



**Australian Government**

# **PMC553040 Set up and optimise glass forming process**

**Release: 1**

# PMC553040 Set up and optimise glass forming process

## Modification History

Release 1. Supersedes and is equivalent to PMC553040C Set up and optimise glass forming process

## Application

This unit of competency covers the skills and knowledge required to set up and optimise a glass forming process. It applies to forming of glass as typically used in production of flat glass, glass containers and glass fibre products.

This unit of competency applies to experienced operators, leading hands, supervisors or those in similar roles who are required to perform shutdown and isolation procedures, prepare and set up equipment, perform changeovers, make adjustments to optimise process, remedy faults/non-conformity and solve problems within area of responsibility.

This unit of competency applies to an experienced operator demonstrating theoretical and technical knowledge and well developed skills in situations that require some discretion and judgement. The experienced operator may work alone or as a member of a team or group and will work in liaison with other shift team members, team leader and supervisor, as appropriate.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

Nil

## Competency Field

Operations

## Unit Sector

Not applicable

## Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

|   |                                           |     |                                                                                            |
|---|-------------------------------------------|-----|--------------------------------------------------------------------------------------------|
| 1 | <b>Prepare for equipment installation</b> | 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-installment equipment preparation according to procedures                           |
|   |                                                        | 1.4 | Ensure that the equipment is in a safe condition for use                                        |
| 2 | <b>Remove current equipment and/or tooling</b>         | 2.1 | Identify and implement all safety and emergency procedures                                      |
|   |                                                        | 2.2 | Shut down equipment in accordance with procedures                                               |
|   |                                                        | 2.3 | Isolate equipment in accordance with procedures                                                 |
|   |                                                        | 2.4 | Remove ancillary equipment in accordance with procedures                                        |
|   |                                                        | 2.5 | Complete records and logs for removal of current equipment                                      |
| 3 | <b>Install and set up new equipment and/or tooling</b> | 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 | <b>Monitor, interpret data and adjust operation</b>    | 4.1 | Monitor process data                                                                            |
|   |                                                        | 4.2 | Ensure forming equipment start-up 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                                                         |
|   |                                               | 4.8  |                                                                                                            |
|   |                                               | 4.9  |                                                                                                            |
|   |                                               | 4.10 |                                                                                                            |
| 5 | <b>Sample, test and record product data</b>   | 5.1  | Sample as required by the product and in line with enterprise requirements                                 |
|   |                                               | 5.2  | Complete appropriate test to enterprise and client requirements                                            |
|   |                                               | 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 | <b>Rectify equipment and quality problems</b> | 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 | <b>Shut down equipment</b>                    | 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 | <b>Prepare equipment for maintenance</b> | 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 | <b>Control hazards</b>                   | 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 |

## Foundation Skills

This section describes those required skills (language, literacy and numeracy) that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

**Regulatory framework** The latest version of all legislation, regulations, industry codes of practice and Australian/international standards, or the version specified by the local regulatory authority, must be used.

Applicable legislation, regulations, standards and codes of practice include:

- health, safety and environmental (HSE) legislation, regulations and codes of practice relevant to the workplace, equipment and production processes and hazardous materials
- Australian/international standards relevant to the materials being used and products being made

- any relevant licence and certification requirements.

All operations to which this unit applies are subject to stringent HSE requirements, which may be imposed through state/territory or federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and such requirements the legislative requirements take precedence.

**Procedures** All operations must be performed in accordance with relevant procedures.

Procedures are written, verbal, visual, computer-based or in some other form, and include one or any combination of:

- manufacturer's technical information
- job cards
- drawings
- emergency procedures
- work instructions
- standard operating procedures (SOPs)
- safe work method statements (SWMS)
- formulas/recipes
- batch sheets
- temporary instructions
- any similar instructions provided for the smooth running of the plant.

**Hazards** Hazards must be identified and controlled. Identifying hazards requires consideration of:

- heat, smoke, dust, vapours or other atmospheric hazards
- weight, shape, volume of materials to be handled
- hazardous products and materials
- sharp edges, protrusions or obstructions
- slippery surfaces, spills or leaks
- electricity
- gas
- gases and liquids under pressure
- noise
- rotational equipment or vibration
- plant services (steam, condensate, cooling water, etc)
- structural hazards
- equipment failures

- machinery, equipment and product mass
- limited head spaces or overhangs
- working at heights
- working in restricted or confined spaces
- other hazards that might arise

**Problems** Routine and non-routine problems must be resolved.

Routine problems are predictable and have known solutions and include one or more of:

- raw materials supply
- equipment alignment
- out-of-specification settings (e.g. temperature and speed)
- product quality problems.

Non-routine problems are unexpected problems or variations of previous problems.

Non-routine problems must be resolved by applying operational knowledge to develop new solutions, either individually or in collaboration with relevant experts, to:

- determine problems needing action
- determine possible fault causes
- develop solutions to problems which do not have a known solution
- follow through items initiated until final resolution has occurred
- report problems outside area of responsibility to designated person.

Operational knowledge includes one or more of:

- procedures
- training
- technical information, such as journals and engineering specifications
- remembered experience
- relevant knowledge obtained from appropriate people.

**Records and reports** Records include one or more of:

- log books/sheets
- electronic records
- job/work sheets

- other records used for the smooth running of the plant.

Reports include one or more of:

- paper or electronic-based logs and reports
- verbal/radio reports
- reporting items found which require action.

