No. 329 **27 March 2009**

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

Chemical Industries

registered by Organising Field 06 – Manufacturing, Engineering & 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 Standards. The full Qualification and Unit Standards 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, SAQA House, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the Qualification and Unit Standards should reach SAQA at the address below and ***no later than 27 April 2009.*** All correspondence should be marked **Standards Setting – SGB for Chemical Industries** and addressed to

The Director: Standards Setting and Development
SAQA
Attention: Mr. E. Brown
Postnet Suite 248
Private Bag X06
Waterkloof
0145
or faxed to 012 – 431-5144
e-mail: ebrown@saqa.org.za

D. MPHUTHING
ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:
National Certificate: Chemical Operations

SAQA QUAL ID	*QUALIFICATION TITLE*		
66209	National Certificate: Chemical Operations		
ORIGINATOR		*PROVIDER*	
Chemical Industries SGB			
QUALIFICATION TYPE	*FIELD*	*SUBFIELD*	
National Certificate	6 - Manufacturing, Engineering and Technology	Manufacturing and Assembly	
ABET BAND	*MINIMUM CREDITS*	*NQF LEVEL*	*QUAL CLASS*
Undefined	120	Level 3	Regular-Unit Stds Based

This qualification replaces:

Qual ID	Qualification Title	NQF Level	Min Credits	Replacement Status
22867	National Certificate: Chemical Systems Operations	Level 3	122	Will occur as soon as 66209 is registered
48916	National Certificate: Explosives Manufacturing Operations	Level 3	120	Will occur as soon as 66209 is registered
58537	National Certificate: Chemical Operations	Level 3	120	Will occur as soon as 66209 is registered

PURPOSE AND RATIONALE OF THE QUALIFICATION
Purpose:

This qualification addresses the training needs of learners wishing to progress beyond NQF Level 2 in chemical process operations. The competence obtained from this qualification provides the foundation needed to take responsibility for a significant process in the chemical operations 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. Career development and personal job satisfaction of operating personnel are facilitated through the learning process used to achieve the competency specified.

Qualifying learners will:

> Understand the various process operations that are used in chemical operations. Understand the principles of chemistry and physics and its application in industry.
> Apply problem solving strategies in a process environment.
> Monitor and control chemical process operations in a process environment.
> Maintain quality in a processing environment.
> Understand and apply safety, health and environmental issues in the workplace.

Rationale:

This qualification is the third in a series of four qualifications aimed at people working in the chemical operations industry. The chemical processing industry is well established in South Africa and its success is dependent upon the efficient production of chemical products. A substantial number of people with applicable workplace-based skills and the correct theoretical foundation are needed to ensure that these production units in South Africa operate productively. Achieving this objective is supported directly by this qualification.

Typical learners are operating personnel working in any of the processing plants found in the broad chemical, petrochemical, minerals processing, refinery, explosives, fertiliser and other related processing industries. The qualification makes provision for some specialisation in these fields.

Competence in chemical process operations requires appropriate general, chemical specific, technical and other knowledge and its application, as well as expertise in operating production equipment and controlling a chemical process. This knowledge and expertise can form a basis for further learning particularly in the production/operational, engineering and supervisory aspects of chemical operations and similar industries in the chemical and other sectors.

RECOGNIZE PREVIOUS LEARNING?
Y

LEARNING ASSUMED IN PLACE
It is assumed that learners are already competent in:

> Communication at NQF Level 3.
> Mathematical Literacy at NQF Level 3.

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 this qualification is open. However, it is preferable that learners have completed the National Certificate in Chemical Operations, NQF Level 2.

Access for learners with disabilities is dependent on the:

> Type and severity of the disability.
> Nature of the operational processes and requirements of the equipment.

QUALIFICATION RULES
In the compulsory Fundamental Component of the qualification, a learner must demonstrate his/her competence in the unit standards totalling 20 credits plus Mathematical Literacy unit standards totalling 16 credits.

The unit standards in the compulsory Core Component of the qualification reflect the skills and competencies needed for building expertise in the chemical operations field. In the Core Component, the learner must demonstrate his/her competence in the unit standards totalling 59 credits.

The Elective component of the qualification is made up of the following specialisations:

General chemical industry specialisation:

Learners wishing to complete this specialisation must select the following unit standards with 15 credits:

> ID 263495: Monitor and control the production of chemicals in a chemical process plant, NQF Level 3, 15 credits.

Explosives industry specialisation:

Learners wishing to complete this specialisation must select at least one of the following unit standards of 15 credits:

> ID 263494: Monitor and control the manufacturing of ammonium nitrate based explosives, NQF Level 3, 15 credits.
> ID 263619: Monitor and control the manufacturing of explosives accessories, NQF Level 3, 15 credits.
> ID 263515: Monitor and control the manufacturing of initiating devices, NQF Level 3, 15 credits.
> ID 263574: Monitor and control the manufacturing of propellants, NQF Level 3, 15 credits.
> ID 263574: Monitor and control the manufacturing of small arms ammunition, NQF Level 3, 15 credits.

