
GOVERNMENT NOTICES

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

No. 1066

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**SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)**

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

Chemical Industries

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

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the qualification and unit standard. The qualification and unit standard can be accessed via the SAQA web-site at www.saga.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 qualification and unit standards should reach SAQA at the address *below and no later than 24 November 2006*. All correspondence should be marked **Standards Setting – SGB for Chemical Industries** and addressed to

<p>The Director: Standards Setting and Development SAQA <i>Attention: Mr. D. Mphuthing</i> Postnet Suite 248 Private Bag X06 Waterkloof 0145 or faxed to 012 – 431-5144 e-mail: dmphuthing@saga.org.za</p>
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DR. S BHIKHA
DIRECTOR: STANDARDS SETTING AND DEVELOPMENT



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Glass Forming

SAQA QUAL ID	QUALIFICATION TITLE		
57828	National Certificate: Glass Forming		
SGB NAME	ORGANISING FIELD ID	PROVIDER NAME	
Chemical Industries SGB	6		
QUAL TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD	
National Certificate	Manufacturing, Engineering and Technology	Manufacturing and Assembly	
ABET BAND	MINIMUM CREDITS	NQF LEVEL	QUALIFICATION CLASS
Undefined	120	Level 3	Regular-Unit Stds Based

PURPOSE AND RATIONALE OF THE QUALIFICATION

Purpose:

This qualification is used to recognise the competence of people to operate and control integrated glass forming process. This includes competence in operating and controlling the total glass forming system and of the glass forming machines.

This competence provides the foundation needed to take responsibility of 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.

Qualifying learners will:

- > Demonstrate an understanding of the various process operations that are used in glass forming.
- > Assess the impact of feedstock variables on the glass forming process.
- > Start-up and shutdown an integrated glass forming process.
- > Monitor and maintain glass forming product quality.
- > Solve and address glass forming problems.

Rationale:

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

Competence in operating molten glass production process requires appropriate general, glass specific technical knowledge and its application; expertise in operating production equipment and controlling a production process. 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 relevant engineering sectors.

Technology relating to glass forming includes Communication, Mathematics, Applied Science, and industry specific technology and information technology.

The National Certificate in Glass Forming at NQF Level 3 addresses the production of formed glass products starting at a forehearth furnace and including the feeder, forming process and terminating on entering the annealing lehr.

RECOGNIZE PREVIOUS LEARNING?

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LEARNING ASSUMED TO BE IN PLACE

It is assumed that learners are already competent in:

> Communication, Mathematical and Computer Literacy at NQF Level 2.

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 of the whole qualification.

Access to the qualification:

Access to the qualification is open. However, it is preferable that learners have completed the unit standards related to the operation of industrial glass forming machines and the application of instrumentation and process control technology in an industrial plant before accessing the qualification.

QUALIFICATION RULES

- > All the fundamental unit standards totalling 36 credits are compulsory.
- > All the core unit standards totalling 45 credits are compulsory.
- > A minimum of 39 credits should be chosen from the elective component.

A minimum of 120 credits is required to obtain the qualification.

EXIT LEVEL OUTCOMES

1. Start the glass forming system up and shut the system down under both planned and abnormal conditions.
2. Evaluate the impact of variations in glass raw materials, changes in melting and conditioning conditions on the forming properties of glass.
3. Control an integrated glass forming process to maintain product quality and plant efficiency.

Critical Cross-Field Outcomes:

Each critical cross-field outcome was considered in terms of its applicability to each of the Specific Outcomes for each unit standard. Where it was found to be applicable, the nature of the skills being developed was specified by the working group and captured in the standard.

Critical cross-field outcomes are assessed per unit standards and are part of all Exit Level Outcomes.

While performing integrated glass forming functions, qualifying learners can:

1. Identify and solve problems in which response displays that responsible decisions, using critical and creative thinking, have been made by:
 - > Applying knowledge and comprehension of safety procedures. Evident in exit level outcomes: 1, 2
 - > Monitoring and controlling quality assurance practices. Evident in exit level outcomes: 2, 3
 - > Applying operating procedures. Evident in exit level outcomes: 1, 2, 3
 - > Controlling variables impacting on an integrated glass forming process. Evident in exit level outcomes: 1, 2, 3
2. Work effectively with others as a member of a team, group, organisation or community by:
 - > Working in a coordinated team during system start-up and shut down. Evident in exit level outcome: 1
 - > Co-ordinating one's work with that of others in the direct surrounding area, suppliers of molten glass and receivers of formed products. Evident in exit level outcomes: 1, 2, 3

