



Australian Government

PMBTECH401 Predict polymer properties and characteristics

Release: 1

PMBTECH401 Predict polymer properties and characteristics

Modification History

Release 1. Supersedes and is equivalent to PMBTECH401B Predict polymer properties and characteristics

Application

This unit of competency covers the skills and knowledge required to predict polymer properties and characteristics as typically used in problem solving and product and process improvement.

This unit of competency applies to technicians or similar roles who are required to predict the impact of process conditions on polymer properties, predict physical properties from polymer morphology, determine the impact of use conditions and polymer characteristics on physical failure, and organise and interpret tests.

This unit of competency applies to an operator/technician applying specialised theoretical and technical knowledge and well developed skills in situations that require autonomy, discretion and judgement. The person may work alone or as a member of a team or group and will work 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

PMBTECH301 Use material and process knowledge to solve problems

Competency Field

Technical

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 **Predict the impact of**

1.1 Predict property changes due to molecular weight and temperature

	processing conditions on polymer properties	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
2	Predict physical properties of polymers from their morphology	2.1	Predict the effects temperature, crystal size, degree of crystallisation, molecular orientation on physical properties
		2.2	Predict shrinkage from morphology
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

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, manual handling 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:

- technical specifications
- technical drawings
- 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.

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

- hazardous products and materials
- vapours or other atmospheric hazards
- interaction of polymers, additives and other materials with process variables
- other hazards that might arise.

Unit Mapping Information

Release 1. Supersedes and is equivalent to PMBTECH401B Predict polymer properties and characteristics

Links

Companion Volume implementation guides are found in VETNet -

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