Sulphuric acid specialisation:

Learners wishing to complete this specialisation must select at least one of the following unit standards of 15 credits:

> ID 263617: Monitor and control pyrite processing within a sulphuric acid production plant, NQF Level 3, 15 credits.
> ID 263635: Monitor and control the pyrite roasting process, NQF Level 3 15 credits.
> ID 263616: Monitor and control the sulphuric acid production process, NQF Level 3, 15 credits.

Mineral extraction and refining specialisation:

Learners wishing to complete this specialisation must select at least one of the following unit standards of 15 credits:

> ID 263454: Monitor and control the base metal leaching process, NQF Level 3, 15 credits.
> ID 263595: Monitor and control the platinum group metals preparation process, NQF Level 3, 15 credits.
> ID 263636: Monitor and control an electrowinning process, NQF Level 3, 15 credits.
> ID 263577: Monitor and control a crystallisation process, NQF Level 3, 15 credits.
> Monitor and control the cobalt production process, NQF Level 3, 15 credits.
> ID 263594: Monitor and control the nickel production process, NQF Level 3, 15 credits.
> ID 263614: Monitor and control the platinum group metals recovery process, NQF Level 3, 15 credits.
> ID 263614: Monitor and control the platinum group metals separation process, NQF Level 3, 15 credits.
> ID 263618: Monitor and control the platinum group metal purification process, NQF Level 3, 15 credits.
> ID 263634: Monitor and control the conversion of platinum group metal salts into final metal products, NQF Level 3, 15 credits.
> ID 263595: Monitor and control the platinum group metals supporting processes, NQF Level 3, 15 credits.

Electives:

The qualification is completed by selecting sufficient credits from this section to make up 120 credits.

The Elective Component of the qualification requires the learner to select additional general application Unit Standards covering aspects such as quality, sampling, computer, mechanical and maintenance support skills. In total the learner must demonstrate his/her competence in a minimum of 25 credits selected from the Elective component.

EXIT LEVEL OUTCOMES

1. Apply problem solving strategies in a process environment.

2. Apply safety and environmental protection procedures in the workplace.

3. Manage and control chemical process operations in a process environment.

4. Maintain quality in a processing environment.

Critical Cross-Field Outcomes:

While performing integrated chemical process operations, qualifying learners can:

Identify and solve problems in which response displays that responsible decisions, using critical and creative thinking, have been made by:

Responding to emergencies in a processing environment:

Refer to the following Exit Level Outcome(s):

> Apply safety and environmental protection procedures in the workplace.

Monitoring and controlling quality assurance practices:

Refer to all Exit Level Outcomes.

Applying operating procedures:

Refer to the following Exit Level Outcome(s):

> Manage and control chemical process operations in a process environment.
> Maintain quality in a processing environment.

Controlling variables impacting on chemical process operations:

Refer to all Exit Level Outcomes.

Work effectively with others as a member of a team, group, organisation or community by:

Working in a coordinated team during processing operations:

Refer to the following Exit Level Outcomes:

> Manage and control chemical process operations in a process environment.

Co-ordinating one's work with that of others in the direct surrounding area, internal and external operations; Evident in all Exit Level Outcomes.

Organise and manage oneself and one's activities responsibly and effectively by:

Using operating instructions to control process plant conditions:

Refer to the following Exit Level Outcome:
> Manage and control chemical process operations in a process environment.

Implementing the steps to solve operating problems in a process plant:

Refer to the following Exit Level Outcome(s):

> Apply problem solving strategies in a process environment.
> Manage and control chemical process operations in a process environment.

Applying quality procedures in a process environment to maintain product quality:

Refer to the following Exit Level Outcome(s):

> Apply problem solving strategies in a process environment.
> Maintain quality in a processing environment.

Collect, analyse, organise and critically evaluate information by:

Monitoring operational parameters:

Refer to the following Exit Level Outcome(s):

> Apply problem solving strategies in a process environment.
> Manage and control chemical process operations in a process environment.
> Maintain quality in a processing environment.

Collating and sorting product quality data:

Refer to the following Exit Level Outcome(s):

> Apply problem solving strategies in a process environment.
> Manage and control chemical process operations in a process environment.
> Maintain quality in a processing environment.

Monitoring and interpreting product quality data and data obtained from product analysis:

Refer to the following Exit Level Outcome(s):

> Apply problem solving strategies in a process environment.
> Manage and control chemical process operations in a process environment.
> Maintain quality in a processing environment.

