



Australian Government

Department of Education, Employment and Workplace Relations

PMBPROD213B Operate extruders

Revision Number: 1

PMBPROD213B Operate extruders

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the routine operation of extrusion equipment. It applies to extrusion processes for pipe, sheet, profile, film, cable and rod and the extrusion of both plastics and rubber.

Application of the Unit

Application of this unit

This competency applies to operators who are required to apply knowledge of materials, product purposes and processes to the operation of extrusion equipment. The key factors are the making of products to meet quality standards and workplace requirements.

The operator will:

- check settings and adjustments of preset equipment
- check extruder operation and report process variations
- check materials for quality and conformity to product requirements
- perform emergency shut down of equipment
- purge line/cleaning line after product, grade or colour change.

This unit does not include

- start-up or routine shutdown of extruders (see *PMBPROD313B Produce extruded products*)
- die setting (see *PMBPREP304C Change equipment dies*)
- start up or routine shutdown of twin screw extruders used for compounding and extruding PVC materials (see *PMBPROD334A Produce products using twin screw extruders*).
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

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. Check work requirements.	1.1 Identify work requirements from production plan or request. 1.2 Check product, materials and equipment meet requirements for job(s). 1.3 Recognise requirements which may not be in accordance with usual practice. 1.4 Ask questions of appropriate person to confirm unusual practice. 1.5 Ensure housekeeping is to requirements. 1.6 Identify hazards associated with the job and take appropriate action. 1.7 Perform other pre-operational checks in accordance with procedures.
2. Operate extruder to procedures.	2.1 Check process is operating within required limits. 2.2 Check product is in specification and to required quality standard. 2.3 Ensure product is consistently ready for next operation. 2.4 Maintain supply of material(s) as required. 2.5 Complete logs and records as required. 2.6 Collect and segregate scrap, trim and other materials as required. 2.7 Keep equipment and work area clean. 2.8 Pause machine cycle and perform emergency stop, as required.
3. Change product/grade while operating as required.	3.1 Run down/purge outgoing grade/product to procedures. 3.2 Make changes specified in procedures for oncoming product/grade. 3.3 Introduce oncoming materials/grade and check oncoming product. 3.4 Undertake other actions as specified in procedures.
4. Respond to routine problems to procedures.	4.1 Recognise known faults that occur during the operation. 4.2 Identify and take action on causes of routine faults.

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	4.3 Log problems as required. 4.4 Identify non-routine process and quality problems and take appropriate action.

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 out of specification products, process problems and materials faults.

Knowledge of organisation procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

Application of the knowledge of managing risks using the hierarchy of controls applied to the extrusion process. Application of approved hazard control, safety procedures and the use of PPE in relation to handling materials, equipment operation and clean-up.

Knowledge of and skills in the operation of extrusion equipment and main components sufficient for consistent production of quality products, including:

- production work-flow sequences and materials demand
- the reasons for checking process control panels and reporting readings which are outside of normal range of process variability
- accurately monitoring equipment operation and product quality
- the potential effects of variations in raw materials and equipment operation in relation to quality of product
- the relationship between the type of extruder and the materials being extruded
- processing behaviour of polymers and the role of additives
- waste management and knowing the importance of reusing non-conforming products wherever possible
- correct selection and use of equipment, materials, processes and procedures
- explain the effect of unauthorised or emergency shutdown in relation to safety and production requirements
- identify factors which may affect product quality or production output and appropriate remedies.

Competence also includes the ability to:

- plan own work, including predicting consequences and identifying improvements
- identify when the operator is able to rectify faults, when assistance is required and who is the appropriate source for assistance
- identify and describe own role and role of others involved directly in the extrusion process.

Language, literacy and numeracy requirements

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

Writing is required to the level of completing workplace forms.

Basic numeracy is required, eg to determine that two 25 kg bags are needed to make up a requirement for 50 kg.

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:

- recognise the importance of material properties and qualities
- apply approved procedures
- take appropriate action to resolve faults or report faults to appropriate personnel
- explain and implement emergency shutdown procedures.

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

- extrusion production standards are met consistently
- upstream and downstream communication is timely and effective operating procedures and work instructions are read and interpreted correctly
- problems are identified and appropriate action is taken (ie the problem is fixed or reported)
- all safety procedures are followed.

Assessment method and context

It is preferred that assessment takes place on an industrial extruder in a work environment. Competence in this unit may be assessed:

- by using an appropriate, industrialextruder
- 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 work environments and sectors within the plastics, rubber and cabling sectors. It includes the operation of all relevant ancillary equipment where that equipment is integral to the extrusion process.

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.

Products

These may include:

- rod
- sheet
- film
- profile
- tread profile
- cable.

Competence under this competency unit is only required in one process.

Materials

This unit applies to most plastic and rubber materials, including compounded PVC fed to the extruder as pellets. It does not apply to dry blended PVC powder (refer to *PMBPROD334A*).

Tools and equipment

This competency includes use of equipment and tools such as:

- extruder equipment and components such as main drive, gearbox, thrust assembly, adapter, gate, breaker plate, screen pack, doser, screw/s, barrel, heaters, thermocouples
- extruders, either single or twin screw
- extrusion dies - rod, sheet, film, pipe, profile, tread profile and cable auxiliary equipment - water pump, feeders, hopper loader, pelletiser, dehumidifiers, etc
- tools for taking samples
- relevant personal protective equipment.

Hazards

Typical hazards include:

- vapours
- burns
- moving equipment
- hazardous materials

- manual handling hazards.

Problems

Respond to 'routine problems' means 'apply known solutions to a variety of predictable problems'. Typical process and product problems may include:

- equipment malfunction
- variations in materials
- contamination of materials or additives
- temperature/speed variations
- routine product extrusion faults - dimensions, surface appearance, colour, deformations
- incorrect quantity of materials.

Variables

Key variables to be monitored include:

- differences between actual and set temperatures
- speeds, including screw speed and haul-off
- colour and uniformity
- surface finish and appearance
- product finished thickness
- output rate
- product integrity and general conformance to specification/sample.
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Unit Sector(s)

Not applicable.