Critical aspects:

It is essential that the principles be understood and that the importance of critical rheological properties is known. Competence must be demonstrated in the ability to quantitatively determine key rheological data.

Language, literacy and numeracy requirements:

This unit requires high level numeracy skills such as are needed for the use of complex algebraic equations, non-linear functions, simultaneous equations and the interpretation of non-linear graphs.

Literacy is also required at least equivalent to senior secondary school level.

Assessment method and context:

Competence in this unit may be assessed:

ν by use of a suitable simulation and/or a range of case studies/scenarios.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	2	3	2	3	3	3

UNIT TITLE

PMBTECH504A - Determine heat transfer loads for processing equipment

UNIT DESCRIPTOR

This competency covers the application of a knowledge of heat transfer and heat balance principles to the design and use of processing equipment.

This competency is typically performed by senior technicians.

This competency in practice

This competency applies to technicians who need to determine heating and/or cooling loads for processing equipment. It includes:

- conduction, convection and radiation
- thermal properties of materials, particularly polymers
- methods of heating polymer materials
- cooling systems
- energy balances.

PREREQUISITES

This unit of competency has **no** prerequisites. However, it assumes the knowledge component included in the following unit of competency. Evidence must be available that the specified knowledge has been acquired and is able to be applied:

- PMB TECH 401 A Predict polymer properties and characteristics.

ELEMENT	PERFORMANCE CRITERIA
1. Calculate heat transferred from/to items.	1.1. Calculate conductive heat transfer to/from an object 1.2. Calculate convective heat transfer to/from an object 1.3. Calculate radiative heat transfer to/from an object 1.4. Calculate combined heat transfer to/from an object, including resistances in series and parallel.
2. Calculate temperature change caused by a change in heat content.	2.1. Calculate temperature change caused by heating/cooling of polymer compounds in typical examples of processing equipment 2.2. Calculate change in heat content caused by shear on a polymer compound 2.3. Calculate temperature rise caused by shear on a polymer compound.
3. Select appropriate heating and/or cooling mechanism for an application.	3.1. Compare rates of heat transfer/overall heat transfer coefficients for major methods of heating and cooling 3.2. Determine appropriate methods of varying/controlling rates of heat transfer 3.3. Calculate heat transfer rates under a range of conditions.
4. Determine heating required to suit process conditions.	4.1. Determine heating requirements to obtain correct viscosity for processing 4.2. Select appropriate heat transfer mechanism(s) to achieve desired conditions.

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ELEMENT	PERFORMANCE CRITERIA
5. Conduct energy balance over process components.	5.1. Determine overall heating load for process components 5.2. Determine overall cooling load for process components 5.3. Determine the adequacy (or otherwise) of the process/plant heating/cooling system to cope with this load.

RANGE OF VARIABLES:

This competency unit includes the heating/cooling loads of all processing equipment and requires the quantitative determination of loads.

This competency applies to all sectors within the plastics, rubber and cablemaking industry.

Standard procedures means all relevant workplace procedures, policies and relevant industry and government codes and standards.

Heat transfer modes include:
- conduction
- convection (forced and natural)
- radiation
- combined conduction/convection.

Sources of heating/cooling include:
- mechanical work such as by a screw, mixer, blender or mill
- water cooling
- air cooling
- steam heating (calculations for saturated steam only)
- hot fluid (eg, oil) heating.

Factors relevant to required heating/cooling rates include:
- viscosity required for process
- flow rates required for process/mould filling
- scorch.

Energy balances include:
- applied heating and cooling
- heat generated from mechanical work.

All operations are performed in accordance with standard procedures and policies.

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EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Knowledge and understanding of heat transfer principles and calculations sufficient to determine the heating/cooling loads of an existing or a new process. Knowledge of the effects of heat/temperature on the materials being processed and the products being made sufficient to determine the processing temperatures and heating/cooling rates required to achieve a satisfactory product from an efficient process.

Knowledge of the enterprise's procedures and policies along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Competence includes the ability for the practical completion of the job to:

- apply and/or explain:
  - conduction
  - convection
  - radiation
  - combined conduction/convection
  - specific heat capacity
  - mechanical work/heat relationships
  - energy balances.

Critical aspects:

It is essential that the principles be understood and that they are able to be applied to real workplace situations. Competence must be demonstrated in the ability to undertake quantitative analyses and then apply the results to determine heating and cooling loads and flow/supply rates

Language, literacy and numeracy requirements:

This unit requires high level numeracy skills at least equivalent to senior secondary school levels.

Literacy is also required at least equivalent to senior secondary school level.

Assessment method and context:

Competence in this unit may be assessed:

- by a suitable project
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES						
1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	2	2	2	3	3	3

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UNIT TITLE

PMBTECH505A - Choose polymer materials for an application

UNIT DESCRIPTOR

This competency covers the application of a knowledge of polymerisation, polymer structure and modifications of polymer materials to their properties so enabling the choice of an appropriate polymer compound for an applications.

This competency is typically performed by technicians developing new products or applying this knowledge set to advanced process/product problem solving.

This competency in practice

This competency applies to technicians who are able to bring together an understanding of the basics of chemistry and polymers and apply this understanding to determine the properties of polymers and polymer products. It includes:

- the influence of polymerisation mechanisms on polymer properties
- the influence of polymer structure on polymer properties
- methods of modifying the properties of raw polymers
- the selection and interpretation of polymer tests
- the ability to bring these skills together to select appropriate material(s) for an application.