Managing records, reports and stock:

>Refer to all Exit Level Outcomes.

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:

Refer to the following Exit Level Outcome(s):

> Apply problem solving strategies in a process environment.
> Manage and control chemical process operations in a process environment.
> Maintain quality in a processing environment.

Preparing and presenting reports:

Refer to the following Exit Level Outcome(s):

> Apply problem solving strategies in a process environment.
> Manage and control chemical process operations in a process environment.
> Maintain quality in a processing environment.

Use science and technology effectively and critically, showing responsibility towards the environment and health of others by:

Working according to health and safety regulations:

> Refer to all Exit Level Outcomes.

Controlling technologically advanced production equipment according to operating procedures:

> Refer to all Exit Level Outcomes.

Working and interpreting technologically advanced instrumentation and computer systems:

> Refer to all Exit Level Outcomes.

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:

Refer to the following Exit Level Outcome(s):

> Manage and control chemical process operations in a process environment.
> Maintain quality in a processing environment.

Adjusting equipment and machinery while taking cognisance of the downstream impact:

Refer to the following Exit Level Outcome(s):

> Apply problem solving strategies in a process environment.
> Manage and control chemical process operations in a process environment.
> Maintain quality in a processing environment.

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:

> Refer to all Exit Level Outcomes.

Maintaining and applying quality practices in the production environment:

Refer to the following Exit Level Outcome(s):

> Manage and control chemical process operations in a process environment.
> Maintain quality in a processing environment.

Performing core operating functions:

Evident in Exit Level Outcome(s):

> Manage and control chemical process operations in a process environment.

Performing specialised computer functions:

Refer to the following Exit Level Outcome(s):

> Apply problem solving strategies in a process environment.
> Manage and control chemical process operations in a process environment.
> Maintain quality in a processing environment.

ASSOCIATED ASSESSMENT CRITERIA
Associated Assessment Criteria for Exit Level Outcome 1:

1.1 Statistical process control is performed in a process environment.
1.2 Instrument control loops are identified and interpreted in accordance with specified requirements.
1.3 Operating problems in a process plant are addressed in accordance with specifications.

Associated Assessment Criteria for Exit Level Outcome 2:

2.1 Emergencies in a process environment are responded to in accordance with specified requirements.
2.2 The work permit system is explained and applied in accordance with organisational requirements.

Associated Assessment Criteria for Exit Level Outcome 3:

3.1 The principles of chemistry and physics are explained in relation to a processing environment.
3.2 Operating instructions are used to control process plant conditions.
3.3 Statistical process control is performed in accordance with specifications.
3.4 Solid-vapour and liquid-vapour separation processes are explained with examples.
3.5 Plant is monitored in a process environment in accordance with specified requirements.
3.6 Process and instrument diagrams are read and interpreted in accordance with code of practice.
3.7 Instrument control loops are identified and interpreted in accordance with specifications.

Associated Assessment Criteria for Exit Level Outcome 4:

4.1 On-site analysis of process materials is conducted in accordance with requirements.

4.2 The quality of products is maintained in a production environment.
4.3 Statistical process control is performed in accordance with specifications.

Integrated Assessment:

The applied competence (practical, foundational and reflexive competencies) of this qualification will be achieved if a learner is able to achieve all the exit level outcomes of this qualification.

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
National Certificate: Chemical Operations was compared with the German Berufschule chemical operations qualifications, the NVQ from Britain, the Australian and New Zealand Qualifications Frameworks.

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 1 to NQF Level 4, were found in the Australian and British qualifications.

Both local and international qualifications place high emphasis on safety with a range of unit standards relating to hazards, emergencies and environmental protection included.

The Chemical Operations Qualification compares well with the best international qualifications and training programmes offered. The compulsory problem solving, quality control and operations 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 and will increase transportability of the qualification considerably.

An extensive international comparability was done which included the United States of America, Australia, New Zealand, Germany, Britain, European Community Chemical Operator Project and relevant African countries.

United States of America:

In the USA training for chemical process operators is generally considered as on-the-job training with some specialised multi-media and simulator-training modules offered by private providers. However a small number of technical colleges offer certificate programmes, which are very similar in design to the Chemical Operations NQF Level 3 and 4 qualifications.

Germany:

The German two year "Produktionsfachkraft Chemie" (Chemical Production Specialist) qualification was used as basis for the development of the NQF Level 1 and NQF Level 2 Chemical Operations qualifications. Our NQF Level 3 qualification was designed to deliver continued training in external operations as required by the chemical industry in South Africa.

The Australian and British qualifications registered respectively on the AQF and the NVQ were also used as benchmarking partners. A comparison of the qualifications was undertaken and the best practice points were used in the generation of the South African qualification's unit standards, including similar core qualification structures and progressions from NQF Level 1 to NQF Level 4.

