Australian Government

Department of Education, Employment and Workplace Relations

PMC553040C Set up and optimise glass forming process

Revision Number: 1

PMC553040C Set up and optimise glass forming process

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the setting up and tuning of the glass forming process including technical fault finding and non-routine problem solving, emergency recovery, optimising the process to gain maximum yield, and detailed knowledge of forming process.

Application of the Unit

Application of the unit	This unit of competency applies to experienced operators, leading hands or supervisors who are responsible for setting up and adjusting the glass forming process from the requirements as set out in production schedules and specifications. The operator is able to run trials and adjust all of the equipment settings to have the production equipment perform satisfactorily. This unit does NOT apply to the set up and optimisation of secondary glass furnace processes, which is covered by *PMC553041C Set up and optimise glass furnace process*. Typically an operator would: • set up, monitor and tune equipment for optimum performance • identify and rectify routine and non-routine operational problems • adjust and optimise processes to gain maximum yield • undertake detailed quality measurements and inspections • implement emergency recovery • undertake housekeeping • complete records and logs. This competency is typically performed by operators working either independently or as part of a work team. At all times they would be liaising with other members of the team.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

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.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for equipment installation	1.1. Determine the product to be manufactured 1.2. Ensure that the equipment change parts, ancillaries and fixtures are available as required 1.3. Perform pre-instalment equipment preparation according to procedures 1.4. Ensure that the equipment is in a safe condition for use
2. Remove current equipment and/or tooling	2.1. Identify and implement all safety and emergency procedures 2.2. Shut down equipment in accordance with procedures. 2.3. Isolate equipment as per procedures 2.4. Remove ancillary equipment in accordance with procedures 2.5. Complete records and logs for removal of current equipment
3. Install and setup new equipment and/or tooling	3.1. Perform required checks and tests prior to installation 3.2. Identify any faults in equipment/tooling and take appropriate action 3.3. Install and set up appropriate ancillary equipment in accordance with procedures 3.4. Set up equipment/tooling as required 3.5. Monitor and adjust until production is as required
4. Monitor, interpret data and adjust operation	4.1. Monitor process data 4.2. Ensure forming equipment startup function complies with work instructions 4.3. Operate glass forming equipment in accordance with procedures 4.4. Monitor plant and process and deduce conditions of materials in process and products being made 4.5. Take appropriate action to improve process operation 4.6. Check that process operation has improved 4.7. Monitor and adjust until production is as required
5. Sample test and record product data	5.1. Sample as required by the product and in line with enterprise requirements 5.2. Complete appropriate test to enterprise and client requirements

ELEMENT	PERFORMANCE CRITERIA
	5.3. Identify variations from process parameters and take appropriate action 5.4. Measure/graph and record operating parameters, according to enterprise requirements 5.5. Record test results as required by procedures
6. Rectify equipment and quality problems	6.1. Identify the range of equipment and quality faults that can occur during the operation 6.2. Diagnose possible causes of equipment and quality faults 6.3. Rectify cause of equipment failure and quality faults by established enterprise procedures 6.4. Identify and rectify equipment failure causes in accordance with established enterprise procedures 6.5. Ensure appropriate records and logs of equipment operations are maintained to meet enterprise requirements 6.6. Identify non-routine problems and report to designated person
7. Shut down equipment	7.1. Shut down equipment in accordance with procedures 7.2. Complete appropriate records and logs 7.3. Shut down equipment in an emergency situation
8. Prepare equipment for maintenance	8.1. Isolate equipment in accordance with work instructions 8.2. Make sure area is clear and safe for maintenance 8.3. Complete all records and logs
9. Control hazards	9.1. Identify hazards from the job to be done 9.2. Identify other hazards in the work area 9.3. Assess the risks arising from those hazards 9.4. Implement measures to control those risks in line with procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- recognising process conditions which will lead to out of specification production
- implementing the enterprise's standard procedures and work instructions and relevant regulatory requirements in a manner relevant to the operation of the process
- reading and numeracy to interpret workplace documents and technical information

