

**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

Water Sector

registered by Organising Field 12, Physical Planning and Construction, 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.saqqa.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 17 September 2007**. All correspondence should be marked **Standards Setting – Water Sector** addressed to

The Director: Standards Setting and Development
SAQA

Attention: Mr. D. Mphuthing

Postnet Suite 248

Private Bag X06

Waterkloof

0145

or faxed to 012 – 431-5144

e-mail: dmphuthing@saqa.org.za

DR S BHIKHA

DIRECTOR: STANDARDS SETTING AND DEVELOPMENT



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:**National Certificate: Water and Wastewater Treatment Process Operations**

SAQA QUAL ID	QUALIFICATION TITLE		
58951	National Certificate: Water and Wastewater Treatment Process Operations		
ORIGINATOR		PROVIDER	
SGB Water Sector			
QUALIFICATION TYPE	FIELD	SUBFIELD	
National Certificate	12 - Physical Planning and Construction	Civil Engineering Construction	
ABET BAND	MINIMUM CREDITS	NQF LEVEL	QUAL CLASS
Undefined	130	Level 2	Regular-Unit Stds Based

PURPOSE OF THE QUALIFICATION

Purpose:

This qualification is aimed at persons who work or intend to work in the water and wastewater treatment plant and who seek recognition for essential skills in water and wastewater treatment works. This qualification will provide learners with a basic knowledge and understanding of the water and wastewater treatment works. Qualifying learner will be able to operate processes at a water and wastewater treatment works in line with the relevant legislation within the water sector. The qualifying learner will understand the implications on cost, health and the environmental conservation of water. This qualification forms the foundation for advancement or progression to the highest levels within the qualification learning pathways.

Qualifying learners will be competent in:

- Applying fundamental knowledge and understanding of current legislation specific to water and wastewater treatment.
- Operating processes at a water and wastewater treatment works.
- Demonstrating an understanding and knowledge of equipment to be used to perform water and wastewater treatment works.
- Communicating with team workers for effective shift take-over and hand-over.

Rationale:

This qualification reflects the workplace-based needs of water and wastewater process operators working in the water sector that are expressed by employers and employees, both now and for the future. The introduction of a National Certificate in Water and Wastewater Process Operations on NQF Level 2 provides the learner with a career path in water and wastewater processes with skills specific to the operation of processes of a water and wastewater treatment works and progression to a National Certificate in Water and Wastewater Process [senior operator] on NQF Level 3 (which will provide the skills necessary for the supervision of a water and wastewater treatment works).

This qualification will enable learners to reach their potential of advancement without the lack of formal education being an impassable barrier. In addition, the qualification will provide access to employment opportunities within the water sector, together with the flexibility to pursue different careers other related sectors such as pollution control, wet industries, electricity generation,

environmental qualifications and will allow for advancement through the recognition of prior learning.

This qualification also focuses on the development of the learner and further mobility and transportability within the water sector. It has been developed to assist with standardisation across the water purification industry and to permit learners, through several common unit standards, to access the complementary Wastewater Process Operation qualification with valuable employment potentials. This qualification will enhance productivity within the water sector, improve the health of communities and contribute towards the ecological sustainability and improvement of the water environment. The individual will have the capacity to advance and gain skills and self-confidence.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED IN PLACE

It is assumed that the learner is competent in:

- Communication at NQF Level 1.
- Mathematical Literacy at NQF Level 1.

Recognition of Prior Learning:

This qualification may be achieved in part or completely through the recognition of prior learning, which includes formal, informal and non-formal learning and work experience. Any learner wishing to be directly assessed may arrange to do so, without attending further training or education. The assessor and learner will decide together on the most appropriate assessment route to be taken.

Access to the qualification:

Access to this qualification is open bearing in mind learning assumed to be in place.

QUALIFICATION RULES

Fundamental:

- All the unit standards in the fundamental component to the value of 36 credits are compulsory.

Core:

- All the unit standards in the core component to the value of 65 credits are compulsory.

Electives:

- Learners must choose a minimum of 18 credits from the elective.

The elective unit standards are clustered to provide areas of specialisation within the water and wastewater domains. Learners choosing an area of specialisation must complete all unit standards listed within that area of specialisation. Additional credits to the value of 11 should be selected from the generic cluster to make up 130 credits in order for the learner to obtain the qualification.