Britain:

A comparison with the British qualification was included, because the British chemical industry is very well developed and the NVQ is an educational structure comparable to the NQF. An Internet search revealed that The City & Guilds Level 3 NVQ in Chemical, Pharmaceutical and Petro-Chemical Manufacture provides for the following areas of specialisation: Controlling Process Operations and Technical Support. The qualification contains compulsory core units consisting of safety, teamwork, work handover and a choice of seven elective units from two separate groups. Three units must be chosen from Group, A which contains the operational units: preparing, controlling, maintaining, restoring and completing complex processing operations and quality management. Four units must be chosen from Group B which contains units ranging from cleaning and preparing equipment, SHEQ, problem solving, risk assessment, energy efficiency and quality control.

Australia:

The Australian processing industry is of a similar size and sophistication as the South African industry. For this reason a comparison with the Australian qualification was included, as well as the AQF being an educational structure comparable to the NQF. An internet search of the AQF revealed that the Australian Certificate III in Process Plant Operations contains five compulsory core units on communication, safety, emergencies, and work procedures. It allows the learner to choose elective unit standards to specialise in the following steams: Chemical and Oil, Hydrocarbons Extractions and Hydrocarbons Transmission. The qualification is made up of 21 units of competence, of which 16 have to be chosen from operations and support domains that are comparable to what is required for the local qualification, e.g. operate and monitor a range of complex processing equipment, OHS, quality maintenance and problem solving.

Africa:

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

New Zealand:

Research in the NZQA showed that a Level 2 Certificate in Energy and Chemical Plant Operations (Process Operation) and a similar Level 4 Process Operation qualifications are registered. There are no Level 3 qualifications in Process operations registered on the NZQA.

Both local and international qualifications place high emphasis on safety with a range of unit standards relating to hazards, emergencies and environmental protection included.

The Chemical Operations Qualification compares well with the best international qualifications and training programmes offered. The compulsory technical 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 and will increase transportability of the qualification considerably.

ARTICULATION OPTIONS

This qualification is the third in a series of four chemical operations qualifications and it will allow the learner a vertical progression from the NQF Level 2 qualification. The qualifying learner may progress into a NQF Level 4 supervisory internal process controller role in the chemical operations industry.

The generic knowledge and expertise enables the learner to progress horizontally in a range of other manufacturing operations or to develop a career where knowledge of chemical operations is necessary.

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 recognised as a provider with the relevant ETQA.

> Assessment and moderation will be overseen by the relevant ETQA according to the ETQA`s 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 assessrnent agency, assessor or provider institution that is accredited by the relevant ETQA.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

N/A

NOTES

This qualification replaces the following qualifications:

> ID 22867: National Certificate in Chemical Systems Operation , NQF Level 3, 122 credits.
> ID 48916: National Certificate: Explosives Manufacturing Operations, Level 3, 120 credits.
> ID 58537: National Certificate: Chemical Operations, Level 3, 130 credits.

UNIT STANDARDS

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Fundamental	119472	Accommodate audience and context needs in oral/signed communication	Level 3	5
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
Fundamental	9013	Describe, apply, analyse and calculate shape and motion in 2-and 3-dimensional space in different contexts	Level 3	4
Fundamental	119457	Interpret and use information from texts	Level 3	5

