



Australian Government

PMBTECH505E Choose polymer materials for an application

Release: 1

PMBTECH505E Choose polymer materials for an application

Modification History

Release 1. Unit code changed. Application changed. Elements and Performance Criteria changed. Range of Conditions removed. Assessment Requirements changed. Supersedes and is equivalent to PMBTECH505 Choose polymer materials for an application.

Application

This unit covers the skills and knowledge required to choose polymer materials for an application for a new product or advanced process or product problem-solving.

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

The unit principally refers to the application of in-depth knowledge of materials, process, equipment and problem-solving to identify polymer structures and properties; determine possible modifications to polymer properties; select tests and interpret results; and select the materials for an application.

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

Pre-requisite Unit

PMBTECH401E Predict polymer properties and characteristics.

Competency Field

Technical.

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 polymer properties based on polymer type	1.1 Estimate molecular weight distribution changes with polymerisation mechanisms and conditions applied 1.2 Predict impact of monomer and polymer structure on polymer properties
2. Estimate polymer properties based on polymer structure	2.1 Predict property changes caused by polarity and intermolecular forces 2.2 Determine possible polymer properties based on chain flexibility variations caused by changes in regularity, tacticity and

Elements	Performance Criteria
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	intermolecular forces 2.3 Estimate polymer properties based on molecular weight or molecular weight distribution and degree of cross-linking 2.4 Predict barrier properties based on molecular orientation and degree of crystallisation
3. Choose a polymer compound for an application	3.1 Select appropriate base polymer or polymers for application based on the polymer properties 3.2 Determine reinforcements or additives required to meet product specification 3.3 Predict failure mechanism for selected compound and modify selection as required 3.4 Determine need for polymer compatibilisers and specify appropriate use as required 3.5 Develop formulation and select appropriate production methods that meet job specifications
4. Organise testing of polymer and interpret test results	4.1 Select appropriate test or tests for compounded polymer based on test purpose and limitations and material being tested 4.2 Test colour using colour coordinates as required to meet product specification 4.3 Interpret test results and modify formulation or production method as required to meet product specification

Foundation Skills

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

- Numeracy skills to collect and analyse numeric and chemical data.
- Reading skills to interpret product specifications and workplace procedures.
- Writing and oral communication skills to plan testing procedures and record and report on test results.

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 PMBTECH505 Choose polymer materials for an application.

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 PMBTECH505E Choose polymer materials for an application

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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:

- choose polymer materials for one application, to meet job and product specifications.

Knowledge Evidence

There must be evidence the candidate has knowledge of:

- polymerisation process
- polymer characteristics
- property changes caused by different mechanisms and conditions for addition polymerisation
- typical processing conditions for typical polymers, including polythene
- property changes caused by using bulk, suspension, solution and emulsion addition polymerisation
- property changes caused by different mechanisms for condensation polymerisation
- the formation and properties of cross-linked polymers
- impact of polymer structure and polymerisation process on polymer properties
- properties and applications of polymers
- the impact of tacticity on addition polymer properties
- the property changes caused by different copolymer structures
- the influence of molecular structure on chain regularity
- the difference between polymer reinforcements and polymer composites
- methods for polymer testing
- basic chemistry, including:
 - atomic structure
 - molecular weight
 - periodic table
 - ionic and covalent bonding
 - intermolecular bonding
 - hydrogen bonding
 - structure of organic compounds

- functional groups and typical reactions
- saturated and unsaturated compounds
- aromatic compounds
- hydrolysis
- addition reactions
- organisational procedures relevant to the work environment or job role
- hazards that may arise in the job or work environment, and:
 - their possible causes
 - potential consequences
 - appropriate risk controls.

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.

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