PREREQUISITES

This unit of competency has **no** prerequisites. However, it assumes the knowledge component included in the following unit of competency. Evidence must be available that the specified knowledge has been acquired and is able to be applied:

- PMB TECH 401 A Predict polymer properties and characteristics.

ELEMENT	PERFORMANCE CRITERIA
1. Determine possible polymer properties based on polymer type.	1.1. Estimate molecular weight distribution changes with polymerisation mechanisms and conditions 1.2. Predict the impact of monomer and polymer structure on properties.
2. Estimate polymer properties based on polymer structure.	2.1. Predict property changes caused by polarity and intermolecular forces 2.2. Determine possible polymer properties based on chain flexibility variations caused by changes in regularity, tacticity and intermolecular forces 2.3. Estimate polymer properties based on molecular weight/ molecular weight distribution, degree of cross-linking. 2.4. Predict barrier properties based on molecular orientation and degree of crystallisation.

ELEMENT	PERFORMANCE CRITERIA
3. Choose a polymer compound for an application.	3.1. Select appropriate base polymer/polymers for an application based on the polymer properties 3.2. Determine reinforcement(s)/additives required to meet product specification 3.3. Predict failure mechanism for selected compound and modify selection if appropriate 3.4. Determine the need for polymer compatibilisers and specify appropriate use if required 3.5. Develop formulation and select appropriate production method.
4. Organise testing of polymer and interpret test results.	4.1. Select appropriate test(s) for compounded polymer based on test purpose and limitations and material being tested 4.2. Test colour using colour coordinates as required 4.3. Interpret test results and modify formulation/production method as required to meet product specification.

RANGE OF VARIABLES:

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry.

Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The polymerisation processes covered by this unit include:

- addition polymerisation
  - mechanisms - free radical (initiation, propagation, termination), ionic
  - conditions - temperature, pressure, catalyst
- condensation polymerisation
- cross-linked polymers.

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The polymers covered by this unit include:

- addition polymers:
  - polyolefins (low, high and linear low density polyethylene, polypropylene)
  - polystyrenes
  - polyvinyl chloride
  - fluoropolymers
  - polymethylmethacrylate
  - ethylene vinylacetate
  - polyacetals
  - ethylene vinyl alcohol
  - polyvinylidine chloride
  - their copolymers (random, alternating, block and graft)
- condensation polymers:
  - polyesters
  - polyamides
  - nylon (6, 6.6, 6.10)
  - polycarbonate
- cross-linked polymers:
  - unsaturated polyesters
  - polyurethanes
  - phenol formaldehyde
  - epoxy
  - ethylenepropylenediene
  - styrene butadiene.

Polymer properties include:

- molecular weight - number average (Mn) and weight average (Mw)
- particle size, size distribution, particle shape and porosity
- tacticity - atactic, isotactic, syndiotactic
- glass transition, melting/softening point, morphology
- flow properties, melt viscosity
- rigidity, tensile yield strength, modulus, impact strength
- brittle and ductile failure
- transparency, barrier (oxygen, carbon dioxide, water)
- dimensional and thermal stability.

Intermolecular forces include:

- Van der Waals forces
- dipole-dipole interaction
- hydrogen bonding.

Reinforcements include:

- silicas and clays
- talc
- glass
- fibres.

Test methods include:

- Fourier Transform Infra Red Spectroscopy
- Differential Scanning Calorimetry
- electrical tests - dielectric constant, power factor, volume resistivity, surface resistivity, tracking resistance
- optical tests - haze, clarity, reflectance
- environmental tests - UV, environmental stress cracking, weatherometer, chemical resistance
- barrier tests - moisture vapour transmission rate, carbon dioxide transmission rate, oxygen transmission rate
- thermal tests - VICAT softening, heat distortion temperature, specific heat capacity, coefficient of thermal expansion, thermal conductivity, low temperature brittleness
- flammability
- mechanical tests - tensile, creep, coefficient of friction, wear resistance/abrasion, density
- colour tests - colour coordinates (LAB), colour difference (ΔE).

All operations are performed in accordance with standard procedures and policies.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Knowledge and understanding of the polymerisation process and polymer characteristics sufficient to enable the selection of polymers with appropriate base properties.

Knowledge of the enterprise's standard procedures and policies. Knowledge of the relevant regulatory requirements and national/international standards along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

This unit assumes a knowledge of basic chemistry including atomic structure, molecular weight, periodic table, ionic and covalent bonding, intermolecular bonding, hydrogen bonding, structure of organic compounds, functional groups and typical reactions, saturated and unsaturated compounds, aromatic compounds, hydrolysis and addition reactions.

Competence includes the ability for the practical completion of the job to:

- apply and explain:
  - property changes caused by different mechanisms and conditions for addition polymerisation
  - typical processing conditions for typical polymers such as polythene
  - property changes caused by using bulk, suspension, solution and emulsion addition polymerisation
  - property changes caused by different mechanisms for condensation polymerisation
  - the formation of cross-linked polymers

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- the properties of cross-linked polymers

- impact of polymerisation process on polymer properties
- impact of polymer structure on polymer properties
- modifications to plastics
- test methods
- properties and applications of polymers
- the impact of tacticity on addition polymer properties
- the property changes caused by different copolymer structures
- the influence of molecular structure on chain regularity

distinguish between polymer reinforcements and polymer composites.

Critical aspects:

It is essential that the polymer and additive properties be understood and the chemistry behind these properties can be explained. Competence must be demonstrated in the ability to predict appropriate polymers and additives from the required properties of a product.