Required knowledge

Required knowledge includes:

- composition and nature of the glass
- setup and tuning of all equipment
- startup and shutdown processes
- optimisation of process for yield maximisation
- energy utilisation
- importance of atmospheric conditions and effect on process
- construction and limitations of the equipment
- out of specification situations
- quality problems
- distinguish between causes of problems, such as:
  - raw materials
  - mould equipment
  - variables
  - mechanical and thermal
  - electrical/instrument
  - atmospheric

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, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	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.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that the equipment be understood and that the importance of critical material properties, settings and readings is known. 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: • setup/tuning is completed to specifications • temperature and pressures are maintained within limits • adjustments made are completed in a timely manner in accordance with procedures/work instructions • quality is monitored to minimise wastage • startup and shutdown occur first time • early warning signs of equipment/processes needing attention or potential problems are recognised and dealt with in a timely manner • process measurements are continually made or observed • the range of possible causes can be identified and the most likely cause determined • appropriate action is taken to ensure a timely return to full performance • obvious problems to related plant areas are recognised and an appropriate contribution made to their solution. Competence must be demonstrated in the operation of all ancillary equipment to the level required for this unit of competency.
Context of and specific resources for	Assessment will require access to an operating plant over

EVIDENCE GUIDE	
assessment	an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation. Simulation or case studies/scenarios may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual plant and will include 'walk-throughs' of the relevant competency components. A bank of scenarios/case studies/what ifs and questions will be required to probe the reasoning behind observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork and communication units. Individual enterprises may choose to add prerequisites and co-requisites relevant to their processes.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate 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. 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) may also be included.	
Procedures	All operations are performed in accordance with standard procedures and work instructions
Product to be made	The product to be made may be determined by consulting the production schedule or similar means
Required setup	Required setup includes: • alignment of all equipment • checks and adjustments according to product specifications and procedures • production schedule requirements
Monitoring	Monitoring includes analysing and interpreting data for: • variations • fluctuations • trends with a view to establishing stable, efficient operation producing goods as required
Process data	Process data include that from: • equipment • instruments • control panels • test results
Appropriate action	Appropriate action includes adjusting: • temperature controls • equipments settings • process conditions to ensure process parameters are maintained to job specifications

RANGE STATEMENT	
Records	Records may be in: • hard copy • electronic form
Application of equipment:	This unit includes equipment applicable to forming glass in each of the specific areas of glass products manufacture: • flat glass • insulation, glass wool insulation, laminated blankets, roll and boards • fibreglass and glass filaments • packaging, bottles and jars

Tools and equipment	Tools and equipment may include:
	• forming and associated equipment such as:
	  • bushings
	  • finshields
	  • applicators
	  • shoe and winder assemblies
	  • spinners
	  • lapping equipment
	  • process water
	  • lehr
	  • furnace
	  • forehearth
	  • bath
	  • fiberisers
	• computers
	• measuring and recording equipment
	• communication equipment
	• hand tools
	• safety clothing and equipment

Process	The process includes: • setting up, monitoring and tuning equipment for optimum performance especially during startup, job change and equipment changes
Typical problems	Typical problems may include: • raw materials supply • equipment alignment

RANGE STATEMENT	
	• analysis of all plant data • control of temperature within specification • product quality • equipment speed • taking corrective action
Plant data	Plant data may include: • test results • instrument/control panel information • data from physical senses (sight, sound and hearing) • temperatures, pressures, material flow and discharge rates and effects • variations to chemical reactions/material modifications
Occupational health and safety (**OHS**)	All operations are subject to stringent OHS requirements and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and OHS requirements, the OHS requirements take precedence

Unit Sector(s)

Unit sector	Operational/technical

Competency field

Competency field	

Co-requisite units

Co-requisite units		

Co-requisite units		