



Australian Government

Department of Education, Employment and Workplace Relations

PMBPROD362B Produce gravity cast polyurethane products

Revision Number: 1

PMBPROD362B Produce gravity cast polyurethane products

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the production of components through the gravity casting of polyurethane into moulds. It applies to the plastics and rubber industry.

This competency is typically performed by all operators working either independently or as part of a work team.

Application of the Unit

Application of this unit

This competency applies to operators who prepare moulds and gravity casting equipment and gravity cast polyurethane. The key factors are the selection of the appropriate mould, maintenance of the correct temperature and ensuring there is no contamination of the materials.

It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- setting up the required moulds
- establishing correct mould temperatures
- preparing material prior to gravity casting
- gravity casting polyurethane
- curing products and stripping moulds
- identifying faults and adjusting the process
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking materials for conformity to job requirements
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding waste and scrap in accordance with workplace instructions
- solving routine and non-routine gravity casting equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit of competency has the prerequisite of *PMBPROD246B Hand mix materials*.

Employability Skills Information

Employability Skills

The required outcomes described in this unit contain applicable Employability Skills. The Employability Skills Summary of the qualification(s) in which this unit is packaged will assist in identifying Employability Skill requirements.

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. Prepare to gravity cast polyurethane materials.	1.1 Interpret materials specifications. 1.2 Identify required materials, including additives and curative. 1.3 Identify required equipment, including handling, control and material preparation equipment. 1.4 Identify materials and process hazards and plan for their elimination. 1.5 Locate and make ready appropriate safety equipment.
2. Plan gravity casting operations.	2.1 Confirm product and process parameters. 2.2 Ensure environmental controls are valid and in place according to procedures. 2.3 Identify product to be made and calculate quantity of material required to produce product of correct shape and physical dimensions. 2.4 Determine product colour and obtain appropriate agents. 2.5 Plan the sequence of events from availability of the material to stripping of the final product. 2.6 Identify appropriate measures to minimise risks from identified hazards.
3. Set up and check gravity casting equipment.	3.1 Set up equipment following procedures and confirm these are within recommended specifications. 3.2 Check time, de-gasser, temperature and allowable adjustments for conformity to documented procedures. 3.3 Check moulds for conformity with customer order and workplace operational requirements. 3.4 Report and discard or make adjustments for non-conforming materials in accordance with procedures. 3.5 Obtain appropriate mould coating and releasing agents.
4. Conduct gravity casting	4.1 Follow planned sequence and workplace

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.
operations.	procedures. 4.2 Ensure equipment operating temperatures and times are within specification. 4.3 Pour materials at the appropriate rate per minute and quantity using techniques to minimise air entrapment and aeration. 4.4 Check product quality, including thickness, weight and product integrity, against specifications. 4.5 Make adjustments to gravity casting equipment to remedy product non-conformity where applicable. 4.6 Produce required quantity of product, check for quality and place in holding areas. 4.7 Deal with material waste and scrap in accordance with workplace procedures. 4.8 Clean up equipment, store lubricants and manage waste in accordance with procedures.
5. Anticipate and solve problems	5.1 Recognise a problem or a potential problem. 5.2 Determine problems needing priority action. 5.3 Refer problems outside area of responsibility to appropriate person, with possible causes. 5.4 Seek information and assistance as required to solve problems. 5.5 Solve problems within area of responsibility. 5.6 Follow through items initiated until final resolution has occurred.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit. Application of knowledge of the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production. Knowledge of organization procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards. Competence includes the ability for the practical completion of the job to apply and/or explain:

- impact of incorrect or faulty materials
- production workflow sequences and materials demand
- focus of operation of work systems and equipment
- correct selection and use of equipment, materials, processes and procedures
- hazards of the materials and process and appropriate hazard control procedures
- products, materials and material characteristics
- behaviour of materials in relation to heat, pressure and time
- quality requirements at each production stage
- function and operating principles of centrifugal casting equipment and ancillary equipment
- impact of machine speed, temperature, pressure, time during cycles on product quality and production output
- the importance of machine set-up and warm-up for effective processing of materials
- safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
- the hierarchy of control including engineering controls
- impact of variations in raw materials and equipment operation in relation to final product
- changes to materials at various stages of production
- waste management and importance of non-conforming materials
- polymer properties and their interactions with process conditions
- relationships between polymer properties and process conditions
- changes to polymer properties to better suit process requirements.
- product problems related to polymer properties
- product problems related to process conditions
- adjustments to process conditions to meet polymer and product requirements.

Competence also includes the ability to:

- plan own work including predicting consequences and identifying improvements
- identify factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required
- distinguish between causes of faults.

Language, literacy and numeracy requirements

This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of completing workplace forms.

Basic numeracy is also required, eg to determine the percentage of rejects if 16 out of 65 products are failed at inspection.

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

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- identify critical materials properties and gravity casting process characteristics in relation to the process requirements and the end product.

Consistent performance should be demonstrated. For example, look to see that:

- production quality and output standards are met consistently
- the process runs consistently and smoothly.

Assessment method and context

Assessment will occur on an industrial gravity casting machine(s) equipment and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- on an operating plant allowing for operation under all normal and a range of abnormal conditions
- in a situation allowing for the generation of evidence of the ability to 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 applies to all polyurethane gravity casting within the plastics and rubber industries. It includes the operation of all relevant additional equipment where that equipment is integral to the polyurethane gravity casting process. This competency unit includes the use of both manually operated equipment and moulds and mechanized processes for longer production runs.

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.

Tools and equipment

This competency includes use of equipment and tools such as:

- moulds and dies
- surface coatings and stripping agents
- hoists/lifting equipment not requiring any special permits or licences
- hand tools such as spanners, wrenches and hammers
- temperature sensing equipment
- relevant personal protective equipment
- hand tools used in the gravity casting process
- material loading equipment used for loading of raw materials.

Hazards

Typical hazards include:

- spills/splashes
- noxious fumes/vapours
- hazardous materials
- manual handling hazards
- temperature hazards
- equipment operations.

Problems

'Anticipate and solve problems' means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/a solution recorded in the procedures.

Typical process and product problems may include:

- variations in materials
- contamination of materials
- mould or die problems
- temperature related difficulties
- product release difficulties
- machine malfunction
- mould/tooling problems processing problems
- excessive aeration of materials
- inadequately mixed materials.

Fault causes

Fault causes include:

- wrong raw materials/additives/curative
- incorrect quantity of materials/additives/curative
- contaminated materials/additives/curative
- variations in section thickness
- difficult product removal
- material 'shuts' and other material problems
- excessive aeration
- voids.

Variables

Key variables to be monitored include:

- operating temperatures
- speed of cure
- colour
- location of pouring basin
- cycle time
- use of separating agents
- product weight
- product integrity and general conformance to specification/sample.
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Unit Sector(s)

Not applicable.