



SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

In accordance with regulation 24(c) of the National Standards Bodies Regulations of 28 March 1998, the Standards Generating Body (SGB) for

Manufacturing and Engineering

Registered by NSB 06, Manufacturing, Engineering and Technology, publishes the following unit standards for public comment.

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the unit standard. The unit standard can be accessed via the SAQA web-site at www.saqa.org.za. Copies may also be obtained from the Directorate of Standards Setting and Development at the SAQA offices, Hatfield Forum West, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the unit standards should reach SAQA at the address *below and no later than 5 April 2004*. All correspondence should be marked **Standards Setting – SGB for Engineering** and addressed to

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY



Title	National Certificate in Molten Glass Production
Field:	Engineering, Manufacturing and Technology
Sub-field:	Manufacturing and Assembly
Level:	3
Credit:	120
Issue date:	
Review date:	

Rationale of the qualification

Typical learners are operating personnel working in a glass manufacturing company. The glass industry is well established in South Africa and its success is dependant upon the efficient production of molten glass. Achievement of this objective is largely dependant upon the competence, recognised by this qualification, of the people who operate integrated batch and melting plants. An adequate number of people with these skills are needed to ensure that the production units in South Africa operate productively.

Competence in operating molten glass production plants requires appropriate general, glass specific technical & other knowledge and its application; expertise in operating production equipment and controlling a production plant. This knowledge and expertise can form a basis for further learning particularly in the production/operational, engineering and supervisory aspects of glass manufacturing and similar industries in the chemical and other sectors.

The learners are expected to benefit by enhanced career opportunities and earning potential that will also benefit the local community and the economy.

Purpose of the purpose

This qualification is used to recognise the competence of people to operate and control integrated batching & melting plants. This includes competence in operating a furnace as described below and of batch mixing which is assumed to be in place.

This competence provides the foundation needed to take responsibility or a significant operation in the industry. It also provides the basis upon which further related learning and career development can take place.

Through the employment of competent operating personnel, employers and in turn the field and sub-field have confidence that this critical work in the industry is efficiently carried out.

Social development and economic transformation are enhanced through efficient production, and career development and personal job satisfaction of operating personnel are facilitated through the learning process used to achieve the competency specified.

Access to the Qualification

This qualification is open to any one who has access to learning opportunities and meets the physical prescriptions for safety and health when working in this environment.

Learning assumed to be in place

Most learners accessing this qualification will be competent in operating a batch mixing facility as found in an integrated glass or equivalent operation. They will also have expertise in operating equipment in a production or manufacturing environment and in the application of process related technology in these operations.

When learners do not have this learning assumed to be in place, appropriate adjustments to the learning process are required.

Exit level Outcomes

Exit level Outcome 1: Explain and use technology related to the production of molten glass

Associated assessment criteria

- 1.1 Solve problems relating to process, production, people, cost environment safety & health in molten glass production using technology and related mathematics
- 1.2 Use information technology to monitor, control and communicate process and production related matters
- 1.3 Use information technology for calculations and data processing when interpreting production related information
- 1.4 Communicate with relevant personnel using appropriate methods and techniques

Exit Level Outcome 2: Operate a glass-melting furnace

Associated assessment criteria

- 2.1 Where applicable, start and stop a glass melting operation
- 2.2 Maintain normal production conditions in a furnace
- 2.3 Respond to abnormal and emergency conditions when operating a furnace
- 2.4 Re-establish normal operating conditions following abnormal or emergency conditions

Exit Level Outcome 3: Control an integrated melting process

- 3.1 Comply with legal and site specific health safety and environmental requirements operating procedures
- 3.2 Control and or execute batch preparation and melting activities in accordance with standard operating procedures
- 3.3 Address hazardous and emergency situations in accordance with standard operating procedures
- 3.4 Communicate information as required to produce molten glass

International comparability

The New Zealand Qualification Authority does not address the production of molten glass. The Vocational Quality Authority in the United Kingdom has similar outcomes based unit standards but there appears to be less emphasis on the application of technology regarding the production, quality assurance and environmental and economic issues related to molten glass production. The level and size of the learning is similar to those described in the South African unit standards making up this qualification.

Integrated Assessment

The applied competence (practical, foundational and reflexive competencies) of this qualification will be achieved if a candidate is able to operate and equipment in a chemical manufacturing environment, maintain quality control practices, demonstrate knowledge of chemical operations technology and perform basic maintenance functions.

