No. 415 **11 May 2007**

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 and Technology, publishes the following qualification and unit standards far 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 ***11*** June ***2007.*** All correspondence should be marked Standards Setting – Chemical Industries and addressed to

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Chemical Operations

SAQA QUAL ID	QUALIFICATION TITLE		
58537	National Certificate: Chemical Operations		
SGB		PROVIDER	
Chemical Industries SGB			
ETQA			
	Engineering and Technology		
ABET BAND	MINIMUM CREDITS	NQF LEVEL	QUAL CLASS
Undefined	120	Level 3	Regular-Unit Stds Based

PURPOSE AND RATIONALE OF THE QUALIFICATION
Purpose:

This qualification is used to address the training needs of learners wishing to progress beyond NQF Level 2 in chemical process operations. This competence 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, and career development and personal job satisfaction of operating personnel are iacilitated through the learning process used to achieve the competency specified.

Qualifying learners will:

Have an understanding of the various process operations that are used in chemical operations:

- Understand the principles of chemistry and physics and its application in industry
- Apply problems 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 replaces the National Certificate in Chemical Systems Operation, NQF Level 3 (ID 22867).

This qualification is the third in a series for people working in the chemical operations industry who need to progress beyond NQF Level *2* and for learners who want *to* progress in the chemical operations industry. The qualification reflects the workplace-based specific needs that a learner requires in the chemical operations industry, before progressing to learning at a higher level.

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

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?
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LEARNING ASSUMED TO BE IN PLACE
It is assumed that learners are already competent in Communication and 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 dependant 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 20 credits in the field of Communication plus 16 credits in the field of Mathematical Literacy

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 hislher competence in the total of ***65*** 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 hislher competence in a minimum of 19 credits selected from the Elective component.

EXIT LEVEL OUTCOMES
1. Apply problems solving strategies in a process environment,

2. Apply safety and environmental protection procedures in the workplace

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

4. Maintain quality in a processing environment.

Critical Cross-Field Outcomes:

Critical cross-field outcomes have been addressed by the exit level outcomes as follows:

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; Evident in Exit Level Outcomels *2.*
- Monitoring and controlling quality assurance practices; Evident in all Exit Level Outcomes.
- Applying operating procedures; Evident in Exit Level Outcomels 3, **4.**
- Controlling variables impacting on chemical process operations; Evident in **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; Evident in Exit Level Outcomels 3.
- 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; Evident in Exit Level Outcomels 3.
- Implementing the steps to solve operating problems in a process plant; Evident in Exit Level Outcornels 1, 3.
- Applying quality procedures in a process environment to maintain product quality; Evident in Exit Level Outcomels 1, 4.

Collect, analyse, organise and critically evaluate information by:

- Monitoring operational parameters; Evident in Exit Level Outcomels 1, 3, **4.**
- Collating and sorting product quality data; Evident in Exit Level Outcomels 1, 3, **4.**
- Monitoring and interpreting product quality data and data obtained from product analysis; Evident in Exit Level Outcomels 1, 3, **4.**
- Managing records, reports and stock; Evident in 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; Evident in Exit Level Outcomels 1, 3, **4.**
- Preparing and presenting reports; Evident in Exit Level Outcomels 1, 3, **4.**

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 **all** Exit Level Outcomes.
- Controlling technologically advanced production equipment according to operating procedures; Evident in all Exit Level Outcomes.
- Working and interpreting technologically advanced instrumentation and computer systems; Evident in 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; Evident in Exit Level Outcomels 3, 4.
- Adjusting equipment and machinery while taking cognisance of the downstream impact; Evident in Exit Level Outcomels 1, 3, 4.

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 all Exit Level Outcomes.
- Maintaining and applying quality practices in the production environment; Evident in Exit Level Outcomels 3, 4.
- Performing core operating functions: Evident in Exit Level Outcomels 3.
- Performing specialised computer functions; Evident in Exit Level Outcomels 1, 3, **4.**

ASSOCIATED ASSESSMENT CRITERIA

1.
- Statistical process control is performed in a process environment.
- Instrument control loops are identified and interpreted in accordance with specified requirements.
- Operating problems in a process plant are addressed in accordance with specifications

2.
- Emergencies in a process environment are responded to in accordance with specified requirements.
- The work permit system is explained and applied in accordance with organisational requirements.