Specialisation Area A:

Water Treatment Process Operations:

Elective:

- ID 246450: Demonstrate knowledge of water treatment process, Level 2, 8 Credits.
- ID 246440: Operate coagulation, flocculation and sedimentation processes, Level 2, 10 Credits.

Total Credits: 18.

Specialisation Area B:

Wastewater Treatment Process Operations:

Elective:

- ID 246469: Operate primary settling processes in wastewater treatment, Level 2, 5 Credits.
- ID 246468: Operate inlet works, Level 2, 5 Credits.
- ID 246460: Demonstrate basic knowledge of the wastewater treatment process, Level 2, 8 Credits.

Total Credits: 18

Specialisation Area C:

Generic:

Electives:

- ID 116534: Carry out basic first aid treatment in the workplace, Level 3, 2 Credits.
- ID 246486: Operate water recovery unit, Level 2, 4 Credits.
- ID 116932: Operate a personal computer system, Level 1, 3 Credits.
- ID 246448: Operate rotating biodisc contactor Level 2, 2 Credits.
- ID 246445: Operate a biological trickling filter, Level 2, 4 Credits.
- ID 246446: Operate a rapid gravity filtration process, Level 3, 5 Credits.
- ID 246437: Demonstrate knowledge of activated sludge processes in wastewater treatment, Level 3, 6 Credits.
- ID 246441: Maintain maturation and oxidation ponds, Level 1, 2 Credits.

Total Credits: 28.

EXIT LEVEL OUTCOMES

On achieving this qualification the qualifying learner will be able to:

1. Apply fundamental knowledge and understanding of current legislation specific to water and wastewater treatment.
2. Operate processes at a water and wastewater treatment works.
 - Range: Processes refer but not limited to processes of coagulation, flocculation and sedimentation processes; operating a sand filter, a pump, water chemical dosing system and operating water recovery unit and disposing of sludge.
3. Demonstrate an understanding and knowledge of equipment to be used to perform water and wastewater treatment works.
4. Communicate with team workers.
 - Range: To ensure smooth shift-take over and handover.

Critical Cross-Field Outcomes:

The qualifying learner will be able to:

- The learner is capable of identifying water and wastewater related problems and creatively to find trouble-shooting solutions.
- Work effectively with others as a member of a team on a daily basis to effectively produce potable water.
- Organise and manage oneself and one's activities responsibly and effectively to implement effective and efficient running of the water and wastewater treatment works.
- Communicate effectively using appropriate verbal and nonverbal skills to ensure a smooth shift take-over and hand-over and reporting all work related issues.
- Demonstrate an understanding of the world, as a set of related systems by recognising that problem solving in the context of water and wastewater does not happen in isolation.
- Use science and technology to show responsibility towards the environment and health of the broader community.

ASSOCIATED ASSESSMENT CRITERIA

Associated Assessment Criteria for Exit level 1:

- Knowledge of current regulatory framework is demonstrated by assessing the quality of water treated.
- Knowledge of the Occupational Health and Safety Act is demonstrated and applied to personal safety in a water and wastewater environment.
- Water and wastewater treatment processes are implemented in line with legal requirements.
- The implications of the current environmental legislation on water and wastewater treatment are explained in own work context.

Associated Assessment Criteria for Exit level 2:

- Water is treated to the required standard for drinking water.
- Laboratory tests are conducted to verify and optimise the performance of water purification treatment works.
 - Range: Designed test refers to but is not limited to cascade, jar test, and settling test.
- Purified water is pumped to the bulk reservoir for distribution purposes.

Associated Assessment Criteria for Exit level 3:

- Equipment and components of a sand filter are identified and applied in terms of their functions.
- Equipment and components of coagulation, flocculation and sedimentation processes are identified and applied in terms of their functions.
- Equipment and components of a sludge system are identified and applied in terms of their functions.
- Components and types of pumps are identified and applied in terms of their functions. Equipment and component of a chemical dosing system are identified and explained in terms of their functions.

Associated Assessment Criteria for Exit level 4:

- Verbal and non-verbal communications skills are used to brief incoming team member(s) on the operation of the water and wastewater treatment plant.
- Shift-take over and handover rules and procedures are adhered to when communicating with team workers.
- Reports are compiled in accordance with work policies and procedures for record keeping purposes.

Integrated Assessment:

Integrated assessment at the level of the qualification provides an opportunity for learners to show that they are able to integrate concepts, ideas and actions across unit standards to achieve competence that is grounded and coherent in relation to the purpose of the qualification. Integrated assessment should show how already demonstrated competence in individual areas can be linked and applied for the achievement of a holistic outcome.