Appropriate methods and tools must be used to assess practical, foundational and reflexive competence of the learner in all the exit level outcomes listed above, as well as to determine a learner's ability to solve problems, work in a team, organize him/herself, use applied science, and understand the implications of actions and reactions in the world as a set of related systems. Such an assessment process will determine development of the whole person, and the integration of applied knowledge and skills.

Assessors should develop, conduct, and ensure integration of, assessment by making use of a range of formative and summative assessment methods against the unit standards that make up the qualification. Combinations of applied, foundational and reflective competencies, including critical cross-field outcomes, should be assessed wherever possible.

Moderators should ensure that assessment is valid, consistent and integrated into work or learning, and that there is sufficient and authenticated evidence of learner competence against the whole qualification.

Range statements

This qualification addresses the production of molten glass using a furnace that is operated on a continuous basis, semi-continuous basis or a non-continuous basis.

The furnace may have electrical (arc), gas and or other heating systems and any appropriate feed, extraction and ventilation/extraction systems).

Technology relating to the melting of glass includes communication, mathematics, applied science, industry specific technology and information technology.

This qualification maybe applicable to other melting or pyrometallurgical operations. This is subject to its acceptance by appropriate subject matter experts.

Critical Cross-field Outcomes

Critical cross-field outcomes are addressed in the exit level outcomes as follows (the numbers refer to the ELOs above where the relevant CCO is predominantly addressed. Detail is specified in the relevant unit standards):

- a) Identifying and solving problems in which responses display that responsible decisions using critical and creative thinking have been made (1.1, 1.2, 1.3, 3.2, 3.4).
- b) Working effectively with others as a member of a team, group, organisation or community (2.1,2.2, 2.3.2.4, 3.2,3.3, 3.4).
- c) Organizing and managing oneself and one's activities responsibly and effectively (1.2, 2.1, 3.2, 3.3, 3.4).

- d) Collecting, analysing, organizing and critically evaluating information (1.2, 1.3, 2.3, 3.1, 3.2, 3.3).
- e) Communicating effectively using visual, mathematical and or language skills in the modes of oral and or written persuasion (1.4, 2.1, 2.2, 2.3, 2.4).
- f) Using science and technology effectively and critically, showing responsibility towards the environment and health of others (1.1, 2.1, 3.1).
- g) Demonstrating an understanding of the world as a set of related systems by recognizing that problem-solving contexts do not exist in isolation (1.1, 2.1, 2.3, 3.1, 3.2, 3.3).

Learning programmes directed towards this qualification will also contribute to the full personal development of each learner and the social and economic development of society at large by making individuals aware of the importance of:

- i. Reflecting on and exploring a variety of strategies to learn more effectively (1.1, 1.2, 1.3,).
- ii. Participating as responsible citizens in the field of local, national and global communities (2.1, 2.3, 3.1, 3.2, 3.3).
- iii. Being culturally and aesthetically sensitive across a range of social contexts (1.1, 2.1).
- iv. Exploring education and career opportunities; developing entrepreneurial opportunities (1.1).

Recognition of prior learning

Recognition of prior learning must be carried out in accordance with the policy and rules specified and used by the ETQA responsible for evaluation of people seeking RPL for a part or the whole qualification.

Articulation possibilities

This qualification is designed enable the learner to progress into a supervisory role in an integrated glass product manufacturing operation.

It also equips the learner with expertise that will enable him or her to operate similar integrated operations as are found in the metallurgical industry.

The generic expertise enables the learner to work in other integrated production operations or to develop a career where technical supervision and problem solving is required.

Moderation Options

- Anyone moderating the assessment of learners against this Qualification must be registered as a moderator with the relevant ETQA.
- Any institution offering learning that will enable the achievement of this Qualification must be accredited or recognized as a provider with the relevant ETQA.
- Assessment and moderation will be overseen by the relevant ETQA according to the ETQAs policies and guidelines for assessment and moderation; in terms of agreements reached around assessment and moderation between ETQAs (including professional bodies); and in terms of the moderation guideline detailed immediately below.
- Moderation must include both internal and external moderation of assessments at exit points of the qualification, unless ETQA policies specify otherwise. Moderation should also encompass achievement of the competence described both in individual unit standards, exit level outcomes as well as the integrated competence described in the qualification.
- Anyone wishing to be assessed against this Qualification may apply to be assessed by any assessment agency, assessor or provider institution that is accredited by the relevant ETQA.

