Australian Government

PMBTECH603E Design structural or mechanical polymer components

Release: 1

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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 PMBTECH603 Design structural/mechanical polymer components.

Application

This unit covers the skills and knowledge required to design a new product, or a component of a new product, that has a significant structural or mechanical requirement. It applies to polymer components including:

- structural components, e.g. support columns and beams in plastic playground equipment
- rigid beams and frames, e.g. in boat hulls and decks
- mechanical components subject to forces or transmitting mechanical power, e.g. gears and cams.

This unit applies to an advanced technologist, technical expert or those in similar roles, working in a lead technical role within a design team. The technologist is not required to demonstrate 'hands-on' operation of equipment as part of this competency.

The unit principally refers to the design of a new product with a significant structural or mechanical component, using the design technologist's application of their significant depth and breadth of knowledge of theoretical polymers, product and processes.

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

PMBTECH505E Choose polymer materials for an application.

Competency Field

Technical.

Elements and Performance Criteria

Elements Elements describe the essential outcomes.	**Performance Criteria** Performance criteria describe the performance needed to demonstrate achievement of the element.
1. Determine mechanical or structural design	1.1 Determine stress or strain requirements of product from product

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requirements	end-use specifications 1.2 Determine flexural or rigidity requirements of product from product end-use specifications 1.3 Determine required physical properties (size, shape and density) of product from product end-use specifications 1.4 Determine environmental requirements (physical, chemical and radiation) of product from product end-use specifications 1.5 Identify how component fits with entire product from product end-use specifications 1.6 Develop mechanical design brief and verify with relevant stakeholders and personnel
2. Select materials and additives, including reinforcing, appropriate for design brief	2.1 Select material or combination of materials with appropriate physical properties to meet product specifications 2.2 Select material or combination of materials with appropriate chemical properties to meet product specifications 2.3 Select material or combination of materials with appropriate radiation resistance properties to meet product specifications 2.4 Arrange for compounding and testing of possible materials to ensure product will meet specifications 2.5 Determine relevant properties of selected material or shortlisted materials from materials knowledge
3. Undertake mechanical design of component	3.1 Calculate size and shape or profile of component to meet design brief 3.2 Liaise with product developer to ensure delivery of required aesthetic aspects 3.3 Liaise with product developer or production to ensure efficiency in manufacture 3.4 Suggest modifications to material or compound of materials to optimise result
4. Design jointing, joining or other product interfaces	4.1 Liaise with designers of other components to ensure end product will meet specifications 4.2 Establish interface requirements, joints and joining with designers as appropriate 4.3 Design suitable interfaces to meet end-use requirements 4.4 Verify interface design meets end-use requirements without

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	sacrificing integrity
5. Finalise design	5.1 Check internal consistency of design against product specifications 5.2 Check overall design meets end-use requirements 5.3 Write accurate component specification based on final design 5.4 Liaise with product developer or production team to write production specification and procedures 5.5 Supervise manufacture and testing of prototypes or manufacturing trials 5.6 Finalise specifications and manufacturing processes and complete all reports 5.7 Ensure project records are complete and all required reports have been completed and submitted 5.8 Archive records according to workplace procedures

Foundation Skills

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

- Numeracy skills to develop and communicate product specifications including formulae, and record and analyse trial data.
- Reading skills to interpret required properties of product and workplace procedures.
- Writing and oral communication skills to work with stakeholders on product development, and record and report on trial results and finalise product design and associated procedures.

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 PMBTECH603 Design structural/mechanical polymer components.

Links

Companion Volume implementation guides are found in VETNet – - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=932aacef-7947-4c80-acc6-593719fe4090