Consistent performance should be demonstrated. In particular look to see that selections made can be justified.

Language, literacy and numeracy requirements:

This unit requires high level literacy and numeracy.

Assessment method and context:

Competence in this unit may be assessed:

- by observation of an actual design project where the assessee takes a lead technical role in the material selection
- by use of a suitable project where arrangements are made to include the testing aspects.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom.

Additional resources might include a range of possible products and their performance specification on which would be based the selection of polymer, compound and confirmatory tests.

KEY COMPETENCIES						
1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	2	3	2	3	3	3

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UNIT TITLE

PMBTECH506A - Analyse the design of products and tools

UNIT DESCRIPTOR

This competency covers the impact of die/tool design on the product and process.

This competency is typically performed by experienced technicians/technologists working either independently or as part of a work team.

This competency in practice

This competency applies to technicians/technologists who work with dies/tools. The key factors are the identification of key features, their impact on the process/product and the recommendation of modifications to dies/tools. It includes:

- describing components and functions using appropriate terminology
- interpreting drawings
- identifying design features and their impact on product
- making recommendations for improving/optimising die design.

PREREQUISITES

This unit of competency has **no** prerequisite. However, it assumes the knowledge component included in the following units of competency. Evidence must be available that the specified knowledge has been acquired and is able to be applied:

- MEM 9.2 Interpret technical drawing
- PMB ORG 403 Conduct trials on products or processes.

ELEMENT	PERFORMANCE CRITERIA
1. Identify tool components and operating principles.	1.1. Identify the common types of tools and their advantages and limitations 1.2. Choose appropriate tool components and systems.
2. Interpret tool drawings.	2.1. Identify tool type from drawing 2.2. Identify tool components from drawing
3. Identify tool and part features that affect product quality.	3.1. Recognise common product faults due to tool problems 3.2. Identify the cause of the faults 3.3. Recommend modifications to tool or material to rectify fault.
4. Identify product features that affect tool design.	4.1. Recognise good and poor product design features in terms of ease of tool design and manufacture 4.2. Identify the critical product design features which affect the selection of an appropriate manufacturing technology 4.3. Identify the critical product design features which affect tool design
5. Analyse tool design.	5.1. Use the process for the design, manufacture and trialing of tools 5.2. Use analysis and balancing tools as appropriate to examine optimum tool design 5.3. Suggest possible improvements to tool or product design.

RANGE OF VARIABLES:

This competency unit includes the analysis of dies, tools and moulds and the products made from them. It does not include moulds such as are used for composites or thermoforming.

The competency does not require a knowledge of industry sectors and materials other than that in which the technician works. It assumes an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The processes covered by this unit include, but are not limited to:

- injection moulding
- extrusion
- blow moulding
- blown film
- compression and transfer moulding.

This competency includes tools and equipment such as:

- technical drawings and specifications
- computers and relevant software.

Typical problems include differences in:

- tool configuration
- ancillary systems and methods of mounting and clamping
- product removal methods
- product requirements
- design and construction process.

All operations are performed in accordance with standard procedures and work instructions.

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EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Knowledge and understanding of the materials, equipment and process sufficient to predict their interactions and their impacts on performance.

Knowledge of the enterprise's procedures and policies along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Competence includes the ability for the practical completion of the job to:

- interpret technical drawings and specifications for tools
- apply and/or explain:
  - function of tool components and systems
  - function of clamping/mounting/ancillary systems
  - tool operating principles and adjustments
  - impact of product design on tooling design
  - impact of tooling design on product
  - impact of tool design and material properties on productivity
  - the technical strengths and weaknesses of common processing and fabrication technologies and their relative suitability for classes of products
  - the economic and market features of common processing and fabrication technologies and their impact on the selection of a technology for a product
  - impact of polymer and polymer compound properties on tool performance and product
  - material/tool interactions
  - the impact of different tool designs on product and productivity
  - the temperature effects on process and product
- distinguish between types of tool designs required for different product types

fine tune and balance (where appropriate) the tooling.

Critical aspects:

The critical aspects for this unit of competency is the ability to apply a thorough understanding of polymer materials, their additives and the rheological, heat and other effects of processing to the design of tools and components. This understanding of material and process interactions should also be able to be applied in the interpretation of technical specifications and drawings.

Language, literacy and numeracy requirements:

This unit requires high levels of numeracy and literacy with the ability to interpret technical specifications and reports. Advanced numeracy allowing the calculation and interpretation of statistics, product formulae and process conditions is also required.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

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Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	2	2	2	3	3	3

UNIT TITLE

PMBTECH507A - Develop fibre composite products using cored-laminate techniques

UNIT DESCRIPTOR

This competency covers the knowledge and skill applicable to the developing of a design for 'sandwich type' fibre-composite laminates, generally to achieve specific performance requirements in strength, stiffness and/or weight.

This competency in practice

This competency applies to technicians who are required to apply knowledge of materials, product purpose and processes to the design of 'sandwich' composites. It may include:

- identifying and planning own work requirements from production requests
- identifying and minimizing any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- solving routine and non-routine composites production equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.

PREREQUISITES

This unit has the prerequisite competencies:

- MEM 9.1A Draw and interpret a sketch
- PMB PREP 508A Produce drawings.