Integrated assessment must judge the quality of the observable performance, and also the quality of the thinking that lies behind it. Assessment tools must encourage learners to give an account of the thinking and decision-making that underpin their demonstrated performance. Some assessment practices will demand practical evidence while others may be more theoretical, depending on the type of outcomes to be assessed, and the nature and level of the qualification. The ratio between action and interpretation is not fixed, but varies according to the demands of the qualification.

While the generic component (literacy, communication and life skills) of this qualification at NQF Level 2 can be assessed through occupational contexts and activities relating to water purification treatment, care must be taken in both the learning programme and the assessment to ensure that these foundational skills are truly portable. The primary aim of this qualification is to ensure that learners have a sound base of general education to prepare them for further learning, whatever career path they may choose. Learners must be able to transfer generic skills such as language, computation and learning skills etc across a number of different contexts, and apply them within a number of learning areas.

A broad range of task-orientated and theoretical assessment tools may be used, with the distinction between practical knowledge and disciplinary knowledge maintained so that each takes its rightful place. Unit standards in the qualification must be used to assess specific and critical cross-field outcomes. During integrated assessments the assessor should make use of formative and summative assessment methods and should assess combinations of practical, applied, foundational and reflexive competencies.

INTERNATIONAL COMPARABILITY

International qualifications were examined to ensure that the qualification model and associated unit standards proposed are comparable in terms of qualification levels, scope and competencies covered. However, the core and elective components have been developed and/or revised taking into account South Africa's unique context, but also looking at international best practice.

Qualifications from the following countries were examined:

Australian Qualifications Framework (AQF):

- NWP01 Water Industry and the Certificate Course in Water and Wastewater.

Scottish Vocational Qualifications (SQA):

- Monitoring the Water Environment level 2, Code G322.
- Operating Process Plant: Sludge level 2, Code G31M.
- Operating Process Plant: Sludge level 2, Code G5HC.
- Operating Process Plant: Water level 2, Code G31J.
- Operating Process Plant: Water level 2, Code G5HE.

New Zealand Qualifications Authority (NZQA):

- National Certificate in Water Treatment (Site Operator).
- National Certificate in Wastewater Treatment (Site Operator), NQF Ref 0879.

United Kingdom (QCA):

- City & Guilds Level 2 Certificate in Water Engineering, 500/1698/2.
- Certificate in Process Plant Operations Level 2.

Findings concerning comparability:

A substantial degree of similarity was found in most of the qualifications examined. Although the South African qualification combines both water and wastewater process operations due to the similarities found in the core components of both qualifications, the revised qualification provides a mix of mandatory unit standards to cover both water and wastewater core competencies and electives as optional units that enable learners to choose from to address their particular roles in their respective areas of specialization.

The South African qualification and its associated unit standards is generally comparable to the Scottish, Australian, New Zealand in terms of levels, scope and range of competencies covered and slightly with the United Kingdom qualification as well although the titles of the qualifications differ.

ARTICULATION OPTIONS

Vertical articulation is possible with:

- National Certificate: Water and Wastewater Treatment Process Operations at NQF Level 3.

Horizontally articulation is possible with:

- National Certificate: Pollution at NQF Level 2.

MODERATION OPTIONS

• Anyone assessing a learner against these standards must be registered as an assessor with the relevant ETQA.

• Any institution offering learning that will enable achievement of these unit standards or will assess these unit standards must be accredited as a provider with the relevant ETQA.

• Moderation of assessment will be overseen by the relevant ETQA according to the moderation guidelines in the relevant qualification and the agreed ETQA procedures.

• Therefore 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

For an applicant to register as an assessor, the applicant needs:

- The assessor must have a qualification at or above the level of this qualification plus a minimum of two years practical, relevant occupational experience.
- Competency in all the outcomes of the generic assessor standard.
- Detailed documentary proof of educational qualification, practical training undergone, and experience gained by the applicant must be provided (Portfolio of evidence).
- To demonstrate competence in relation to these specified standards and qualifications, at or above, the level of the qualifications in question.
- To meet any other additional requirements laid down by their constituent ETQA.

- The subject matter experience of the assessor can be established by recognition of prior learning.
- The status of registered assessors can be checked on the appropriate ETQA database or website.

