



Australian Government

PMBPROD293 Operate vacuum bagging equipment

Release: 1

PMBPROD293 Operate vacuum bagging equipment

Modification History

Release 1. Supersedes and is equivalent to PMBPROD293B Operate vacuum bagging equipment

Application

This unit of competency covers the skills and knowledge required to operate vacuum bagging equipment to make composite parts.

This unit of competency applies to operators who are required to take product off mould table; prepare materials and moulds; check vacuum bags, closures and fittings; operate the equipment; and recognise routine and non-routine problems and take appropriate action.

This unit of competency applies to an individual working alone or as part of a team or group and working in liaison with other shift team members, team leader and supervisor, as appropriate.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

Nil

Competency Field

Production

Unit Sector

Not applicable

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

1	Check work requirements	1.1	Identify work requirements from production plan or request
		1.2	Check product, materials and equipment meet requirements for job
		1.3	Recognise requirements which may not be in accordance with usual practice

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| | | 1.4 | Ask questions of appropriate person to confirm non-standard job specifications |
| | | 1.5 | Ensure housekeeping is to requirements |
| | | 1.6 | Identify hazards associated with job and take appropriate action |
| | | 1.7 | Perform other pre-operational checks in accordance with procedures |
| 2 | Check process set-up | 2.1 | Check safety equipment is 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 | Complete pre-start checks |
| 3 | Operate equipment to procedures | 3.1 | Start equipment safely and correctly when required |
| | | 3.2 | Check process is operating 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 materials as required |
| | | 3.6 | Complete logs and records as required |
| | | 3.7 | Collect and segregate scrap, waste and other materials as required |
| | | 3.8 | Keep equipment and work area clean |
| | | 3.9 | Shut down as required |
| 4 | Respond to | 4.1 | Recognise known faults that occur during the operation |

routine problems in accordance with procedures	4.2	Identify and take action on causes of routine faults
	4.3	Log problems as required
	4.4	Identify non-routine process and quality problems and take appropriate action

Foundation Skills

This section describes those required skills (language, literacy and numeracy) that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Regulatory framework The latest version of all legislation, regulations, industry codes of practice and Australian/international standards, or the version specified by the local regulatory authority, must be used.

Applicable legislation, regulations, standards and codes of practice include:

- health, safety and environmental (HSE) legislation, regulations and codes of practice relevant to the workplace, equipment and production processes and hazardous materials
- Australian/international standards relevant to the materials being used and products being made
- any relevant licence and certification requirements.

All operations to which this unit applies are subject to stringent HSE requirements, which may be imposed through state/territory or federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and such requirements the legislative requirements take precedence.

Procedures All operations must be performed in accordance with relevant procedures.

Procedures are written, verbal, visual, computer-based or in some other form, and include one or any combination of:

- emergency procedures
- work instructions
- standard operating procedures (SOPs)
- safe work method statements (SWMS)
- formulas/recipes
- batch sheets
- temporary instructions
- any similar instructions provided for the smooth running of the plant.

Tools and equipment

Tools and equipment include:

- moulds
- vacuum bags
- vacuum pumps and fittings eg hoses and couplings
- programmable logic controllers (PLC) if fitted
- hand tools used in the this process.

Additional tools and equipment will be selected as required from:

- hoists/lifting equipment not requiring any special permits or licences
- manual handling aids, such as hand carts and trolleys
- relevant personal protective equipment (PPE).

Hazards

Hazards must be identified and controlled. Identifying hazards requires consideration of:

- hazardous products and materials
- sharp edges, swarf and scrap
- protrusions or obstructions
- slippery surfaces, spills or leaks
- rotational equipment or vibration
- smoke, dust, vapours or other atmospheric hazards
- high temperatures
- electricity
- gas
- gases and liquids under pressure
- structural hazards
- equipment failures
- machinery, equipment and product mass
- other hazards that might arise.

Routine problems

Routine problems must be resolved by applying known solutions.

Routine problems are predictable and include one or more of:

- equipment malfunction
- vacuum leaks
- resin, wet out non-conformance of the laminate
- variations in process conditions especially temperature
- variations affecting cure rate
- variations in materials
- contamination of materials
- equipment, tool or mould damage
- routine product faults
- mould/tooling problems
- variations in materials and/or contamination of materials.

Known solutions are drawn from one or more of:

- procedures
- training
- remembered experience.

Non-routine problems must be reported according to according to relevant procedures.