ELEMENT	PERFORMANCE CRITERIA
1. Confirm product specification.	1.1. Confirm physical/structural properties required of product 1.2. Confirm other requirements of product 1.3. Identify relevant regulations/standards/codes of practice which may be applicable 1.4. Draw/use hand sketch to confirm product size and shape.
2. Identify technical requirements.	2.1. Determine the laminate properties appropriate for the job 2.2. Select the appropriate core material(s) 2.3. Select the appropriate resin, matrix and other materials 2.4. Determine joints, attachment points and other special features required 2.5. Determine lay-up technique to be used.
3. Develop specification for manufacturing product.	3.1. Develop technical/engineering drawing of new product to company required standards 3.2. Develop material list/specification for new product 3.3. Develop manufacturing procedures/specifications for new product 3.4. Complete required documentation.

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ELEMENT	PERFORMANCE CRITERIA
4. Liaise with manufacturing personnel.	4.1. Liaise with production and other relevant people to ensure specifications/procedures are clear, adequate and understood 4.2. Provide technical expertise to the production process as required to facilitate manufacture 4.3. Recognise and resolve technical problems with the design or manufacturing procedures.

RANGE OF VARIABLES:

This competency applies to the design of composites products using sandwich construction within the plastics and rubber industries. It covers the design of new sandwich products within the scope of normal sandwich product manufacture for the enterprise - ie, using the range of materials and techniques which are standard within the enterprise. For design outside this range, see PMB TECH 601A Develop a new product.

Procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Laminate properties, materials, and lay-up techniques may include:

- PVC rigid foam, plywood, balsa, honeycomb, SAN and linear PVC foam materials, pre-pregs, vacuum bagging materials and techniques.

Procedures developed should minimise typical hazards, including:

- hazardous vapours and materials
- fibres, airborne and handled.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Application of knowledge of materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence also includes the knowledge about how to hand lay-up and vacuum-bag composites, but not necessarily the competence to actually make sandwich composite product.

Competence includes the ability for the practical completion of the job to apply and/or explain:

- principal construction techniques**:**
  - influence of common core and skin materials on construction method
  - the technical advantages of various types
  - the specific applications in general use and specific use such as aerospace, civil construction, or marine structures
  - inner and outer moulds
  - pre-formed skins
  - repair costs
  - test results

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- placement of reinforcements

ν failure modes

ν materials and their suitability as core materials:

- PVC rigid foams
- PU foams
- SAN foams
- linear PVC foams
- plywood
- balsa
- various honeycomb materials

ν structural considerations:

- significance of core shear stress
- importance of core to skin bond strength
- principles of design to meet core shear stress criteria
- damage and repair implications

ν function and operating principles of composites forming equipment, machine components and ancillary equipment

ν impact of temperature, pressure, time, on product quality and production output

ν safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup

ν impact of variations in raw materials and equipment operation in relation to final product

and to:

ν plan own work including predicting consequences and identifying improvements

ν interpret from production requests the correct selection and use of equipment, materials, processes and procedures

ν identify hazards of the materials and process

ν implement appropriate procedures for hazard control

ν use PPE, safely handle products and materials, read relevant safety information and apply safety precautions appropriate to the task.

Critical aspects:

It is essential that competence is demonstrated in the ability to select the appropriate moulded laminate structure to meet the cost and performance specification for the particular job.

Language, literacy and numeracy requirements:

This unit requires high levels of numeracy and literacy with the ability to write and interpret technical specifications and reports. Advanced numeracy allowing the calculation and interpretation of statistics, product formulae and process conditions is also required.

Assessment method and context:

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- by use of a suitable simulation and/or a range of case studies/scenarios
- by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	3	3	3	3	3	3

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UNIT TITLE

PMBTECH601A - Develop a new product

UNIT DESCRIPTOR

This competency covers the development of a new product for a company and the facilitation of its initial production.

This competency is typically performed by high level staff, working as part of a product design, development and implementation team and taking a lead technical role.

This competency in practice

This competency applies to people who develop new products to meet a specified end use. This will involve working closely with a range of management and operations personnel and requires balancing the business and technical sides of the new product. This unit of competency applies to the technical expert. Critical aspects for success include:

- ensuring the technical performance meets the customer's needs
- making sure the market needs of cost, timeliness and quality are appropriately balanced
- designing a product and process which can be efficiently made by the company
- liaising with the required people to ensure tooling design and manufacture and equipment modification is correct
- optimising the process for the new product at the completion of the development phase.

PREREQUISITES

This unit of competency has **no** prerequisites. However it assumes the knowledge component included in the following units of competency. Evidence must be available that the specified knowledge has been acquired and is able to be applied:

- PMB TECH 502A Review and analyse production trials and specify retrials
- PMB TECH 505A Choose polymer materials for an application
- MEM 15.1A Perform basic statistical quality control.

ELEMENT	PERFORMANCE CRITERIA
1. Confirm design brief of new product.	1.1. Communicate with customer and other key stakeholders and agree on; technical specification, aesthetic requirements, timelines, cost, and other market requirements 1.2. Determine regulatory/industry code/intellectual property requirements for product 1.3. Identify possible tooling/process/equipment need 1.4. Develop design brief, including relevant drawings, to meet needs 1.5. Obtain 'sign off' on total design brief from all relevant persons.