NOTES

This qualification replaces two qualifications:

- ID 24193, National Certificate: Water Purification Process Operations, Level 2, 120 credits.
- ID 22673, National Certificate: Wastewater Process Operations, Level 2, 120 Credits.

UNIT STANDARDS

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Core	246472	Handle and dispose of water and wastewater sludge	Level 1	5
Core	246443	Operate a sand filter	Level 1	4
Core	246459	Apply personal safety practices in the water sector	Level 2	4
Core	246464	Conduct sampling for water and wastewater treatment processes	Level 2	4
Core	246461	Conduct water treatment process control tests	Level 2	4
Core	8494	Demonstrate an understanding of HIV/AIDS and its implications	Level 2	4
Core	246471	Demonstrate knowledge and understanding of plant equipment	Level 2	6
Core	246473	Demonstrate knowledge of elementary biology in the water wastewater environment	Level 2	3
Core	246463	Demonstrate knowledge of water cycle, water and wastewater systems and processes	Level 2	5
Core	246442	Operate pumps	Level 2	5
Core	246535	Operate the chlorine dosing process	Level 2	5
Core	246466	Operate water and wastewater chemical dosage systems	Level 2	10
Core	246449	Orientate self in the workplace	Level 2	6
Elective	246441	Maintain maturation and oxidation ponds	Level 1	2
Elective	116932	Operate a personal computer system	Level 1	3
Elective	246460	Demonstrate basic knowledge of the wastewater treatment process	Level 2	8
Elective	246450	Demonstrate knowledge of the water treatment process	Level 2	8
Elective	246445	Operate a biological trickling filter	Level 2	4
Elective	246440	Operate coagulation, flocculation and sedimentation processes	Level 2	10
Elective	246468	Operate inlet works	Level 2	5
Elective	246469	Operate primary settling processes in wastewater treatment	Level 2	5
Elective	246486	Operate water recovery unit	Level 2	4
Elective	246448	Operating a rotating biological contactor unit	Level 2	3
Elective	116534	Carry out basic first aid treatment in the workplace	Level 3	2
Elective	246437	Demonstrate knowledge of activated sludge processes in wastewater treatment	Level 3	6
Elective	246446	Operate a rapid gravity filtration process	Level 3	5
Fundamental	119463	Access and use information from texts	Level 2	5
Fundamental	9009	Apply basic knowledge of statistics and probability to influence the use of data and procedures in order to investigate life related problems	Level 2	3
Fundamental	7480	Demonstrate understanding of rational and irrational numbers and number systems	Level 2	3
Fundamental	9008	Identify, describe, compare, classify, explore shape and motion in 2-and 3-dimensional shapes in different contexts	Level 2	3
Fundamental	119455	Respond to selected literary texts	Level 2	5
Fundamental	119460	Use language and communication in occupational learning programmes	Level 2	5
Fundamental	7469	Use mathematics to investigate and monitor the financial aspects of personal and community life	Level 2	2
Fundamental	9007	Work with a range of patterns and functions and solve problems	Level 2	5

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Fundamental	119456	Write/present for a defined context	Level 2	5



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Demonstrate knowledge of activated sludge processes in wastewater treatment***

SAQA US ID	UNIT STANDARD TITLE		
246437	Demonstrate knowledge of activated sludge processes in wastewater treatment		
ORIGINATOR		PROVIDER	
SGB Water Sector			
FIELD		SUBFIELD	
12 - Physical Planning and Construction		Civil Engineering Construction	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 3	6

SPECIFIC OUTCOME 1

Describe the theory of activated sludge.

SPECIFIC OUTCOME 2

Describe the layout of the plant.

SPECIFIC OUTCOME 3

Make adjustments on the plant.

SPECIFIC OUTCOME 4

Monitor performance of the plant.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Operate coagulation, flocculation and sedimentation processes***

SAQA US ID	UNIT STANDARD TITLE		
246440	Operate coagulation, flocculation and sedimentation processes		
ORIGINATOR		PROVIDER	
SGB Water Sector			
FIELD		SUBFIELD	
12 - Physical Planning and Construction		Civil Engineering Construction	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	10

SPECIFIC OUTCOME 1

Obtain chemical solutions for jar testing.

SPECIFIC OUTCOME 2

Evaluate the flash mixing and coagulation process.

SPECIFIC OUTCOME 3

Monitor the flocculation process.