Unit Mapping Information

Release 1. Supersedes and is equivalent to PMBPROD293B Operate vacuum bagging equipment

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=932aacef-7947-4c80-acc6-593719fe4090>

Assessment Requirements for PMBPROD293 Operate vacuum bagging equipment

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria and demonstrate the ability to:

- read and interpret procedures, job specifications, material labels and safety data sheets (SDS)
- select and use materials, tools and equipment to meet job specifications
- prepare moulds, fibre preforms, prepregs, resins, additives and release agents to specifications
- monitor vacuum bagging equipment and ancillary equipment using measured/indicated data and smell, sight, sound and feel as appropriate
- monitor and interpret key variables, including:
 - vacuum bag conditions
 - production rate
 - curing time and conditions
 - product integrity and general conformance to specification
- operate and adjust the equipment to meet product quality and production output specifications
- pause the equipment or shut down equipment in normal and abnormal circumstances
- identify hazards and apply relevant hazard controls
- apply safety procedures
- apply housekeeping procedures
- apply waste management procedures
- recognise early warning signs of equipment/processes needing attention or with potential problems
- recognise routine and non-routine problems
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- take action to resolve faults or report faults to appropriate personnel
- distinguish between possible causes of routine faults, including:
 - raw material variations/contamination
 - process abnormalities
 - procedural errors
 - mechanical abnormalities

- communicate effectively with team/work group and supervisors
- complete workplace records
- do basic arithmetical manipulations, including additions, subtractions, divisions, fractions and percentages.

Knowledge Evidence

Must provide evidence that demonstrates knowledge relevant to their job sufficient to operate under routine only supervision and to solve routine problems, including knowledge of:

- function of vacuum bagging equipment
- principles of operation of the equipment
- role of fibres, preregs, resins, additives and release agents
- the potential effects of variations in raw materials and equipment operation in relation to quality of product
- production workflow sequences and materials demand
- process behaviours of resins and the role of additives
- factors which may affect product quality or production output and appropriate remedies
- routine problems, their probable causes and relevant corrective actions
- organisation procedures relevant to the work environment/job role
- hierarchy of control
- hazards that may arise in the job/work environment and:
 - their possible causes
 - potential consequences
 - appropriate risk controls.

Assessment Conditions

- The unit should be assessed holistically and the judgement of competence shall be based on a holistic assessment of the evidence.
- In all plants it may be appropriate to assess this unit concurrently with units such as:
 - teamwork
 - communication.
- The collection of performance evidence:
 - should occur over a range of situations which include typical disruptions to normal, smooth operation of an operating plant
 - will typically include a supervisor/third-party report or other evidence, focussing on consistent performance and problem recognition and solving. A supervisor/third-party report must be prepared by someone who has a direct, relevant, current relationship with the person being assessed and who is in a position to form a judgement on workplace performance relevant to the unit of competency
 - must include the use of an appropriate industrial item of equipment requiring demonstration of operation, start and stop procedures and responding to problems

- may use industry-based simulation for all or part of the unit particularly where safety, lack of opportunity or significant cost is an issue.
- Assessment should occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions. This must cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.
- Assessment in a simulated environment should use evidence collected from demonstration of skills and one or more of:
 - walk-throughs
 - pilot plant operation
 - industry-based case studies/scenarios
 - 'what ifs'.
- Knowledge evidence may be collected concurrently with performance evidence or through an independent process, such as workbooks, written assessments or interviews.
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications associated with this unit.
- The regulatory framework will be reflected in workplace policies and procedures and is not required to be independently assessed.
- Foundation skills are integral to competent performance of the unit and should not be assessed separately.
- Assessors must satisfy the assessor competency requirements that are in place at the time of the assessment as set by the VET regulator.
- In addition the assessor or anyone acting in subject matter expert role in assessment shall demonstrate both technical competency and currency. If the assessor cannot demonstrate technical competency and currency they shall assess with a subject matter expert who does meet these requirements.
- Technical competence can be demonstrated through one or more of:
 - relevant VET or other qualification/Statement of Attainment
 - appropriate workplace experience undertaking the type of work being assessed under routine and non-routine conditions
 - appropriate workplace experience supervising/evaluating the type of work being assessed under routine and non-routine conditions
- Currency can be demonstrated through one or more of:
 - being currently employed undertaking the type of work being assessed
 - being employed by the organisation undertaking the type of work being assessed and having maintained currency in accordance with that organisation's policies and procedures

- having consulted/had contact with an organisation undertaking the type of work being assessed within the last twelve months, the consultation/contact being related to assessment
- conducting on the job training/assessments of the type of work being assessed
- being an active member of a relevant professional body and participating in activities relevant to the assessment of this type of work.

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