Criteria for registration of assessors

In order to assess this qualification, the assessor needs:

- Well developed interpersonal skills, personal credibility, and a record of ethical behaviour
- Registration with the Education, Training and Development Practitioners' ETQA as a generic assessor.
- Competence against the unit standard "Plan and conduct assessment of learning outcomes."
- Detailed documentary proof of educational qualification, practical training undergone, and/or experience gained at an appropriate level in the work concerning the production of molten glass. This must meet the relevant ETQA policies and guidelines. The subject matter expertise of the assessor can be established through the recognition of prior learning.
- Registration with, or recognition by, the Chemical Industries Education and Training Quality Assurance Body of other ETQA as specified through and appropriate memorandum of understanding.

JUSTIFICATION & MOTIVATION OF CREDITS**LEVEL:**

Attribute	Level	Justification
Skills	3	Well developed choice
Procedures	3	Significant choice
Context	3	Range of familiar
Knowledge	3+	Some relevant theoretical & broad base
Information processing	3	Interpretation of available information
Problem Solving	3	Range of known responses to familiar problems, based on limited discretion and judgement
Orientation of activities	3	Directed, with some autonomy
Application of responsibility	2+	Under some general supervision and quality checking
Orientation of scope of responsibility	3	Significant responsibility for the quantity and quality of output, and possible responsibility for the output of others

Average Level: 3+

Actual Level Assigned: 3

CREDITS:

Total hours required by the learner to achieve the required outcome:

Activity	Hours
Classroom Teaching	100 - 400
On-The-Job Training	600 - 900
Other (Specify) simulated production training unit	50 - 200
Total	1200

(! Credit ~ 10 hours of learning)

Notes:

Operate a glass furnace or a non continuous on a continuous basis or Operate a non-continuous glass melting furnace is compulsory for this qualification.

NATIONAL CERTIFICATE IN MOLTEN GLASS PRODUCTION

Fundamental				Core				Elective			
Title	Level	Credits	NLRD ID	Title	Level	Credits	NLRD ID	Title	Level	Credits	NLRD ID
Accommodate audience and context needs in oral communication	3	5	8968	Know and apply relevant technology in glass production	3	12	New	Operate a glass furnace on a continuous basis * or Operate a non-continuous glass furnace*	3	50	New
Interpret and use information from texts	3	5	8969	Control an integrated melting operation	3	10	New		3	25	New
Write texts for a range of communicative contexts	3	5	8970					Conform to and apply legislation and operational instructions in Chemical Processing	3	4	Awaiting allocation
Use language and communication in occupational learning programmes	3	5	8979					Produce and use spreadsheets for business	3	5	7567
Demonstrate an understanding of the use of different number bases and measurement units and an awareness of error on the context of relevant qualifications	3	2	9010					Produce word processing documents for business	3	5	7570
Work with a wide range of patterns and transformations of functions and solve related problems	3	8	7457					Supervision of a production operation Planning, Process	~3	~10	To be sourced
Use structured models to describe, represent and analyse shape and motion in 2- and 3-dimensional space	3	4	7460					Engineering maintenance	~3	~10	To be sourced
Collect and use data to establish statistical and probability models and solve related problems	3	5	7454								
Total		39				22					Min 59

Unit Standards used in National Certificate in Molten Glass Operation Level 3

Title 1: Know and apply technology in the melting and conditioning of glass

- SO 1.1:** Describing the melting process
- SO 1.2:** Describing and applying technology used in the glass melting process
- SO 1.3:** Describing and applying safety, health environmental and quality practices used in the glass industry
- SO 1.4:** Describe economic considerations applicable in the glass melting process

Title 2: Control an integrated melting glass operation

- SO 2.1:** Monitor and maintain normal operating conditions in an integrated glass melting operation
- SO 2.2:** Collect and interpret non-routine information regarding an integrated glass melting operation
- SO 2.3:** Contribute to the maintenance of an integrated glass melting operation
- SO 2.4:** Respond to hazardous conditions or emergencies in an integrated glass melting operation
- SO 2.5:** Adjust glass production to comply with forming requirements (including shut down and start up a non-continuous glass melting operation where this is practiced)

Title 3: Operate a glass furnace on a continuous basis

- SO 3.1:** Operate components of the furnace and ancillary equipment or machinery
- SO 3.2:** Maintain normal operating conditions in a furnace
- SO 3.3:** Address abnormal, emergency and banked (idle) conditions in a glass melting furnace

Title 4: Operate a non-continuous glass furnace

- SO 4.1:** Operate components of the furnace and ancillary equipment or machinery
- SO 4.2:** Commission a cold furnace/establish normal operating conditions in a furnace from cold
- SO 4.3:** Maintain normal operating conditions in a furnace
- SO 4.4:** Address abnormal or emergency conditions in a furnace
- SO 4.5:** Shut down a furnace