SPECIFIC OUTCOME 4

Operate the sedimentation process.

SPECIFIC OUTCOME 5

Operate sludge withdrawal process.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Maintain maturation and oxidation ponds***

SAQA US ID	UNIT STANDARD TITLE		
246441	Maintain maturation and oxidation ponds		
ORIGINATOR			PROVIDER
SGB Water Sector			
FIELD			SUBFIELD
12 - Physical Planning and Construction			Civil Engineering Construction
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 1	2

SPECIFIC OUTCOME 1

Monitor anaerobic ponds.

SPECIFIC OUTCOME 2

Describe the differences between oxidation and maturation ponds.

SPECIFIC OUTCOME 3

Maintain inlets and outlets in accordance with work policies and procedures.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:**Operate pumps**

SAQA US ID	UNIT STANDARD TITLE		
246442	Operate pumps		
ORIGINATOR		PROVIDER	
SGB Water Sector			
FIELD		SUBFIELD	
12 - Physical Planning and Construction		Civil Engineering Construction	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	5

SPECIFIC OUTCOME 1

Explain working principles of pumps.

SPECIFIC OUTCOME 2

Demonstrate knowledge of a pumping system.

SPECIFIC OUTCOME 3

Maintain pumps.

SPECIFIC OUTCOME 4

Maintain drive units of pumps.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:**Operate a sand filter**

SAQA US ID	UNIT STANDARD TITLE		
246443	Operate a sand filter		
ORIGINATOR	PROVIDER		
SGB Water Sector			
FIELD	SUBFIELD		
12 - Physical Planning and Construction	Civil Engineering Construction		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 1	4

SPECIFIC OUTCOME 1

Explain the filtration process.

SPECIFIC OUTCOME 2

Control water flow.

SPECIFIC OUTCOME 3

Explain the different types of filters.

SPECIFIC OUTCOME 4

Monitor filter performance.

SPECIFIC OUTCOME 5

Perform backwashing process of a rapid gravity sand filter.

SPECIFIC OUTCOME 6

Explain the unclogging of a slow sand filter.

SPECIFIC OUTCOME 7

Maintain a sand filter.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:**Operate a biological trickling filter**

SAQA US ID	UNIT STANDARD TITLE		
246445	Operate a biological trickling filter		
ORIGINATOR		PROVIDER	
SGB Water Sector			
FIELD		SUBFIELD	
12 - Physical Planning and Construction		Civil Engineering Construction	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	4

SPECIFIC OUTCOME 1

Explain the operation of a biological trickling filter process.

SPECIFIC OUTCOME 2

Monitor and control a biological trickling filter.

SPECIFIC OUTCOME 3

Apply methods to maintain a biological trickling filter.

SPECIFIC OUTCOME 4

Collate data for biological trickling filters.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:**Operate a rapid gravity filtration process**

SAQA US ID	UNIT STANDARD TITLE		
246446	Operate a rapid gravity filtration process		
ORIGINATOR			PROVIDER
SGB Water Sector			
FIELD			SUBFIELD
12 - Physical Planning and Construction			Civil Engineering Construction
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 3	5

SPECIFIC OUTCOME 1

Identify and explain the principles of rapid gravity filtration.

SPECIFIC OUTCOME 2

Maintain the filter media.

SPECIFIC OUTCOME 3

Maintain the filter structure.

SPECIFIC OUTCOME 4

Conduct an inspection of compressors, blowers and backwash pumps and compare with design parameters.

SPECIFIC OUTCOME 5

Read and interpret flow indicators.

SPECIFIC OUTCOME 6

Collate data for filtration process.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Operating a rotating biological contactor unit***

SAQA US ID	UNIT STANDARD TITLE		
246448	Operating a rotating biological contactor unit		
ORIGINATOR		PROVIDER	
SGB Water Sector			
FIELD		SUBFIELD	
12 - Physical Planning and Construction		Civil Engineering Construction	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	3

SPECIFIC OUTCOME 1

Explain the operation of a rotating biological contactor process.

SPECIFIC OUTCOME 2

Monitor and control a rotating biological contactor.

SPECIFIC OUTCOME 3

Apply methods to maintain a rotating biological contactor.

SPECIFIC OUTCOME 4

Collate data for rotating biological contactors.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Orientate self in the workplace***

SAQA US ID	UNIT STANDARD TITLE		
246449	Orientate self in the workplace		
ORIGINATOR	PROVIDER		
SGB Water Sector			
FIELD	SUBFIELD		
12 - Physical Planning and Construction	Civil Engineering Construction		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	6

SPECIFIC OUTCOME 1

Explain reporting procedures at own works.