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2. Determine material requirements for product.	2.1. Select appropriate base polymer grade/polymer blend or range of polymers/grades for evaluation 2.2. Select type(s) of reinforcement and other additives needed 2.3. Determine material testing and evaluation regime required to meet product end use requirements, including regulatory/ industry code requirements 2.4. Arrange for compounding, testing and evaluation of trial materials 2.5. Interpret material trial results and guide material trial process 2.6. Determine final materials specification(s).
3. Determine process requirements for product.	3.1. Select appropriate process to make product based on factors including: • type of material • dimensional precision of product • length of run/number of products • required aesthetics • size and complexity of product • available capital funding • process equipment available 3.2. Determine any special process/equipment requirements for this product 3.3. Communicate with production personnel to determine their concerns and/or special needs.
4. Ensure process needs for new product have been met.	4.1. Liaise with tool/die/mould/equipment design/procurement personnel 4.2. Interpret hardware specifications and ensure they are appropriate for the job required 4.3. Liaise with process personnel to ensure appropriate draft procedures for new product have been developed.
5. Trial new product through the process.	5.1. Design trialing procedure to deliver required information 5.2. Ensure OH&S and environmental requirements are stringently observed 5.3. Coordinate the trialing of the new product 5.4. Interpret product trial results and guide product trial process 5.5. Tune process to optimise production of new product.
6. Determine process capability.	6.1. Plot appropriate statistical process control charts 6.2. Determine 3σ confidence limits 6.3. Compare confidence limits with product specification.
7. Coordinate product trials.	7.1. Determine product testing and evaluation regime required to meet end use requirements, including regulatory/industry code requirements 7.2. Arrange for testing and evaluation of trial product/prototype 7.3. Interpret product trial results and guide product trial process 7.4. Determine final product specification 7.5. Make required changes to materials, process and equipment.

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8. Implement standard procedures for new product.	8.1. Monitor initial production and adjust process, conditions and materials to make the process a smooth operation 8.2. Ensure process specifications reflect the optimised operation developed 8.3. Ensure standard operating procedures are correct for the new product 8.4. Ensure equipment and other hardware records are updated to reflect additions/changes 8.5. Ensure project records are complete and all required reports have been completed and submitted 8.6. Archive records according to company procedure.

RANGE OF VARIABLES:

This competency unit is for the design of a new product 'from scratch'. It assumes an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. The competency assumes a working knowledge of all main processes and materials so that an informed choice can be made between them.

This unit requires an understanding of all standard processes, major polymer types and common additives.

This competency includes tools and equipment such as:

- for design of dies such as are used in extrusion, injection moulding and blow moulding
- for design of moulds such as are used in rotational moulding and composites
- understanding of use of all standard processing equipment
- relevant personal protective equipment.

Typical regulatory requirements include:

- OH&S
- food grade requirements
- environmental regulations
- PACIA packaging covenant
- structural codes.

Typical problems include:

- defining product end use requirements in terms meaningful to the product design and manufacture
- matching suitable materials and processes to the product needs and company expertise and facilities
- matching (and improving) process capability to product tolerances.

All operations are performed in accordance with standard procedures and policies.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Knowledge and understanding of the materials, equipment and process sufficient to choose an appropriate combination of materials and process to achieve the end use function of the product

Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Competence includes the ability for the practical completion of the job to:

- select and justify the selection of:
  - polymer type and grade for a range of applications
  - additives (including reinforcing) and grade for a range of applications
  - appropriate process for a range of product/market applications
  - material and product testing procedures
- apply theoretical principles to predict:
  - the impact of the polymerisation process on the polymer process
  - appropriate polymer type and grade for typical applications
  - appropriate additives and grades for a range of applications
  - effects of processes and processing on the final properties of the product
  - miscibility and solubility effects and phase separation/single phase processing
- mathematically determine
  - volume fractions in a formula
  - product cost estimates
- interpret and make recommendations based on:
  - laboratory test results
  - field test results
  - market analysis data
  - trialing data.

Critical aspects:

The critical aspect for this unit of competency is the ability to apply a thorough understanding of polymer materials, their additives and the rheological, heat and other effects of processing to a new situation and use this understanding to predict likely solutions to the new product design specification challenge. This understanding of material and process interactions should also be able to be applied in interpreting data and making adjustments to materials and process to achieve the desired outcomes.

Language, literacy and numeracy requirements:

This unit requires high levels of numeracy and literacy with the ability to write and interpret technical specifications and reports. Advanced numeracy allowing the calculation and interpretation of statistics, product formulae and process conditions is also required.

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Assessment method and context:

Competence in this unit may be assessed:

- by observation of an actual product development project where the assessee takes a lead technical role
- by use of a suitable product development project where arrangements are made to also assess the implementation aspects.

The development must be of a product which is new to the organisation and not just a modification of an existing product. It is possible that a major redesign of an existing product may encompass all the aspects of a new product design to an appropriate breadth and depth. Where the only available product design projects are the major redesign of an existing project, normally several such projects will be required to match the breadth and depth of skills which can be demonstrated by the development of a totally new product.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	3	3	3	3	3	3

UNIT TITLE

PMBTECH602A - Develop a new die or tool

UNIT DESCRIPTOR

This competency covers the development of a new die or tool for a company and the facilitation of its initial use in production.

This competency is typically performed by high level staff, working as part of a die/tool design, development and implementation team and taking a lead technical role.

This competency in practice

This competency applies to people who develop new dies/tools to meet a specified end use. This will involve working closely with a range of management and operations personnel and toolmakers who will often be external to the company. It requires balancing the ease of use and process efficiency with tool/die life and maintenance requirements. This unit of competency applies to the technical expert. Critical aspects for success include:

- ensuring the technical performance meets the process and maintenance/reliability needs
- making sure the needs of cost, timeliness and quality are correctly balanced
- designing a die/tool which is efficient to use by the company
- liaising with the required people to ensure tooling design matches the product and process needs
- optimising the process for the new die/tool at the completion of the development phase.