3.
- The principles of chemistry and physics are explained in relation to a processing environment.
- Operating instructions are used to control process plant conditions.
- Statistical process control is performed in accordance with specifications.
- Solid-vapour and liquid-vapour separation processes are explained with examples.
- Plant is monitored in a process environment in accordance with specified requirements.
- Process and instrument diagrams are read and interpreted in accordance with code of practice.
- Instrument control loops are identified and interpreted in accordance with specifications.

4.
- On-site analysis of process materials is conducted in accordance with requirements.
- The quality of products is maintained in a production environment.
- 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 candidate 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

Benchmarking was done against 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 roles 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 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:

• Well-developed interpersonal skills.
• Assessors to meet the requirements of the generic assessor standards.
• Competence against the unit standard "Conduct outcomes-based assessments".
• 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 relevant ETQA as specified through an appropriate memorandum of understanding.

NOTES
This qualification replaces qualification 22867, "National Certificate in Chemical Systems Operation NQF Level 3 ", Level 3, 122 credits.

UNIT STANDARDS

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Core	244085	Respond to emergencies in a process environment	Level 3	6
Core	244091	Identify and interpret instrument control loops	Level 3	8
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
Core	244098	Perform statistical process control in a process environment	Level 3	4
Core	244090	Demonstrate understanding of the principles of kinematics in physics	Level 3	6
Core	244092	Demonstrate understanding of solid-vapour and surface based separation processes	Level 3	10
Core	244086	Apply quality procedures in a process plant	Level 3	6
Core	244093	Read and interpret process and instrumentation diagrams	Level 3	4
Core	244241	Apply knowledge of chemical reactions in a processing environment	Level 3	6
Elective	244108	Apply safety, health and environment protection procedures in a process plant	Level 3	6
Elective	244088	Act as the Safety Watcher during the performance of maintenance activities	Level 3	3
Elective	10255	Select, use and care for power tools	Level 2	5
Elective	116936	Use a Graphical User Interface (GUI)-based database application to work with simple databases	Level 3	3
Elective	119078	Use a GUI-based word processor to enhance a document through the use of tables and columns	Level 3	5
Elective	116518	Conduct safety and health representation activities	Level 2	3

Source: National Learners' Records Database Qualification 58537 26/04/2007 Page 7

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Elective	244095	Dismantle, assemble and install basic components in a process environment	Level 3	6
Elective	10170	Demonstrate understanding of employment relations in an organisation	Level 3	3
Elective	114981	Capture numerical and text information on an electronic database	Level 2	2
Elective	116940	Use a Graphical User Interface (GUI)-based spreadsheet application to solve a given problem	Level 3	6
Elective	119744	Select, use and care for engineering hand tools	Level 2	8
Elective	244094	Perform and support maintenance functions	Level 3	5
Elective	244096	Conduct on-site analysis of process materials	Level 3	5
Fundamental	119472	Accommodate audience and context needs in oral/signed communication	Level 3	5
Fundamental	119457	Interpret and use information from texts	Level 3	5
Fundamental	119465	Write/present/sign texts for a range of communicative contexts	Level 3	5
Fundamental	119467	Use language and communication in occupational learning programmes	Level 3	5
Fundamental	9013	Describe, apply, analyse and calculate shape and motion in 2-and 3-dimensional space in different contexts	Level 3	4
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	7456	Use mathematics to investigate and monitor the financial aspects of personal, business and national issues	Level 3	5
Fundamental	9012	Investigate life and work related problems using data and probabilities	Level 3	5

Source: National Learners' Records Database Qualification 58537 26/04/2007 Page 8

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Use operating instructions to control process plant conditions

SGB		***PROVIDER***	
Chemical Industries SGB			
FIELD		***SUBFIELD***	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	***UNIT STANDARD TYPE***	***NQF LEVEL***	***CREDITS***
Undefined	Regular	Level 3	1 n

SPECIFIC OUTCOME 1
Apply Standard Operating Procedures **(SOPs)** in starting up a process.

SPECIFIC OUTCOME 2
Apply Standard Operating Procedures (SOPs) to achieve normal operating conditions.

SPECIFIC OUTCOME 3
Apply Standard Operating Procedures (SOPs) in shutting down a process.