3. Organise and manage oneself and one's activities responsibly and effectively by:
- > Planning and implementing one's own start-up and shutdown activities. Evident in exit level outcome: 1
 - > Planning and implementing one's own routine operational functions. Evident in exit level outcomes: 1, 2, 3
 - > Planning and implementing corrective action to maintain product quality. Evident in exit level outcome: 3
4. Collect, analyse, organise and critically evaluate information by:
- > Monitoring operational parameters. Evident in exit level outcomes: 1, 2
 - > Collating and sorting product quality data. Evident in exit level outcome: 3
 - > Monitoring and interpreting product quality data and data obtained from product analysis. Evident in exit level outcomes: 2, 3
 - > Managing records, reports and stock. Evident in exit level outcomes: 1, 2, 3
5. Communicate effectively by using mathematical and/or language skills in the modes of oral and/or written presentations by:
- > Recording and interpretation of instrument readings. Evident in exit level outcomes: 1, 2, 3
 - > Preparing and presenting reports. Evident in exit level outcomes: 1, 2, 3
6. Use science and technology effectively and critically, showing responsibility towards the environment and health of others by:
- > Working according to health and safety regulations. Evident in exit level outcomes: 1, 2, 3
 - > Controlling technologically advanced production equipment according to operating procedures. Evident in exit level outcomes: 1, 2, 3
 - > Working and interpreting technologically advanced instrumentation and computer systems. Evident in exit level outcomes: 1, 2, 3
7. Demonstrate an understanding of the world as a set of related systems by recognising that problem solving contexts do not exist in isolation by:
- > Monitoring and controlling quality assurance practices. Evident in exit level outcomes: 2, 3
 - > Adjusting equipment and machinery while taking cognisance of the downstream impact. Evident in exit level outcomes: 1, 2, 3
8. Contribute to the full personal development of each learner and the social and economic development of the society at large by:
- > Maintaining and applying safety practices in the production environment. Evident in exit level outcomes: 1, 2, 3
 - > Maintaining and applying quality practices in the production environment. Evident in exit level outcomes: 2, 3
 - > Performing core operating functions. Evident in exit level outcomes: 1, 2, 3
 - > Performing specialised computer functions. Evident in exit level outcomes: 1, 2, 3

ASSOCIATED ASSESSMENT CRITERIA

1.
 - > Pre start-up condition of the process and equipment is assessed by visual inspection.
 - > Start-up and shutdown documentation is completed in accordance with requirements and relevant parties are informed throughout the process.
 - > Start-up and shutdown of the process is conducted according to operating procedures.
 - > Corrective action is taken on deviations or abnormal conditions in accordance with organisational procedures.
2.
 - > The feeder mechanism is adjusted in accordance with instructions to compensate for weight variations, process deviations and potential process deviations.
 - > Glass forming settings are adjusted to compensate for changes in the molten glass properties due to variations in the raw material, melting and glass conditioning.
 - > Feeder mechanism components are replaced in accordance with procedures.
- 3.

- > Procedural adjustments are set up to the operating parameters on the forming machine to ensure and/or improve quality and efficiency.
- > Plant and equipment efficiency is monitored and maintained in accordance with procedures.
- > Product quality is assessed and reported by obtaining data from quality monitoring systems, taking samples and conducting tests and checks.
- > Data is interpreted and the best course of action is assessed to improve product quality and plant efficiency.

Integrated assessment:

The applied competence (practical, foundational and reflexive competencies) of this qualification will be achieved if a learner is able to operate the equipment in a glass-manufacturing environment, maintain quality control practices, demonstrate knowledge of glass forming 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.

INTERNATIONAL COMPARABILITY

Benchmarking was done against the NVQ from Britain, SVQ from Scotland, the German Berufsschule and the Australian and New Zealand Qualifications Frameworks because they are considered to have best practice in glass manufacturing. Britain leads a European Community (EC) pilot project to investigate the establishment of a benchmark glass manufacturing qualification for the EC. The other participants in the EC project are Sweden, the Czech Republic and Romania, who have been amongst the world leaders in glass manufacturing for many years.

