



Australian Government

Department of Education, Employment and Workplace Relations

PMBTECH602B Develop a new die or tool

Revision Number: 1

PMBTECH602B Develop a new die or tool

Modification History

Not applicable.

Unit Descriptor

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.

Application of the Unit

Application of this unit

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.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit of competency has the prerequisites of:

- *PMBTECH506B Analyse the design of products and tools*
- *MEM9.3B Prepare basic engineering drawing*
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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 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 OHS 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

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	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.

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 design an efficient and effective die and to test that die in the process and validate its fitness for purpose.

Knowledge of organization 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.

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

- die material(s)
- die finish(s)
- the impact of the melt viscosity on die size and design
- runner/sprue design needed
- dies size and shape required to product required product
- Fourier analysis
- mould flow analysis
- shear stress/strain rates (viscosity)
- die design data
- production trial 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 required.

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 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.

Assessment method and context

Assessment will occur using industrial dies/tools and equipment and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- using appropriate, industrial dies/tools 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.

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 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 cabling 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

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:

- injection moulding
- extrusion
- blow moulding
- extrusion blow moulding
- injection blow moulding.

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

Problems

Typical process and product problems may include:

- clarifying the design brief
- communication breakdowns between product designer, die designer, toolmaker and production and maintenance needs.
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Unit Sector(s)

Not applicable.