SPECIFIC OUTCOME 4
Apply Standard Operating Procedures (SOPs) in correcting abnormal conditions

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Respond to emergencies in a process environment

SGB		***PROVIDER***	
Chemical Industries **SGB**			
FIELD		***SUBFIELD***	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	***UNIT STANDARD TYPE***	***NQF LEVEL***	***CREDITS***
Undefined	Regular	Level ***3***	6

SPECIFIC OUTCOME 1
Assess emergency conditions according to SOPs

SPECIFIC OUTCOME 2
Evacuate all non-essential persons from the emergency area.

SPECIFIC OUTCOME 3
Respond to serious injury to personnel.

SPECIFIC OUTCOME 4
Contain the effect of the failure to minimise the threat to human life, equipment and the environment.

SPECIFIC OUTCOME 5
Return plant to normal operating conditions after a plant or service failure

SPECIFIC OUTCOME 6
Complete post emergency functions.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

SGB		***PROVIDER***	
Chemical Industries SGB			
FIELD		***SUBFIELD***	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	***UNIT STANDARD TYPE***	***NQF LEVEL***	***CREDITS***
Undefined	Regular	Level ***3***	6

SPECIFIC OUTCOME 1
Demonstrate an understanding *of* quality control.

SPECIFIC OUTCOME 2
Apply quality assurance principles to process parameters:

SPECIFIC OUTCOME 3
Apply quality assurance principles to assess product quality.

SPECIFIC OUTCOME 4
Recognise and address quality problems in work area.

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Solve operating problems in a process plant

SAQA US ID	*UNIT STANDARD TITLE*		
244087	Solve operating problems in a process plant		
SGB		*PROVIDER*	
Chemical Industries SGB			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level *3*	5

SPECIFIC OUTCOME 1
Identify and quantify the process variables deviating from the standard during process operation.

SPECIFIC OUTCOME 2
Establish and execute/suggest the optimum action to be taken

SPECIFIC OUTCOME 3
Select solutions.

SPECIFIC OUTCOME 4
Implement solutions and carry out follow-up activities

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Act as the Safety Watcher during the performance of maintenance activities

SAQA US ID	*UNIT STANDARD TITLE*		
244088	Act as the Safety Watcher during the performance of maintenance activities		
SGB		*PROVIDER*	
Chemical Industries SGB			
FIELD		*SUBFIELD*	
6 - Manufacturing. Engineering and Technology		Manufacturing and Assembly	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	3

SPECIFIC OUTCOME 1
Understand the role and functions *of* the Safety Watcher.

SPECIFIC OUTCOME 2
Prepare for chemical safety as part of safety watcher dutie in a rocess are

SPECIFIC OUTCOME 3
Understand the role *of* the safety watcher in enforcing the work permit system.

SPECIFIC OUTCOME 4
Monitor the working environment with gas testing equipment as required by the work permit.

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Demonstrate understanding of the principles of kinematics in physics

SAQA US ID	*UNIT STANDARD TITLE*		
244090	Demonstrate understanding of the principles of kinematics in physics		
SGB		*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	6

SPECIFIC OUTCOME 1
Demonstrate an understanding *of* concepts related to position and displacement.

SPECIFIC OUTCOME *2*
Demonstrate an understanding of force, mass and acceleration.

SPECIFIC OUTCOME 3
Demonstrate an understanding of velocity and acceleration.

SPECIFIC OUTCOME 4
Demonstrate an understanding *of* relative velocities

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIJ S JANDARD:

Identify and interpret instrument control loops

SAQA US ID	*UNIJSJANDARD TITLE*		
244091	Identify and interpret instrument control loops		
SGB		*PROVIDER*	
Chemical Industries **SGB**			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	*UNIJSJANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	8

SPECIFIC OUTCOME 1
Explain the principles of control loops

SPECIFIC OUTCOME *2*
Describe the use and application of safety devices in control loops

SPECIFIC OUTCOME 3
Interpret the application of control loops in a process

SPECIFIC OUTCOME 4
Apply control ioop theory in day-to-day problem solving

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Demonstrate understanding of solid-vapour and surface based separation processes

SAQA US ID	UNITSTAND		
244092	Demonstrate understanding of solid-vapour and surface based separation processes		
SGB		PROVIDER	
Chemical Industries SGB			
FIELD		SUBFIELD	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 3	10

SPECIFIC OUTCOME 1
Demonstrate an understanding of crystallisation in process applications.