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Fundamental	9012	Investigate life and work related problems using data and probabilities	Level 3	5
Fundamental	119467	Use language and communication in occupational learning programmes	Level 3	5
Fundamental	7456	Use mathematics to investigate and monitor the financial aspects of personal, business and national issues	Level 3	5
Fundamental	119465	Write/present/sign texts for a range of communicative contexts	Level 3	5
Core	244241	Apply knowledge of chemical reactions in a processing environment	Level 3	6
Core	244086	Apply quality procedures in a process plant	Level 3	6
Core	244092	Demonstrate understanding of solid-vapour and surface based separation processes	Level 3	10
Core	244091	Identify and interpret instrument control loops	Level 3	8
Core	244098	Perform statistical process control in a process environment	Level 3	4
Core	244093	Read and interpret process and instrumentation diagrams	Level 3	4
Core	244085	Respond to emergencies in a process environment	Level 3	6
Core	244087	Solve operating problems in a process plant	Level 3	5
Core	244084	Use operating instructions to control process plant conditions	Level 3	10
Elective	114981	Capture numerical and text information on an electronic database	Level 2	2
Elective	244078	Demonstrate understanding of a work permit system	Level 2	3
Elective	259622	Describe the functions of the workplace health and safety representative	Level 2	3
Elective	119744	Select, use and care for engineering hand tools	Level 2	8
Elective	10255	Select, use and care for power tools	Level 2	5
Elective	244088	Act as the Safety Watcher during the performance of maintenance activities	Level 3	3
Elective	244108	Apply safety, health and environment protection procedures in a process plant	Level 3	6
Elective	244096	Conduct on-site analysis of process materials	Level 3	5
Elective	10170	Demonstrate understanding of employment relations in an organisation	Level 3	3
Elective	244090	Demonstrate understanding of the principles of kinematics in physics	Level 3	6
Elective	244095	Dismantle, assemble and install basic components in a process environment	Level 3	6
Elective	263577	Monitor and control a crystallisation process	Level 3	15
Elective	263636	Monitor and control an electrowinning process	Level 3	15
Elective	263617	Monitor and control pyrite processing within a sulphuric acid production plant	Level 3	15
Elective	263614	Monitor and control the Platinum Group Metals (PGMs) recovery process	Level 3	15
Elective	263618	Monitor and control the Platinum Group Metals purification process	Level 3	15
Elective	263454	Monitor and control the base metal leaching process	Level 3	15
Elective	263576	Monitor and control the cobalt production process	Level 3	15
Elective	263634	Monitor and control the conversion of platinum group metal salts into final metal products	Level 3	15
Elective	263497	Monitor and control the manufacturing of ammonium nitrate based explosives	Level 3	15
Elective	263619	Monitor and control the manufacturing of explosives accessories	Level 3	15
Elective	263515	Monitor and control the manufacturing of initiating devices	Level 3	15
Elective	263574	Monitor and control the manufacturing of propellants	Level 3	15
Elective	263575	Monitor and control the manufacturing of small arms ammunition	Level 3	15
Elective	263594	Monitor and control the nickel production process	Level 3	15
Elective	263595	Monitor and control the platinum group metals preparation process	Level 3	15
Elective	263615	Monitor and control the platinum group metals separation process	Level 3	15
Elective	263854	Monitor and control the platinum group metals supporting processes	Level 3	15

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Elective	263495	Monitor and control the production of chemicals in a chemical process plant	Level 3	15
Elective	263635	Monitor and control the pyrite roasting process	Level 3	15
Elective	263616	Monitor and control the sulphuric acid production process	Level 3	15
Elective	263475	Operate packaging equipment used in an explosives manufacturing environment	Level 3	8
Elective	244094	Perform and support maintenance functions	Level 3	5
Elective	119078	Use a GUI-based word processor to enhance a document through the use of tables and columns	Level 3	5
Elective	116936	Use a Graphical User Interface (GUI)-based database application to work with simple databases	Level 3	3
Elective	116940	Use a Graphical User Interface (GUI)-based spreadsheet application to solve a given problem	Level 3	6

LEARNING PROGRAMMES RECORDED AGAINST THIS QUALIFICATION
None

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Monitor and control the base metal leaching process

SAQA US ID	*UNIT STANDARD TITLE*		
263454	Monitor and control the base metal leaching process		
ORIGINATOR		*PROVIDER*	
Chemical Industries SGB			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Explain the fundamental principles applicable to the base metal leaching process.

SPECIFIC OUTCOME 2
Monitor and control the different ancillary systems interacting with the base metal leaching process.

SPECIFIC OUTCOME 3
Monitor and control the quality standards of process materials in the base metal leaching process.

SPECIFIC OUTCOME 4
Monitor and control the base metal leaching process.

SPECIFIC OUTCOME 5
Monitor the safety, health, environment, security and housekeeping aspects of the base metal leaching process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	66209	National Certificate: Chemical Operations	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Operate packaging equipment used in an explosives manufacturing environment

SAQA US ID	*UNIT STANDARD TITLE*		
263475	Operate packaging equipment used in an explosives manufacturing environment		
ORIGINATOR		*PROVIDER*	
Chemical Industries SGB			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	8

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Explain the operating principles of the packaging equipment.

SPECIFIC OUTCOME 2
Perform start-up of packaging equipment.

SPECIFIC OUTCOME 3
Monitor packaging parameters.

SPECIFIC OUTCOME 4
Monitor and maintain packaging quality.

SPECIFIC OUTCOME 5
Perform shut-down of the packaging process.

SPECIFIC OUTCOME 6
Maintain operational integrity in the packaging area.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	66209	National Certificate: Chemical Operations	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Monitor and control the production of chemicals in a chemical process plant

SAQA US ID	*UNIT STANDARD TITLE*		
263495	Monitor and control the production of chemicals in a chemical process plant		
ORIGINATOR		*PROVIDER*	
Chemical Industries SGB			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Explain the fundamental principles applicable to the chemical process.

SPECIFIC OUTCOME 2
Monitor and control the different ancillary systems interacting with the chemical process.

SPECIFIC OUTCOME 3
Monitor and control the quality standards of process materials in the chemical process.

SPECIFIC OUTCOME 4
Monitor and control the chemical production process.