SPECIFIC OUTCOME 2

Explain organisational structure relating to own position.

SPECIFIC OUTCOME 3

Explain security procedures.

SPECIFIC OUTCOME 4

Draw a layout of own works.

SPECIFIC OUTCOME 5

Explain work policies and procedures relating to own job.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Demonstrate knowledge of the water treatment process***

SAQA US ID	UNIT STANDARD TITLE		
246450	Demonstrate knowledge of the water treatment process		
ORIGINATOR	PROVIDER		
SGB Water Sector			
FIELD	SUBFIELD		
12 - Physical Planning and Construction	Civil Engineering Construction		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	8

SPECIFIC OUTCOME 1

Explain the water treatment process.

SPECIFIC OUTCOME 2

Explain turbidity and the removal of suspended particles from water.

SPECIFIC OUTCOME 3

Explain acidity and alkalinity.

SPECIFIC OUTCOME 4

Explain the disinfection process.

SPECIFIC OUTCOME 5

Explain and interpret the distribution network.

SPECIFIC OUTCOME 6

Explain sludge handling process.

SPECIFIC OUTCOME 7

Demonstrate knowledge of water treatment monitoring process.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Apply personal safety practices in the water sector***

SAQA US ID	UNIT STANDARD TITLE		
246459	Apply personal safety practices in the water sector		
ORIGINATOR			PROVIDER
SGB Water Sector			
FIELD			SUBFIELD
12 - Physical Planning and Construction			Civil Engineering Construction
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	4

SPECIFIC OUTCOME 1

Demonstrate knowledge of personal safety practices at the workplace.

SPECIFIC OUTCOME 2

Identify and explain the roles and responsibilities of a health and safety representative.

SPECIFIC OUTCOME 3

Explain the health and safety procedures relating to own job.

SPECIFIC OUTCOME 4

Apply emergency procedures in own work situation.

SPECIFIC OUTCOME 5

Maintain good housekeeping practices in a working environment.

SPECIFIC OUTCOME 6

Identify and explain occupational health and safety hazards in the water sector.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Demonstrate basic knowledge of the wastewater treatment process***

SAQA US ID	UNIT STANDARD TITLE		
246460	Demonstrate basic knowledge of the wastewater treatment process		
ORIGINATOR		PROVIDER	
SGB Water Sector			
FIELD		SUBFIELD	
12 - Physical Planning and Construction		Civil Engineering Construction	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	8

SPECIFIC OUTCOME 1

Explain the properties of water and water contaminants.

SPECIFIC OUTCOME 2

Explain different sources of wastewater.

SPECIFIC OUTCOME 3

Identify and describe the steps of the wastewater treatment process.

SPECIFIC OUTCOME 4

Explain different types of sanitation systems.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Conduct water treatment process control tests***

SAQA US ID	UNIT STANDARD TITLE		
246461	Conduct water treatment process control tests		
ORIGINATOR		PROVIDER	
SGB Water Sector			
FIELD		SUBFIELD	
12 - Physical Planning and Construction		Civil Engineering Construction	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	4

SPECIFIC OUTCOME 1

Calibrate test instruments.

SPECIFIC OUTCOME 2

Perform physical determinant tests.

SPECIFIC OUTCOME 3

Perform chemical determinant tests.

SPECIFIC OUTCOME 4

Conduct settling tests.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Demonstrate knowledge of water cycle, water and wastewater systems and processes

SAQA US ID	UNIT STANDARD TITLE		
246463	Demonstrate knowledge of water cycle, water and wastewater systems and processes		
ORIGINATOR		PROVIDER	
SGB Water Sector			
FIELD		SUBFIELD	
12 - Physical Planning and Construction		Civil Engineering Construction	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	5

SPECIFIC OUTCOME 1

Identify and explain the process of the natural water cycle.

SPECIFIC OUTCOME 2

Explain the impact of land-use on water within a catchment.

SPECIFIC OUTCOME 3

Discuss ground water as a water resource.