African countries with manufacturing facilities (including SADC countries) were scanned for applicable qualifications or training programmes, but no relevant qualifications are offered in any of these countries.

Good international comparability, including similar core qualification structures and progressions from NQF Level 2 to NQF Level 3, were found in the Australian, New Zealand, British and Scottish qualifications. As in the South African glass qualifications, separate qualifications are used to address glass melting and glass forming. The German Berufsschule offers a two-year course consisting of an in-depth theory component and a detailed mechanical (dismantle, assemble and set-up) component.

A direct comparison with these international qualifications indicates that the focus of all the qualifications is basically the same. However, the international qualifications have a variety of mechanical, business and **soft** skills electives supporting their core, whereas a wider scope of glass manufacturing Unit Standards were seen as a higher priority to complete the proposed South African glass forming qualification.

The scope of training provided by the two world leading equipment suppliers, Emhart Glass and Owens-Illinois (O-I), covers the basic glass forming and equipment operating principles but lacks the depth and integrated approach required by a qualification. These suppliers also developed an internationally accepted code of "Good Forming Practice", which serves as a general operating directive in the industry. These Good Forming Practice directives serve as a general reference framework for this qualification.

The Glass Forming Qualification compares well with the best international qualifications and training programmes offered. The additional operational content incorporated in the qualification will serve to support qualifying learners to make better informed, autonomous decisions within a more compact timeframe than international learners.

ARTICULATION OPTIONS

This qualification allows for both horizontal and vertical articulation.

This qualification follows a vertical progression to the FETC: Manufacturing and Assembly Operations. SAQA ID: 48915.

Horizontal articulation can occur with the National Certificate: Molten Glass Production at NQF Level 3. SAQA ID: 48434.

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 THE REGISTRATION OF ASSESSORS

In order to assess this qualification, the assessor needs to:

- > Be registered as an assessor **with** the relevant ETQA.
- > Have a similar qualification at one level higher than the level of the qualification.
- > Have relevant working experience.

NOTES

N/A

UNIT STANDARDS

(Note: A blank space after this line means that the qualification is not based on Unit Standards.)

	UNIT STANDARD ID AND TITLE	LEVEL	CREDITS	STATUS
core	242921 Monitor and maintain glass forming product quality and plant efficiency	Level 3	10	Draft - Prep for P Comment
core	242922 Assess the impact of feedstock variables on the glass forming process	Level 3	10	Draft - Prep for P Comment
core	242923 Start-up and shutdown an integrated glass forming process	Level 3	10	Draft - Prep for P Comment
core	242924 Solve and address glass forming problems	Level 3	15	Draft - Prep for P Comment
Elective	9913 Perform first line maintenance	Level 3	14	Reregistered
Elective	13223 Apply safety, health and environmental protection procedures	Level 3	6	Reregistered
Elective	14783 Conform to and apply legislation and operational instructions in chemical processing	Level 3	4	Registered
Elective	116940 Use a Graphical User Interface (GUI)-based spreadsheet application to solve a given problem	Level 3	6	Registered
Elective	119078 Use a GUI-based word processor to enhance a document through the use of tables and columns	Level 3	5	Registered
Elective	242941 Operate the feeder mechanism in the production of formed glass containers	Level 3	18	Draft - Prep for P Comment
Elective	242942 Control an integrated container glass forming process	Level 3	25	Draft - Prep for P Comment
Elective	10981 Supervise work unit to achieve work unit objectives (individuals and teams)	Level 4	12	Reregistered
Fundamental	7456 Use mathematics to investigate and monitor the financial aspects of personal, business and national issues	Level 3	5	Reregistered

Fundamental	9010 Demonstrate an understanding of the use of different number bases and measurement units and an awareness of error in the context of relevant calculations	Level 3	2	Reregistered
Fundamental	9012 Investigate life and work related problems using data and probabilities	Level 3	5	Reregistered
Fundamental	9013 Describe , apply, analyse and calculate shape and motion in 2- and 3-dimensional space in different contexts	Level 3	4	Reregistered
Fundamental	119457 Interpret and use information from texts	Level 3	5	Registered
Fundamental	119465 Write/present/sign texts for a range of communicative contexts	Level 3	5	Registered
Fundamental	119467 Use language and communication in occupational learning programmes	Level 3	5	Registered
Fundamental	119472 Accommodate audience and context needs in oral/sign ed communication	Level 3	5	Registered



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UNIT STANDARD:

1

Monitor and maintain glass forming product quality and plant efficiency

SAQA US ID	UNIT STANDARD TITLE		
242921	Monitor and maintain glass forming product quality and plant efficiency		
Chemical Industries SGB	6		
UNIT STANDARD TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Manufacturing, Engineering and Technology	Engineering and Related Design	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	10	Level 3	Regular

SPECIFIC OUTCOME 1

Monitor and maintain the system routinely.