SPECIFIC OUTCOME 5
Monitor the safety, health, environment, security and housekeeping aspects of the chemical process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	66209	National Certificate: Chemical Operations	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Monitor and control the manufacturing of ammonium nitrate based explosives

SAQA US ID	*UNIT STANDARD TITLE*		
263497	Monitor and control the manufacturing of ammonium nitrate based explosives		
ORIGINATOR		*PROVIDER*	
Chemical Industries SGB			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Explain the fundamental principles applicable to the ammonium nitrate manufacturing process.

SPECIFIC OUTCOME 2
Monitor and control the different ancillary systems interacting with the ammonium nitrate manufacturing process.

SPECIFIC OUTCOME 3
Monitor and control the quality standards of process materials in the ammonium nitrate manufacturing process.

SPECIFIC OUTCOME 4
Monitor and control the ammonium nitrate manufacturing process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	66209	National Certificate: Chemical Operations	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Monitor and control the manufacturing of initiating devices

SAQA US ID	*UNIT STANDARD TITLE*		
263515	Monitor and control the manufacturing of initiating devices		
ORIGINATOR		*PROVIDER*	
Chemical Industries SGB			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Explain the fundamental principles applicable to the manufacturing of initiating devices.

SPECIFIC OUTCOME 2
Monitor and control the different ancillary systems interacting with the manufacturing of initiating devices.

SPECIFIC OUTCOME 3
Monitor and control the quality standards of process materials in the manufacturing of initiating devices.

SPECIFIC OUTCOME 4
Monitor and control the manufacturing of initiating devices.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	66209	National Certificate: Chemical Operations	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Monitor and control the manufacturing of propellants

SAQA US ID	*UNIT STANDARD TITLE*		
263574	Monitor and control the manufacturing of propellants		
ORIGINATOR		*PROVIDER*	
Chemical Industries SGB			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	15

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
116009	Control propellant manufacturing processes	Level 3	20	Will occur as soon as 263574 is registered

SPECIFIC OUTCOME 1
Explain the fundamental principles applicable to the manufacturing of propellants.

SPECIFIC OUTCOME 2
Monitor and control the different ancillary systems interacting with the manufacturing of propellants.

SPECIFIC OUTCOME 3
Monitor and control the quality standards of process materials in the manufacturing of propellants.

SPECIFIC OUTCOME 4
Monitor and control the manufacturing of propellants.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	66209	National Certificate: Chemical Operations	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Monitor and control the manufacturing of small arms ammunition

SAQA US ID	***UNIT STANDARD TITLE***		
263575	Monitor and control the manufacturing of small arms ammunition		
ORIGINATOR		***PROVIDER***	
Chemical Industries SGB			
FIELD		***SUBFIELD***	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	***UNIT STANDARD TYPE***	***NQF LEVEL***	***CREDITS***
Undefined	Regular	Level 3	15

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
116013	Control small arms ammunition manufacturing processes	Level 3	20	Will occur as soon as 263575 is registered

SPECIFIC OUTCOME 1
Explain the fundamental principles applicable to the manufacturing of small arms ammunition.

SPECIFIC OUTCOME 2
Monitor and control the different ancillary systems interacting with the manufacturing of small arms ammunition.

SPECIFIC OUTCOME 3
Monitor and control the quality standards of process materials in the manufacturing of small arms ammunition.

SPECIFIC OUTCOME 4
Monitor and control the manufacturing of small arms ammunition.

QUALIFICATIONS UTILISING THIS UNIT STANDARD
None

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Monitor and control the cobalt production process

SAQA US ID	*UNIT STANDARD TITLE*		
263576	Monitor and control the cobalt production process		
ORIGINATOR		*PROVIDER*	
Chemical Industries SGB			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Explain the fundamental principles applicable to the cobalt reduction process.

SPECIFIC OUTCOME 2
Monitor and control the different ancillary systems interacting with the cobalt reduction process.

SPECIFIC OUTCOME 3
Monitor and control the quality standards of process materials in the cobalt reduction process.

SPECIFIC OUTCOME 4
Monitor and control the cobalt reduction process.

SPECIFIC OUTCOME 5
Monitor the safety, health, environment, security and housekeeping aspects of the cobalt reduction process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	66209	National Certificate: Chemical Operations	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Monitor and control a crystallisation process

SAQA US ID	*UNIT STANDARD TITLE*		
263577	Monitor and control a crystallisation process		
ORIGINATOR		*PROVIDER*	
Chemical Industries SGB			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Explain the fundamental principles applicable to a crystallisation process.

SPECIFIC OUTCOME 2
Monitor and control the different ancillary systems interacting with the crystallisation process.

SPECIFIC OUTCOME 3
Monitor and control the quality standards of process materials in the crystallisation process.