SPECIFIC OUTCOME 2
Demonstrate an understanaing of drying in process applications

SPECIFIC OUTCOME 3
Demonstrate an understanding of membrane based processes

SPECIFIC OUTCOME 4
Demonstrate an understanding of surface based processes

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Read and interpret process and instrumentation diagrams

SGB		***PROVIDER***	
Chemical Industries SGB			
FIELD		***SUBFIELD***	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	***UNIT STANDARD TYPE***	***NQF LEVEL***	***CREDITS***
Undefined	Regular	Level *3*	*4*

SPECIFIC OUTCOME 1
Locate and identify process and instrumentation diagrams

***SPECIFIC OUTCOME* 2**
Read and interpret P&IDs.

***SPECIFIC OUTCOME* 3**
Identify piping and valves from P&IDs

***SPECIFIC OUTCOME* 4**
Identify equipment from P&IDs.

SPECIFIC OUTCOME *5*
Identify instrumentation from P&IDs

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Perform ***and*** support maintenance functions

SGB		***PROVIDER***	
Chemical Industries SGB			
FIELD		***SUBFIELD***	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	***UNIT STANDARD TYPE***	***NQF LEVEL***	***CREDITS***
Undefined	Regular	Level ***3***	5

SPECIFIC OUTCOME 1
Understand planned maintenance, scheduled (statutory) and breakdown maintenance.

SPECIFIC OUTCOME 2
Communicate maintenance requirements

SPECIFIC OUTCOME 3
Prepare equipment for maintenance

SPECIFIC OUTCOME 4
Perform post maintenance tasks

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Dismantle, assemble and install basic components in a process environment

SGB		***PROVIDER***	
Chemical Industries **SGB**			
FIELD		***SUBFIELD***	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	***UNIT STANDARD N P E***	***NQF LEVEL***	***CREDITS***
Undefined	Regular	Level ***3***	6

SPECIFIC OUTCOME 1
Prepare for activity.

SPECIFIC OUTCOME 2
Dismantle assembly.

SPECIFIC OUTCOME 3
Assemble components and install sub-assembly

SPECIFIC OUTCOME 4
Perform in-line checks and post-installation activities

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Conduct an-site analysis of process materials

SGB		***PROVIDER***	
Chemical Industries SGB			
FIELD		***SUBFIELD***	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	***UNIT STANDARD TYPE***	***NQF LEVEL***	***CREDITS***

SPECIFIC OUTCOME 1
Understand and explain safe working practices in a plant laboratory.

SPECIFIC OUTCOME 2
Handle laboratory equipment in accordance with **SOPs**

SPECIFIC OUTCOME 3
Handle laboratory chemicals in accordance with SOPs

SPECIFIC OUTCOME 4
Conduct tests and take readings in accordance with specifications and work policies and procedures.

SPECIFIC OUTCOME 5
Analyse and record data obtained from tests

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

SGB		***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	

SPECIFIC OUTCOME 1
Describe the principles *of* statistical process control.

SPECIFIC OUTCOME *2*
Select process applications that may benefit from SPC

SPECIFIC OUTCOME 3
Collect, organise and plot data to derive statistics

SPECIFIC OUTCOME 4
Interpret process control charts

SPECIFIC OUTCOME 5
Recommend corrective actions.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Apply safety, health and environment protection procedures in a process plant

SAQA US ID	UNIT STANDARD TITLE		
244108	Apply safety, health and environment protection procedures in a process plant		
SGB		PROVIDER	
Chemical Industries SGB			
FIELD		SUBFIELD	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 3	6

SPECIFIC OUTCOME 1
Explain the responsibilities and liability regarding safety in the workplace.

SPECIFIC OUTCOME 2
Prepare for safety and environmental inspections in work area

SPECIFIC OUTCOME 3
Conduct safety, health and environmental inspections in work area

SPECIFIC OUTCOME **4**
Respond to unsafe unacceptable conditions in work area.

SAQA

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Apply knowledge of chemical reactions in a processing environment

SGB		***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***	6

SPECIFIC OUTCOME 1
Perform elementary chemical calculations

SPECIFIC OUTCOME 2
Demonstrate an understanding of acids and bases

SPECIFIC OUTCOME 3
Demonstrate an understanding of oxidation-reduction (redox) reactions and their industrial applications.

SPECIFIC OUTCOME 4
Demonstrate understanding **of** chemical reaction rates.

SPECIFIC OUTCOME 5
Demonstrate understanding of chemical equilibrium