



Australian Government

PMBTECH301E Optimise polymer processing operations

Release: 1

PMBTECH301E Optimise polymer processing operations

Modification History

Release 1. Unit code and title changed. Application changed. Elements and Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMBTECH301 Use materials and process knowledge to solve problems.

Application

This unit describes the skills and knowledge required to optimise operations and solve routine problems by applying general polymer material and process knowledge.

This unit applies to an experienced technician working alone or as part of a team.

The unit principally refers to thermoplastic and rubber polymers but not thermoset composites. It introduces polymer technology concepts and their practical application to common processes and routine production.

No licensing or certification requirements exist at the time of publication. Relevant legislation, industry standards and codes of practice within Australia must be applied.

Pre-requisite Unit

Nil.

Competency Field

Technical – Polymer Technology

Elements and Performance Criteria

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
1. Identify and use applications of polymer materials	1.1 Identify typical applications for common polymer materials used in workplace processes 1.2 Recognise physical properties of common polymers and their applications in workplace processes 1.3 Use correct type and amount of additive according to manufacturer specifications and work health and safety regulations 1.4 Identify major impurities that have potential to impact, or have impacted, product and process 1.5 Apply corrective actions to remove or compensate for impurities

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
	according to operational, equipment and workplace procedures
2. Determine expected material properties from polymer type and grade	2.1 Identify relationships between polymer type and polymer characteristics to determine optimal job specifications 2.2 Identify relationships between polymer grade and degree of polymerisation to determine optimal job specifications 2.3 Identify the influence of polymer structure on properties to determine optimal job specifications
3. Solve process control variances related to polymer flow characteristics	3.1 Use polymer flow test methods and consider flow properties in process design 3.2 Use knowledge of causes of changes in state of the polymer to control critical process variances 3.3 Identify relationship between polymer flow and other polymer properties to assess and control process variances 3.4 Recognise incorrect polymer flow characteristics from process and product outputs 3.5 Recommend corrective actions for process control variances caused by polymer flow to relevant personnel
4. Solve process and product control variances related to heating and cooling of products and their associated materials	4.1 Recognise impact of polymer crosslinking on product output properties to amend process controls 4.2 Recognise impact of polymer crystallisation and crystal size on product output properties to amend process controls 4.3 Recognise impact of shrinkage on product output properties to amend process controls 4.4 Recognise impact of annealing on product output properties to amend process controls 4.5 Recognise process and product signs of incorrect heating/cooling to amend process controls 4.6 Recommend corrective actions for process control variances caused by heating to relevant personnel
5. Anticipate and solve process control variances related to polymer faults	5.1 Recognise and analyse existing or potential process control variances and their causes 5.2 Determine, prioritise and implement remedial and preventative actions based on identified issues and causes 5.3 Monitor process control variances and corrective actions taken

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
	until resolved 5.4 Accurately maintain records and logbooks

Foundation Skills

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

- Numeracy skills to manage measurements of materials and analyse production output results.
- Reading skills to interpret job and equipment specifications and workplace procedures.
- Writing and oral communication skills to record, report on and analyse production outputs and make recommendations for improvements.

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

Unit Mapping Information

Supersedes and is equivalent to PMBTECH301 Use materials and process knowledge to solve problems.

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 PMBTECH301E Optimise polymer processing operations

Modification History

Release 1. Unit code and title changed. Application changed. Elements and Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMBTECH301 Use materials and process knowledge to solve problems.

Performance Evidence

There must be evidence the candidate has completed the tasks outlined in the elements and performance criteria of this unit of competency, and demonstrated the ability to:

- optimise polymer processing operations at least once to achieve required production outputs.

Knowledge Evidence

There must be evidence the candidate has knowledge of:

- the principles of polymer processing operations, and functions of associated equipment
- production workflow sequences and materials demand
- types and application of common polymer materials and additives, including the effects of using the incorrect amount or type of additive
- structure of common polymers
- commonly accepted diagrammatic representations of polymer molecular shape and arrangement
- polymer properties related to flow, including:
 - molecular weight
 - molecular structure
 - factors effecting apparent viscosity
- polymer properties related to common polymer types and grades
- impact of common impurities on process and product
- the impact of temperature and heating or cooling rate on processing and properties
- characteristics of materials and their behaviour in relation to process conditions and stages of production
- key variables that may affect product quality and production output
- other typical and atypical process and product problems, including early warning signs, possible causes and corrective actions
- the distinguishing characteristics of causes of problems, and the application of problem analysis and problem-solving methods to polymer processing and polymer products
- organisational procedures relevant to the work environment or job role.

Assessment Conditions

Skills must have been demonstrated in the workplace or in a simulated environment that reflects workplace conditions and contingencies.

Assessors must satisfy the NVR/AQTF mandatory competency requirements for assessors.

Links

Companion Volume implementation guides are found in VETNet –

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