



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **PMBPROD315C Produce polyurethane foam**

**Revision Number: 1**

## **PMBPROD315C Produce polyurethane foam**

### **Modification History**

Not applicable.

### **Unit Descriptor**

#### **Unit descriptor**

This competency covers the application of knowledge of materials, product purpose and processes to the production of polyurethane foam.

### **Application of the Unit**

#### **Application of this unit**

This competency applies to advanced operators producing polyurethane foam. The key factors are the adequate planning of the process stages, preparation of the equipment, checking on performance of the equipment and making approved adjustments and equipment corrections. This competency is typically performed by all operators working either independently or as part of a work team.

It includes:

- checking job sheets for work to be done and identifying the priority in which jobs/product will be made/completed
- ensuring appropriate raw materials are available
- ensuring the equipment and materials are appropriate for the job carrying out the process
- checking the outputs for conformance with specification
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are re-used where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine 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 has **no** prerequisites.

## 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.<br>Assessment of performance is to be consistent with the evidence guide. |

## Elements and Performance Criteria

| <b>ELEMENT</b><br><b>ELEMENT</b>                                  | <b>PERFORMANCE CRITERIA</b><br>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. Plan process stages for polyurethane foam production.          | 1.1 Plan the stages in the polyurethane foaming process and ensure these comply with the quality requirements for production.<br>1.2 Identify and allow for changes in materials at each stage of the polyurethane foaming process.<br>1.3 Plan the availability of the equipment and components for each production stage.<br>1.4 Anticipate the impact of the process on product characteristics and product quality and useability.<br>1.5 Plan work requirements based on procedures.                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 2. Identify work requirements for polyurethane foaming operations | 2.1 Prepare materials, including base raw materials and additives.<br>2.2 Recognise hazards and follow appropriate hazard control/minimisation methods.<br>2.3 Check materials, ancillary supplies and equipment are correct Check equipment and processes used for materials preparation, production process and for the downstream operations are available.<br>2.4 Check product quality requirements for the relevant process stage(s).<br>2.5 Identify and check emergency stops, gauges, guards and controls.<br>2.6 Plan the task sequences, including times and locations for product quality checks, equipment operation and required production outputs.<br>2.7 Provide for ongoing materials input, waste management and work area housekeeping requirements.<br>2.8 Arrange any required supplementary equipment for product quality testing or routine equipment maintenance and/or adjustments. |
| 3. Check polyurethane foaming process set-up                      | 3.1 Comply with equipment information, required quality specifications and set-up procedures.<br>3.2 Set up equipment in accordance with required quality specifications and standard operating procedures.<br>3.3 Check polyurethane foaming equipment settings and                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

| <b>ELEMENT</b><br>ELEMENT                                       | <b>PERFORMANCE CRITERIA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                 | Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                                 | <p>adjustments and conformity to documented procedures.</p> <p>3.4 Inspect materials for conformity with requirements including surface condition and materials thickness.</p> <p>3.5 Discard non-conforming materials or make adjustments to processing operations in accordance with procedures.</p>                                                                                                                                                                                                                                                                                                                           |
| 4. Operate and make adjustments as required to the foam process | <p>4.1 Start up, operate and shut down foam equipment as required by procedures.</p> <p>4.2 Monitor polyurethane foaming operations noting product quality, production outputs, equipment operating temperature, amperage, pressures, colour, thickness and product integrity.</p> <p>4.3 Make adjustments to remedy faults and non-conformity to production standards where applicable.</p> <p>4.4 Collect material which is able to be reprocessed and reused, and dispose of waste and scrap in accordance with workplace procedures.</p> <p>4.5 Clean up equipment, lubricate, and adjust in accordance with procedures.</p> |
| 5. Anticipate and solve problems                                | <p>5.1 Recognise a problem or a potential problem.</p> <p>5.2 Determine problems needing priority action.</p> <p>5.3 Refer problems outside area of responsibility to appropriate person, with possible causes.</p> <p>5.4 Seek information and assistance as required to solve problems.</p> <p>5.5 Solve problems within area of responsibility.</p> <p>5.6 Follow through items initiated until final resolution has occurred.</p>                                                                                                                                                                                            |

## 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:

- products, materials and material characteristics
- behaviour of materials in relation to heat, pressure and time
- impact of machine speed, temperature, pressure, time during cycles on product quality and production output
- 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
- 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
- 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.

Competency also includes the ability to:

- plan own work, including predicting consequences and identifying improvements
- maintain output and product quality using appropriate instruments, controls, test information and readings
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- identify and describe own role and role of others involved directly in the foam process
- 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.

### 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 that 16 units and 46 units are equal to a total of 62 units.

## 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 polyurethane foaming 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 polyurethane foam machine(s) equipment and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- on a processing 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 advanced operators working either independently or as part of a work team.

### Procedures

All operations are performed in accordance with procedures.

Procedures means 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:

- manual handling aids - hand carts and trolleys
- knives and other bag opening equipment
- hoists/lifting equipment not requiring any special permits or licences
- basic hand tools required for opening of material packaging
- relevant personal protective equipment
- material loading equipment used for loading of raw materials.

### Hazards

Typical hazards include:

- spills
- dusts/vapours
- slip and fall, particularly due to spilt granules
- temperature
- hazardous materials
- manual handling 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:

- machine malfunction
- out of specification equipment operation
- contamination of materials
- variations in materials and/or contamination of materials
- processing problems.

### Variables

Key variables to be monitored include:

- operating temperatures
- speed
- colour
- cushion specification
- cycle time
- output rate
- product weight
- product integrity and general conformance to specification/sample.
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## **Unit Sector(s)**

Not applicable.