SPECIFIC OUTCOME 4
Monitor and control the crystallisation process.

SPECIFIC OUTCOME 5
Monitor the safety, health, environment, security and housekeeping aspects in the crystallisation plant.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	66209	National Certificate: Chemical Operations	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Monitor and control the nickel production process

SAQA US ID	*UNIT STANDARD TITLE*		
263594	Monitor and control the nickel production process		
ORIGINATOR		*PROVIDER*	
Chemical Industries SGB			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Explain the fundamental principles applicable to the nickel production process.

SPECIFIC OUTCOME 2
Monitor and control the different ancillary systems interacting with the nickel production process.

SPECIFIC OUTCOME 3
Monitor and control the quality standards of process materials in the nickel production process.

SPECIFIC OUTCOME 4
Monitor and control the nickel production process.

SPECIFIC OUTCOME 5
Monitor the safety, health, environment, security and housekeeping aspects of the nickel production process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	66209	National Certificate: Chemical Operations	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Monitor and control the platinum group metals preparation process

SAQA US ID	*UNIT STANDARD TITLE*		
263595	Monitor and control the platinum group metals preparation process		
ORIGINATOR		*PROVIDER*	
Chemical Industries SGB			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Explain the fundamental principles applicable to the PGM production process.

SPECIFIC OUTCOME 2
Monitor and control the different ancillary systems interacting with the PGM production process.

SPECIFIC OUTCOME 3
Monitor and control the quality standards of process materials in the PGM production process.

SPECIFIC OUTCOME 4
Monitor and control the PGM production process.

SPECIFIC OUTCOME 5
Monitor the safety, health, environment, security and housekeeping aspects of the PGM production process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	66209	National Certificate: Chemical Operations	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Monitor and control the Platinum Group Metals (PGMs) recovery process

SAQA US ID	*UNIT STANDARD TITLE*		
263614	Monitor and control the Platinum Group Metals (PGMs) recovery process		
ORIGINATOR		*PROVIDER*	
Chemical Industries SGB			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Explain the fundamental principles applicable to the PGMs recovery process.

SPECIFIC OUTCOME 2
Monitor and control the different ancillary systems interacting with the PGMs recovery process.

SPECIFIC OUTCOME 3
Monitor and control the quality standards of process materials in the PGMs recovery process.

SPECIFIC OUTCOME 4
Monitor and control the PGMs recovery process.

SPECIFIC OUTCOME 5
Monitor the safety, health, environment, security and housekeeping aspects of the PGMs recovery process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	66209	National Certificate: Chemical Operations	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Monitor and control the platinum group metals separation process

SAQA US ID	*UNIT STANDARD TITLE*		
263615	Monitor and control the platinum group metals separation process		
ORIGINATOR		*PROVIDER*	
Chemical Industries SGB			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Explain the fundamental principles applicable to the PGM separation process.

SPECIFIC OUTCOME 2
Monitor and control the different ancillary systems interacting with the PGM separation process.

SPECIFIC OUTCOME 3
Monitor and control the quality standards of process materials in the PGM separation process.

SPECIFIC OUTCOME 4
Monitor and control the PGM separation process.

SPECIFIC OUTCOME 5
Monitor the safety, health, environment, security and housekeeping aspects of the PGM separation process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	66209	National Certificate: Chemical Operations	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Monitor and control the sulphuric acid production process

SAQA US ID	*UNIT STANDARD TITLE*		
263616	Monitor and control the sulphuric acid production process		
ORIGINATOR		*PROVIDER*	
Chemical Industries SGB			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Explain the fundamental principles applicable to the sulphuric acid production process.

SPECIFIC OUTCOME 2
Monitor and control the different ancillary systems interacting with the sulphuric acid production process.

SPECIFIC OUTCOME 3
Monitor and control the quality standards of process materials in the sulphuric acid production process.

SPECIFIC OUTCOME 4
Monitor and control the sulphuric acid production process.

SPECIFIC OUTCOME 5
Monitor the safety, health, environment, security and housekeeping aspects of the sulphuric acid production process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	66209	National Certificate: Chemical Operations	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Monitor and control pyrite processing within a sulphuric acid production plant

SAQA US ID	*UNIT STANDARD TITLE*		
263617	Monitor and control pyrite processing within a sulphuric acid production plant		
ORIGINATOR		*PROVIDER*	
Chemical Industries SGB			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Explain the fundamental principles applicable to pyrite processing.

SPECIFIC OUTCOME 2
Monitor and control the different ancillary systems interacting with pyrite processing.

SPECIFIC OUTCOME 3
Monitor and control the quality standards of process materials in pyrite processing.

SPECIFIC OUTCOME 4
Monitor and control pyrite processing.