PREREQUISITES

This unit of competency has **no** prerequisites. However, it assumes the knowledge component included in the following units of competency. Evidence must be available that the specified knowledge has been acquired and is able to be applied:

- PMB TECH 506A Analyse the design of products and tools
- PMB PREP 508 A Produce drawings.

ELEMENT	PERFORMANCE CRITERIA
1. Confirm die requirements.	1.1. Communicate with customer and other key stakeholders and agree on; product technical specification, product aesthetic requirements, timelines, cost, usage and other requirements 1.2. Identify tool design/product design/process issues which may be in conflict and resolve 1.3. Develop design brief, including relevant drawings, to meet needs 1.4. Obtain ‘sign off’ on total design brief from all relevant persons.

2. Develop concept design specification of new die.	2.1. Select appropriate material(s) of construction or range of materials and grades 2.2. Select appropriate finish requirements for die/tool 2.3. Design die/tool using appropriate mathematical techniques 2.4. Validate die design specifications against die requirements and design brief.
3. Liaise with toolmaker on die manufacture.	3.1. Discuss design brief and concept design with tool maker(s) 3.2. Verify understanding of die/tool requirements and ability to meet requirements 3.3. Negotiate contract to make die according to company policy and procedures 3.4. Continue to liaise with toolmaker.
4. Trial new die and determine modification(s) (if any) required.	4.1. Design trialing procedure to deliver required information 4.2. Ensure OH&S and environmental requirements are stringently observed 4.3. Coordinate the trialing of the new die/tool 4.4. Interpret die/tool trial results and guide die trial process 4.5. Tune process to optimise use of new die/tool.
5. Bring new die into standard production	5.1. Monitor initial production and adjust die, process and conditions to make the process a smooth operation 5.2. Ensure process specifications reflect the optimised operation developed 5.3. Ensure standard operating procedures are correct for the new product 5.4. Ensure equipment and other hardware records are updated to reflect additions/changes 5.5. Ensure project records are complete and all required reports have been completed and submitted 5.6. Archive records according to company procedure.

RANGE OF VARIABLES:

This competency unit is for the design of a new die or tool. It assumes an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. The competency assumes a working knowledge of all main processes, polymer materials and materials of construction of dies/tools so that an informed choice can be made between them.

The processes covered by this unit include, but are not limited to:

- injection moulding
- extrusion
- blow moulding
- extrusion blow moulding
- injection blow moulding.

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This competency includes the ability to mathematically design dies and analyse die trials. It also requires an understanding of the operation of the process equipment.

Typical problems include:

- clarifying the design brief
- communication breakdowns between product designer, die designer, toolmaker and production and maintenance needs.

All operations are performed in accordance with standard procedures and policies.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Knowledge and understanding of the materials, equipment and process sufficient to design an efficient and effective die and to test that die in the process and validate its fitness for purpose.

Knowledge of the enterprise's policies and procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Competence includes the ability for the practical completion of the job to:

- select and justify the selection of:
  - die material(s)
  - die finish(s)
- apply theoretical principles to predict:
  - the impact of the melt viscosity on die size and design
  - runner/sprue design needed
  - dies size and shape required to product required product
- use mathematics in the design process including:
  - Fourier analysis
  - mould flow analysis
  - shear stress/strain rates (viscosity)
- interpret and make recommendations based on:
  - die design data
  - production trial data.

Critical aspects:

The critical aspects for this unit of competency is the ability to apply a thorough understanding of polymer materials, their additives and the rheological, heat and other effects of processing to the design of a new die/tool. The influence of die/tool design on the operability of the process and the properties of the product also need to be understood. The interpretation of die trial data and the modification of die and/or process to improve the outcome, are also critical.

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Language, literacy and numeracy requirements:

This unit requires high levels of numeracy and literacy with the ability to write and interpret technical specifications and reports. Advanced numeracy allowing the calculation and interpretation of statistics, product formulae and process conditions is also required.

Assessment method and context:

Competence in this unit may be assessed:

- by observation of an actual die development project where the assessee takes a lead technical role
- by use of a suitable die development project where arrangements are made to also assess the implementation aspects.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	3	3	3	3	3	3

UNIT TITLE

PMBTECH603A - Design structural/mechanical polymer components

UNIT DESCRIPTOR

This competency covers the mechanical/structural design of components which are to be made from polymeric materials. It applies the traditional engineering structures to viscoelastic materials.

This competency is typically performed by senior technicians/technologists who are designing, or part of a team, designing polymeric structures or polymeric mechanical components.

This competency in practice

This competency applies to technologists designing new mechanical or structural components. The key factors in the design of the component are adequate strength and rigidity and making allowances for, and taking maximum advantage of, the inherent properties of polymeric materials. It includes:

- structural components such as support columns and beams in plastic playground equipment
- rigid beams and frames such as in boat hulls and decks
- mechanical components (such as gears, cams, etc) subject to forces/transmitting mechanical power
- working with a certified structural engineer (when appropriate) to provide specialised polymer knowledge.

PREREQUISITES

This unit of competency requires a detailed understanding of mechanics such as might be gained from some engineering studies. Where this knowledge is to be gained as part of this unit of competency, it will require a significantly greater effort and time than would otherwise be required.

