



Australian Government

Department of Education, Employment and Workplace Relations

PMAOPS211B Operate manufacturing extruders

Revision Number: 1

PMAOPS211B Operate manufacturing extruders

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the operation of extruders which produce plastic granules/pellets from polymer resin and similar extrusions, eg powder coating resin. It includes the operation of equipment ancillary to the extruder, including that used for adding masterbatch and other additives.
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Application of the Unit

Application of the unit	In this competency, the operator would operate an extruder and its associated equipment, such as the input and output feeder systems or cooling systems. This includes starting up and shutting down the system, building the extrusion rate up correctly after start up, and then monitoring the system to maintain the required output rate and quality. This requires the operator to have a good understanding of the effect of adjustments (eg barrel temperature) on the extrusion process. The operator would make appropriate adjustments as required to ensure the product quality meets specifications, output meets schedule and to minimise potential problems with the process. In this competency, the operator would: • make changes to the extruder system such as change the production rate or change the specifications of the output product • perform cleaning and minor maintenance on the extruder system in accordance with procedures • identify and control hazards related to manufacturing extruders and surrounding areas. Generally the operator would be part of a team during start up and shut down procedures and would be expected to be capable of demonstrating competence in all parts of this unit. At all times they would be liaising and cooperating with other members of the team.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		
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Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Start up extruder systems.	1.1. Perform pre-start-up checks 1.2. Start up individual items of equipment, and the entire extrusion system 1.3. Start up system after maintenance 1.4. Build up extrusion rate steadily 1.5. Produce output at specified rate and quality within minimum time.
2. Monitor and control the extrusion process.	2.1. Complete routine checks, logs and paperwork 2.2. Inspect pellet/granule properties, and recognise and correct problems 2.3. Monitor stock levels of feeds and products and take action to maintain production schedule and quality 2.4. Adjust plant to achieve required output rate and quality with maximum plant efficiency.
3. Change production rates and/or product grade/specification.	3.1. Predict from rates and schedule when a transition will be required 3.2. Manage transitions smoothly and in a timely manner 3.3. Minimise scrap/off grade as a result of a transition.
4. Carry out maintenance procedures	4.1. Isolate extrusion equipment and prepare for maintenance as required 4.2. Test safety trips and alarms 4.3. Complete minor maintenance according to procedures 4.4. Receive plant back from maintenance 4.5. Prepare plant for the introduction of polymer and additives 4.6. Return plant to operation.
5. Shut down extrusion systems.	5.1. Determine type of shut down required 5.2. Give advance warning of shut down where appropriate 5.3. Change over individual items of equipment 5.4. Shut down individual items of equipment and the entire extrusion system 5.5. Perform an emergency shut down when required 5.6. Reset trips and alarms after a shut down and leave plant in a condition ready to restart 5.7. Shut down for maintenance when required.

ELEMENT	PERFORMANCE CRITERIA
6. Clean extruder.	6.1. Identify cleaning requirements 6.2. Clean extrusion equipment to requirements according to procedures.
7. Control hazards.	7.1. Identify hazards in work area and with equipment 7.2. Assess risks arising from those hazards 7.3. Take appropriate action to control risks in accordance with procedures and duty of care.
8. Respond to extruder problems.	8.1. Monitor plant frequently and critically throughout shift using measured/indicated data and senses (sight, hearing etc) as appropriate. 8.2. Recognise operational problems 8.3. Analyse cause of operational problems within scope of skill level 8.4. Take timely and appropriate action to solve operational problems.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills

The ability to distinguish between types and causes of problems as relevant to the practical operation of equipment at the job level.

Required knowledge

A comprehensive understanding of extrusion equipment principles and typical problems to a level needed to control the operation, and recognise and resolve operational problems. In particular it includes a knowledge of:

- all items on a schematic of the extruder and the function of each
- principles of operation of equipment
- physics of operation, including effects of temperature and pressure
- properties of materials being extruded
- temperature and viscosity effects
- isolating a problem to an item of equipment
- methods of resolving problems.

This knowledge is required of all major items of equipment which comprise the extrusion system.

Evidence Guide

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 the Training Package.

Overview of assessment

Assessment for this unit of competency will be on an operating plant. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation.

Simulation may be required to allow for timely assessment of parts of this unit of competency (eg Elements 3 and 4). Simulation should be based on the actual plant and will include walk-throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios and role plays.

This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of what-if scenarios both on the plant (during demonstration of normal operations and walk throughs of abnormal operations) and off the plant.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action. The emphasis should be on the ability to stay out of trouble rather than on recovery from a disaster.

Consistent performance should be demonstrated. In particular look to see that:

- early warning signs of equipment/processes needing attention or with potential problems are recognised
- the range of possible causes can be identified and analysed and the most likely cause determined
- appropriate action is taken to ensure a timely return to full performance
- obvious problems in related plant areas are recognised and an appropriate contribution made to their solution.

These aspects may be best assessed using a range of scenarios/case studies/what-ifs as the stimulus with a

EVIDENCE GUIDE	
	walk through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations which may have been generated from the past incident history of the plant, incidents on similar plants around the world, hazard analysis activities and similar sources.
Context of and specific resources for assessment	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork and communication units. For many plants, it might be appropriate for this unit to be assessed with: • <i>PMAOPS210B Operate particulates processing equipment</i> • <i>MSAPMSUP210A Process and record information.</i> In a major hazard facility, it may be appropriate to assess this unit concurrently with: • <i>MSAPMOHS200A Work safely.</i>
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the communication ability, language and literacy capacity of the assessee and the work being performed.

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. Bold italicised wording, if used in the Performance Criteria, is detailed below. 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.

Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	This competency unit includes all items of equipment and unit operations which form part of the extrusion system. Typically this will include: • additive (including masterbatch) systems • granule/pellet cutting and cooling systems • barrel/head heating and cooling systems.
Problems	It could also include other equipment as well as the extruder itself. It includes the operation of equipment ancillary to the extruder, including that used for adding masterbatch and other additives. Typical problems include: • knife/blade/cutter adjustment • screen pack preparation and changes • granule/pellet properties not to specification • granule/pellet cooling systems etc.
Procedures	All operations are performed in accordance with procedures.
Health, safety and environment (HSE)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Unit sector	Operational/technical
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Competency field

Competency field	
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Co-requisite units

Co-requisite units		
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