SPECIFIC OUTCOME 5
Monitor the safety, health, environment, security and housekeeping aspects of pyrite processing.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	66209	National Certificate: Chemical Operations	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Monitor and control the Platinum Group Metals purification process

SAQA US ID	*UNIT STANDARD TITLE*		
263618	Monitor and control the Platinum Group Metals purification process		
ORIGINATOR		*PROVIDER*	
Chemical Industries SGB			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Explain the fundamental principles applicable to the PGM purification process.

SPECIFIC OUTCOME 2
Monitor and control the different ancillary systems interacting with the PGM purification process.

SPECIFIC OUTCOME 3
Monitor and control the quality standards of process materials in the PGM purification process.

SPECIFIC OUTCOME 4
Monitor and control the PGM purification process.

SPECIFIC OUTCOME 5
Monitor the safety, health, environment, security and housekeeping aspects of the PGM purification process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	66209	National Certificate: Chemical Operations	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Monitor and control the manufacturing of explosives accessories

SAQA US ID	*UNIT STANDARD TITLE*		
263619	Monitor and control the manufacturing of explosives accessories		
ORIGINATOR		*PROVIDER*	
Chemical Industries SGB			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Explain the fundamental principles applicable to the manufacturing of explosives accessories.

SPECIFIC OUTCOME 2
Monitor and control the different ancillary systems interacting with the manufacturing of explosives accessories.

SPECIFIC OUTCOME 3
Monitor and control the quality standards of process materials in the manufacturing of explosives accessories.

SPECIFIC OUTCOME 4
Monitor and control the manufacturing of explosives accessories.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	66209	National Certificate: Chemical Operations	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Monitor and control the conversion of platinum group metal salts into final metal products

SAQA US ID	*UNIT STANDARD TITLE*		
263634	Monitor and control the conversion of platinum group metal salts into final metal products		
ORIGINATOR		*PROVIDER*	
Chemical Industries SGB			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Explain the fundamental principles applicable to converting PGM salts into final metal products.

SPECIFIC OUTCOME 2
Monitor and control the different ancillary systems interacting with the PGM final metals conversion process.

SPECIFIC OUTCOME 3
Monitor and control the quality standards of process materials in the PGM final metals conversion process.

SPECIFIC OUTCOME 4
Monitor and control the PGM final metals conversion process.

SPECIFIC OUTCOME 5
Monitor the safety, health, environment, security and housekeeping aspects of the PGM final metals conversion process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	66209	National Certificate: Chemical Operations	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Monitor and control the pyrite roasting process

SAQA US ID	*UNIT STANDARD TITLE*		
263635	Monitor and control the pyrite roasting process		
ORIGINATOR		*PROVIDER*	
Chemical Industries SGB			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Explain the fundamental principles applicable to the pyrite roasting process.

SPECIFIC OUTCOME 2
Monitor and control the different ancillary systems interacting with the pyrite roasting process.

SPECIFIC OUTCOME 3
Monitor and control the quality standards of process materials in the pyrite roasting process.

SPECIFIC OUTCOME 4
Monitor and control the pyrite roasting process.

SPECIFIC OUTCOME 5
Monitor the safety, health, environment, security and housekeeping aspects of the pyrite roasting process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	66209	National Certificate: Chemical Operations	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Monitor and control an electrowinning process

SAQA US ID	*UNIT STANDARD TITLE*		
263636	Monitor and control an electrowinning process		
ORIGINATOR		*PROVIDER*	
Chemical Industries SGB			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Explain the fundamental principles applicable to an electrowinning process.

SPECIFIC OUTCOME 2
Monitor and control the different ancillary systems interacting with the electrowinning process.

SPECIFIC OUTCOME 3
Monitor and control the quality standards of process materials in the electrowinning process.

SPECIFIC OUTCOME 4
Monitor and control the electrowinning process.

SPECIFIC OUTCOME 5
Monitor the safety, health, environment, security and housekeeping aspects of the electrowinning process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	66209	National Certificate: Chemical Operations	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Monitor and control the platinum group metals supporting processes

SAQA US ID	*UNIT STANDARD TITLE*		
263854	Monitor and control the platinum group metals supporting processes		
ORIGINATOR		*PROVIDER*	
Chemical Industries SGB			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Explain the fundamental principles applicable to the PGM supporting processes.

SPECIFIC OUTCOME 2
Monitor and control the different ancillary systems interacting with the PGM supporting processes.

SPECIFIC OUTCOME 3
Monitor and control the quality standards of process materials in the PGM supporting processes.

SPECIFIC OUTCOME 4
Monitor and control the PGM supporting processes.

SPECIFIC OUTCOME 5
Monitor the safety, health, environment, security and housekeeping aspects of the PGM supporting processes.

QUALIFICATIONS UTILISING THIS UNIT STANDARD
None