This unit of competency has **no** prerequisites. However, it assumes the knowledge component included in the following unit of competency. Evidence must be available that the specified knowledge has been acquired and is able to be applied:

- PMB TECH 505 A Choose polymer materials for an application.

ELEMENT	PERFORMANCE CRITERIA
1. Determine mechanical/ structural design requirements.	1.1. Determine stress/strain requirements of end use 1.2. Determine flexural/rigidity requirements of end use 1.3. Determine required physical properties (such as size, shape, density) of end use 1.4. Determine environmental requirements (physical, chemical, radiation) of end product 1.5. Identify how component fits with entire end product 1.6. Develop mechanical design brief and verify with appropriate people.

2. Select material(s) and additives, including reinforcing, appropriate for the design brief.	2.1. Select material/combination of materials with appropriate physical properties 2.2. Select material/combination of materials with appropriate chemical properties 2.3. Select material/combination of materials with appropriate radiation resistance properties 2.4. Arrange for compounding and testing of possible material(s) as appropriate 2.5. Determine relevant properties of selected material/shortlisted materials.
3. Undertake mechanical design of component.	3.1. Calculate size and shape/profile of component to meet design brief 3.2. Liaise with product developer to also deliver required aesthetic aspects 3.3. Liaise with product developer/production to ensure efficiency in manufacture 3.4. Suggest modifications to material(s)/compound as required.
4. Design jointing/joining/ other product interfaces.	4.1. Liaise with designers of other components 4.2. Agree on interface requirements/joints/joining as appropriate 4.3. Design suitable interfaces 4.4. Check interface design to ensure it meets the end use requirements without sacrificing integrity.
5. Finalise design.	5.1. Check internal consistency of design 5.2. Check overall design meets end use requirements 5.3. Write component specification 5.4. Liaise with product developer/production to write production specification/procedures 5.5. Supervise manufacture and testing of prototypes/manufacturing trials as appropriate 5.6. Finalise specifications and manufacturing processes, complete all reports 5.7. Ensure project records are complete and all required reports have been completed and submitted 5.8. Archive records according to company procedure.

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RANGE OF VARIABLES:

This competency unit is for the design of a new product or a component of a new product which has a significant structural or mechanical requirement. It assumes an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

This competency applies to all work environments and sectors within the plastics, rubber and cablemaking industry. The competency assumes a working knowledge of all main processes and polymer materials so that an informed choice can be made between them

Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

The situations covered by this unit include, but are not limited to:

- critical load bearing structural components requiring significant design such as columns and beams
- critical mechanical components transmitting power/forces such as shafts, gears, bearings
- component joints/joins
- components with a critical rigidity/flexural specification
- individual components
- integrated structural components
- large and small components.

This unit does NOT provide a qualification as a certified structural engineer such as might be required by government regulation for some structures. However persons with this competency should be able to work closely with such people, if required, providing specialised polymer knowledge.

The materials covered by this unit include, but are not limited to:

- composites
- single phase polymer structures
- multi-phase polymer structures
- polymer blends.

This competency includes industry sectors such as:

- composites
- rotational moulding
- extrusion
- injection moulding
- general rubber goods
- polyurethane.

It includes all materials and their additives.

All operations are performed in accordance with standard procedures and policies and the relevant industry/government and codes and standards.

EVIDENCE GUIDE:

Essential knowledge and enterprise requirements:

Knowledge and understanding of the materials, equipment and process sufficient to design a component which is mechanically/structurally fit for its end purpose and which can be efficiently manufactured.

Knowledge of the enterprise's policies and procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Competence includes the ability for the practical completion of the job to:

- apply and explain:
  - stress/strain data of polymeric materials to the design situation
  - material creep/viscoelasticity
  - impact and notch strength
  - tensile, compressive, shear and torsional strength
  - tear strength
  - adequate safety factors
  - overall design features which take advantage of the polymeric material(s) being used
- make compounding recommendations to modify properties such as:
  - stress/strain data of polymeric materials
  - material creep/viscoelasticity, rheometric properties
  - material strength
  - environmental resistance (eg, temperature, chemicals, UV and other radiation)
- make changes to physical size and shape to change:
  - stiffness/rigidity, deflection
  - strength.

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Critical aspects:

The critical aspect for this unit of competency is the ability to apply a thorough understanding of polymer materials, their additives and the rheological, heat and other effects of processing to the design of a new mechanical or structural component. The ability to modify both compound design and mechanical design to optimise the results should be evident. The designed product must not only be fit for its purpose but also capable of efficient manufacture for an appropriate price/cost.

Language, literacy and numeracy requirements:

This unit requires high levels of numeracy and literacy with the ability to write and interpret technical specifications and reports. Advanced numeracy allowing the calculation and interpretation of statistics, design formulae and process conditions is also required.

Assessment method and context:

Competence in this unit may be assessed:

- by observation of an actual design project where the assessee takes a lead technical role
- by use of a suitable design project where arrangements are made to also assess the implementation aspects.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.

Resource implications:

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom.

Additional resources might include a range of possible products and their performance specification on which would be based the mechanical/structural design.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	3	3	3	3	3	3

UNIT TITLE

LMTEMGN06A - Design equipment and system modifications

UNIT DESCRIPTOR

This unit covers the skills and knowledge required to design equipment and system modifications for applications within in an enterprise. This unit applies to general equipment and system design, not die/tool design.

This competency is typically performed by senior technicians/technologists working either independently or as part of a work team.

PREREQUISITES

This competency has **no** prerequisites.

