



Australian Government

Department of Education, Employment and Workplace Relations

PMBTECH601B Develop a new product

Revision Number: 1

PMBTECH601B Develop a new product

Modification History

Not applicable.

Unit Descriptor

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.

Application of the Unit

Application of this unit

This competency applies to operators who are required 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.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit of competency has the prerequisites of:

- *PMBTECH502B Review and analyse production trials and specify retrials*
- *PMBTECH505B Choose polymer materials for an application*
- *MEM15.1B Perform basic statistical quality control*
-

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
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.
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.
3. Determine process requirements for product.	3.1 Select appropriate process to make product based on appropriate factors 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/ <u>die</u> / <u>mould</u> /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

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	developed.
5. Trial new product through the process.	5.1 Design trialing procedure to deliver required information. 5.2 Ensure OHS 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 3 sigma 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.
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.

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	8.6 Archive records according to company procedure.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit. 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 organization procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Knowledge as a basis for solving processing and material problems including:

- 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
- 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
- laboratory test results
- field test results
- market analysis data
- trialing data.

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.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

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.

Assessment method and context

Assessment will occur using industrial products, situations and equipment using industrial polymers and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- using appropriate, industrial product, situations and polymers
- in a situation allowing for the generation of evidence of the ability to recognise, anticipate and respond to problems
 - by using a suitable simulation and/or a range of case studies/scenarios
 - through a combination of these techniques.

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 re-design 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. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement 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.

Access must be provided to appropriate learning and/or assessment support when required.

Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice and/or Australian/international standards, the latest version must be used.

Context

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 cabling 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.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards. These may include

- OHS
- food grade requirements
- environmental regulations
- PACIA packaging covenant
- structural codes.

Tools and equipment

This competency requires an understanding of the use of all standard processing equipment, It includes use of equipment and tools for:

- design of dies, such as are used in extrusion, injection moulding and blow moulding
- design of moulds such as are used in rotational moulding and composites
- understanding
- relevant personal protection.

Appropriate factors

Appropriate factors include:

- 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.

Problems

Typical process and product problems may 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.
-

Unit Sector(s)

Not applicable.