SPECIFIC OUTCOME 2

Perform product sampling, checks and tests.

SPECIFIC OUTCOME 3

Make process adjustments in accordance with procedures.

SPECIFIC OUTCOME 4

Monitor product quality, operational efficiency, equipment efficiency and operational trends.



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UNIT STANDARD:

2

Assess the impact of feedstock variables on the glass forming process

SAQA US ID	UNIT STANDARD TITLE		
242922	Assess the impact of feedstock variables on the glass forming process		
SGB NAME	ORGANISING FIELD ID	PROVIDER NAME	
Chemical Industries SGB	6		
UNIT STANDARD TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Manufacturing, Engineering and Technology	Engineering and Related Design	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	10	Level 3	Regular

SPECIFIC OUTCOME 1

Evaluate the impact of raw material variations on the glass forming process.

SPECIFIC OUTCOME 2

Evaluate the impact of variations in the melting operation on the glass forming process.

SPECIFIC OUTCOME 3

Evaluate the impact of variations in the conditioning process on the glass forming process.



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UNIT STANDARD:

3

SAQA US ID	UNIT STANDARD TITLE		
242923	Start-up and shutdown an integrated glass forming process		
SGB NAME		ORGANISING FIELD ID	PROVIDER NAME
Chemical Industries SGB		6	
UNIT STANDARD TYPE		ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION
Regular		Manufacturing, Engineering and Technology	Engineering and Related Design
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE

SPECIFIC OUTCOME 1

Prepare for system start-up.

SPECIFIC OUTCOME 2

Start up the glass forming process.

SPECIFIC OUTCOME 3

Shut down the system to a specified state.

SPECIFIC OUTCOME 4

Shutdown the process under abnormal conditions.



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UNIT STANDARD:

4

SAQA US ID	UNIT STANDARD TITLE		
242924	Solve and address glass forming problems		
SGB NAME		ORGANISING FIELD ID	PROVIDER NAME
Chemical Industries SGB		6	
UNIT STANDARD TYPE		ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION
Regular		Manufacturing, Engineering and Technology	Engineering and Related Design
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	15	Level 3	Regular

SPECIFIC OUTCOME 1

Assess product quality in terms of changes in the process and machine settings.

SPECIFIC OUTCOME 2

Establish and execute the optimum action to be taken.

SPECIFIC OUTCOME 3

Select a range of feasible solutions.

SPECIFIC OUTCOME 4

Implement solutions and carry out follow-up activities.



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UNIT STANDARD:

5

Operate the feeder mechanism in the production of formed glass containers

SAQA US ID	UNIT STANDARD TITLE		
242941	Operate the feeder mechanism in the production of formed glass containers		
Chemical Industries SGB		6	
UNIT STANDARD TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Manufacturing, Engineering and Technology	Engineering and Related Design	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	18	Level 3	Regular

SPECIFIC OUTCOME 1

Describe the feeder mechanism and its operation.

SPECIFIC OUTCOME 2

Make weight adjustments to improve gob form and size.

SPECIFIC OUTCOME 3

Make minor shear adjustments in accordance to instructions.

SPECIFIC OUTCOME 4

Make plunger adjustments.

SPECIFIC OUTCOME 5

Replace feeder mechanism equipment.



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UNIT STANDARD:

6

SAQA US ID	UNIT STANDARD TITLE		
242942	Control an integrated container glass forming process		
SGB NAME	ORGANISING FIELD ID	PROVIDER NAME	
Chemical Industries SGB	6		
UNIT STANDARD TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regula	Mechanical Engineering and Technology	Engineering and Related Design	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	25	Level 3	Regular

SPECIFIC OUTCOME 1

Set up the forming processes.

SPECIFIC OUTCOME 2

Make mechanical adjustments to each of the forming components.

SPECIFIC OUTCOME 3

Set and adjust glass forming machine operating parameters.

SPECIFIC OUTCOME 4

Operate the valve block and cushioning valves.