ELEMENT	PERFORMANCE CRITERIA
1. Assess requirements.	1.1. Modification or design requirement is established to take into account production, facility, OH&S and environmental factors 1.2. Design concepts are established, taking into consideration process, material, quantity, cost and outcome requirements 1.3. Codes, regulations and technical documentation are consulted to establish design limitations, where applicable 1.4. Specialist expertise is consulted as required.
2. Evaluate options.	2.1. Options are defined and evaluated to determine most appropriate design modification 2.2. Selected option is confirmed with appropriate personnel in accordance with workplace procedures
3. Design modifications.	3.1. Modification is designed to meet end use specifications/ standards and all legislative or regulatory requirements 3.2. Verification of the design is undertaken in accordance with enterprise procedures.
4. Coordinate design implementation and testing.	4.1. Implementation of the design/modification is arranged and coordinated 4.2. Design outcome is tested and assessed to establish conformance to requirements 4.3. Variations to the design are assessed where necessary 4.4. Documentation is prepared to meet all requirements
5. Maintain records.	5.1. Records are maintained of design and modification outcomes in accordance with enterprise procedures

RANGE OF VARIABLES:

General context:

Competence must be demonstrated in the design of equipment and system modifications for applications in an enterprise.

Significant judgement is required in planning, design, technical or supervisory activities related to operations or processes.

Work is assessed in accordance with statutory requirements, organisation insurance requirements, OH&S legislation, manual handling procedures and relevant health regulations.

Worksite environment may include:

Work may be conducted in a large scale production or small business situation.

The competencies can apply to the design of equipment/system modifications associated with product changes or improvements and/or establishment of a new production line.

Design activities relate to processes which are based on established principles and practices, and that require modifications determined by experience and analysis.

Work is undertaken to meet specifications.

Activities may involve:

- design research and consultation with internal or external specialists
- assessment and evaluation of design concepts
- design implementation and testing of modifications.

The competencies are applied under limited guidance in line with a broad plan, budget or strategy.

Knowledge and skills are applied:

- as part of major functional area
- in highly specialised situations requiring a range of skills.

The competencies are used independently within substantially non-routine situations.

Sources of information/documents may include:

- work instructions
- manufacturer's specifications and instructions
- organisation work procedures and specifications
- organisational or external personnel
- quality and Australian standards and procedures.

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Workplace context may include:

Work organisation procedures and practices relating to the design of equipment and system modifications for applications within an enterprise.

Conditions of service, legislation and industrial agreements including:

- workplace agreements and awards
- federal or State/Territory legislation
- standard work practices.

Reporting actions include verbal and written communication in accordance with organisational policies and procedures.

Communication may be oral, written or visual and can include simple data.

Being responsible for the maintenance of own work quality and being required to contribute to the quality improvement of team or section output, where necessary.

Safety, environmental, housekeeping and quality are as specified by machine/equipment manufacturers, regulatory authorities and the enterprise.

Applicable regulations and legislation may include

- occupational health and safety legislation relevant to workplace activities
- relevant Australian design standards
- workers' compensation legislation
- environmental legislation and regulations.

EVIDENCE GUIDE:

Critical aspects of evidence to be considered:

Assessment must confirm appropriate knowledge and skills to:

- establish design/modification requirements
- assess design and modification options
- organise implementation of design/modification
- ensure work meets specifications
- apply workplace health and safety policies in work operations
- maintain accurate records.

Interdependent assessment of units:

This unit does not necessarily need to be assessed in conjunction with other units and can be assessed independently.

Required knowledge and skills:

Underpinning knowledge of:

- appropriate design techniques
- relevant Australian design standards
- OH&S considerations and environmental factors in relation to equipment/system design
- safety and environmental aspects of relevant enterprise activities
- workplace procedures and reporting/recording processes
- relevant regulatory requirements and codes of practice.

Underpinning skills to:

- interpret design requirements
- apply technical skills, including performing technical calculations
- conduct tests and prepare drawings/documentation
- evaluate design options
- communicate effectively within the workplace, including liaising with other departments
- establish or interpret procedures, where required
- determine report requirements and present information in appropriate formats.

Resource implications:

Access to real or appropriately simulated situations involving the design of equipment and system modifications for applications within a plastics, rubber or cablemaking context.

This includes real or simulated work areas, materials, equipment, and information on work specifications, manufacturer's instructions, relevant safety procedures and regulations, quality standards, organisation procedures and customer requirements.

Consistency in performance:

Applies underpinning knowledge and skills when:

- organising work
- evaluating design options
- completing tasks
- identifying improvements
- applying safety precautions relevant to the task
- assessing operational capability of specified equipment used and work processes.

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Shows evidence of application of relevant workplace procedures including:

- hazard policies and procedures including codes of practice
- job procedures and work instructions
- quality procedures (where existing)
- waste, pollution and recycling management processes.

Action taken promptly, accidents and incidents reported in accordance with statutory requirements and enterprise procedures.

Recognises and adapts appropriately to cultural differences in the workplace, including modes of behaviour and interactions among staff and others.

Work completed systematically with attention to detail without damage to goods, equipment or personnel.

Context for assessment:

Assessment may occur on the job or in an appropriately simulated environment.

KEY COMPETENCIES

1 Collect, analyse & organise information	**2** Communicate ideas and information	**3** Plan and organise activities	**4** Work with others & in teams	**5** Use mathematical ideas and techniques	**6** Solve problems	**7** Use technology
3	3	3	3	3	3	3