### **Tools and equipment**

Tools and equipment include:

- glass forming equipment as used to make one or more of:
  - flat glass
  - insulation, glass wool insulation, laminated blankets or roll and boards
  - fibreglass or glass filaments
  - packaging, bottles or jars
- ancillary equipment that is integral to the process
- measuring and recording equipment.

## **Unit Mapping Information**

Release 1. Supersedes and is equivalent to PMC553040C Set up and optimise glass forming process

## **Links**

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=45a7f1d5-61a5-447a-9688-7abbd7e1a5c7>

# Assessment Requirements for PMC553040 Set up and optimise glass forming process

## Modification History

Release 1. Supersedes and is equivalent to PMC553040C Set up and optimise glass forming process

## Performance Evidence

Must provide evidence that demonstrates knowledge relevant to their job sufficient to operate independently and to solve routine and non-routine problems including knowledge of:

- read and interpret procedures, job specifications, production schedules, test results, instruments/control panels, material labels and safety data sheets (SDS)
- install and set up equipment to process specifications
- perform pre-start checks, start-up/shutdown procedures and isolations
- monitor key variables, including:
  - installation and performance of equipment/tooling
  - process parameters
  - yield
  - energy utilisation
  - variations
  - fluctuations
  - trends
  - material properties/chemical reactions
  - product integrity and general conformance to specification
- use tests, process data and own senses to monitor plant and maximise performance
- make adjustments to equipment settings, process conditions and/or raw materials to bring production into specification
- identify hazards and apply relevant hazard controls
- apply safety procedures
- recognise early warning signs of equipment/processes needing attention or with potential problems
- distinguish between causes of problems, including:
  - instrument failure/malfunction
  - electrical/mechanical failure/malfunction
  - wrong readings
  - material variations/contamination
  - process abnormalities
  - procedural errors
  - atmospheric conditions

- recognise and prioritise problems requiring action
- resolve routine and non-routine problems
- communicate effectively with team/work group and supervisors
- complete workplace records
- calculate and interpret process conditions, performance and trends.

## Knowledge Evidence

Must provide evidence that demonstrates knowledge relevant to their job sufficient to operate independently and to solve routine and non-routine problems, including knowledge of:

- principles of glass forming process
- functions, limitations and principles of operation of glass forming and ancillary equipment being used
- impact of variations in equipment settings, process conditions and raw materials on product quality, production output and optimisation of process
- factors which may affect product quality or production output and appropriate remedies
- physics and chemistry relevant to the equipment/process/materials
- importance of atmospheric conditions and effect on process
- characteristics of materials being processed and their behaviour in relation to process conditions and stages of production
- quality requirements at each stage of production
- common adjustments in process variables and their impact on product quality and production output
- start-up and shutdown processes
- routine and non-routine problems that may arise, the range of possible causes and appropriate actions
- organisation procedures relevant to the work environment/job role
- hierarchy of control
- hazards that may arise in the job/work environment and:
  - their possible causes
  - potential consequences
  - appropriate risk controls.

## Assessment Conditions

- The unit should be assessed holistically and the judgement of competence shall be based on a holistic assessment of the evidence.
- The collection of performance evidence:
  - should occur over a range of situations which include typical disruptions to normal, smooth operation of an operating plant

- will typically include a supervisor/third-party report or other evidence, focusing on consistent performance and problem recognition and solving. A supervisor/third-party report must be prepared by someone who has a direct, relevant, current relationship with the person being assessed and who is in a position to form a judgement on workplace performance relevant to the unit of competency
- must include the use of an appropriate industrial item/s of equipment requiring demonstration of operation, start-up and shutdown procedures and responding to problems
- may use industry-based simulation for all or part of the unit particularly where safety, lack of opportunity or significant cost is an issue.
- Assessment should occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions. This must cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.
- Assessment in a simulated environment should use evidence collected from demonstration of skills and one or more of:
  - walk-throughs
  - pilot plant operation
  - industry-based case studies/scenarios
  - 'what ifs'.
- Knowledge evidence may be collected concurrently with performance evidence (provided a record is kept) or through an independent process such as workbooks, written assessments or interviews (provided a record is kept).
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications associated with this unit.
- The regulatory framework will be reflected in workplace policies and procedures and is not required to be independently assessed.
- Foundation skills are integral to competent performance of the unit and should not be assessed separately.
- Assessors must satisfy the assessor competency requirements that are in place at the time of the assessment as set by the VET regulator.
- In addition the assessor or anyone acting in subject matter expert role in assessment shall demonstrate both technical competency and currency. If the assessor cannot demonstrate technical competency and currency they shall assess with a subject matter expert who does meet these requirements.
- Technical competence can be demonstrated through one or more of:
  - relevant VET or other qualification/Statement of Attainment
  - appropriate workplace experience undertaking the type of work being assessed under routine and non-routine conditions

- appropriate workplace experience supervising/evaluating the type of work being assessed under routine and non-routine conditions
- Currency can be demonstrated through one or more of:
  - being currently employed undertaking the type of work being assessed
  - being employed by the organisation undertaking the type of work being assessed and having maintained currency in accordance with that organisation's policies and procedures
  - having consulted/had contact with an organisation undertaking the type of work being assessed within the last twelve months, the consultation/contact being related to assessment
  - conducting on the job training/assessments of the type of work being assessed
  - being an active member of a relevant professional body and participating in activities relevant to the assessment of this type of work.

## Links

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