SPECIFIC OUTCOME 4

Discuss surface water as a water resource.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:**Conduct sampling for water and wastewater treatment processes**

SAQA US ID	UNIT STANDARD TITLE		
246464	Conduct sampling for water and wastewater treatment processes		
ORIGINATOR	PROVIDER		
SGB Water Sector			
FIELD	SUBFIELD		
12 - Physical Planning and Construction	Civil Engineering Construction		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	4

SPECIFIC OUTCOME 1

Identify and describe sampling points.

SPECIFIC OUTCOME 2

Prepare for sampling.

SPECIFIC OUTCOME 3

Perform chemical sampling.

SPECIFIC OUTCOME 4

Perform microbiological sampling.

SPECIFIC OUTCOME 5

Carry out associated field tests.

SPECIFIC OUTCOME 6

Explain the collection of samples from auto-samplers.

SPECIFIC OUTCOME 7

Prepare for hand over of samples.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:**Operate water and wastewater chemical dosage systems**

SAQA US ID	UNIT STANDARD TITLE		
246466	Operate water and wastewater chemical dosage systems		
ORIGINATOR	PROVIDER		
SGB Water Sector			
FIELD	SUBFIELD		
12 - Physical Planning and Construction	Civil Engineering Construction		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	10

SPECIFIC OUTCOME 1

Identify the chemicals used on a water and wastewater treatment plant.

SPECIFIC OUTCOME 2

Prepare chemical concentration and adjust chemical dosing rate.

SPECIFIC OUTCOME 3

Maintain chemical dosing facilities and equipment in a safe working condition.

SPECIFIC OUTCOME 4

Demonstrate knowledge of emergency procedures in emergency situations.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:**Operate inlet works**

SAQA US ID	UNIT STANDARD TITLE		
246468	Operate inlet works		
ORIGINATOR		PROVIDER	
SGB Water Sector			
FIELD	SUBFIELD		
12 - Physical Planning and Construction	Civil Engineering Construction		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	5

SPECIFIC OUTCOME 1

Plan work according to inlet flow and the occurrence of rain and pollution.

SPECIFIC OUTCOME 2

Remove and dispose screenings.

SPECIFIC OUTCOME 3

Explain the reasons for use of storm water and bypass weirs.

SPECIFIC OUTCOME 4

Dispose of grit from inlet works.

SPECIFIC OUTCOME 5

Record flow measurement in inlet works.

SPECIFIC OUTCOME 6

Identify and report equipment and structural defects.

SPECIFIC OUTCOME 7

Monitor influent to detect pollution.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Operate primary settling processes in wastewater treatment***

SAQA US ID	UNIT STANDARD TITLE		
246469	Operate primary settling processes in wastewater treatment		
ORIGINATOR	PROVIDER		
SGB Water Sector			
FIELD	SUBFIELD		
12 - Physical Planning and Construction	Civil Engineering Construction		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	5

SPECIFIC OUTCOME 1

Demonstrate knowledge of the different settling processes.

SPECIFIC OUTCOME 2

Dislodge and de-scum in accordance with working procedures.

SPECIFIC OUTCOME 3

Maintain settling tanks.

SPECIFIC OUTCOME 4

Collate data for settling tanks.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Demonstrate knowledge and understanding of plant equipment***

SAQA US ID	UNIT STANDARD TITLE		
246471	Demonstrate knowledge and understanding of plant equipment		
ORIGINATOR			PROVIDER
SGB Water Sector			
FIELD			SUBFIELD
12 - Physical Planning and Construction			Civil Engineering Construction
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	6

SPECIFIC OUTCOME 1

Identify and describe the different plant equipment on water and wastewater environment.

SPECIFIC OUTCOME 2

Apply safety procedures during the operation of plant equipment.

SPECIFIC OUTCOME 3

Demonstrate knowledge of plant instrumentation.

SPECIFIC OUTCOME 4

Maintain plant instrumentation.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Handle and dispose of water and wastewater sludge***

SAQA US ID	UNIT STANDARD TITLE		
246472	Handle and dispose of water and wastewater sludge		
ORIGINATOR	PROVIDER		
SGB Water Sector			
FIELD	SUBFIELD		
12 - Physical Planning and Construction	Civil Engineering Construction		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 1	5

SPECIFIC OUTCOME 1

Explain health and environmental risks when handling and disposing of water and wastewater sludge.

SPECIFIC OUTCOME 2

Identify and describe the disposal options for water and wastewater sludges.

SPECIFIC OUTCOME 3

Record the volume of water and wastewater sludge disposal.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Demonstrate knowledge of elementary biology in the water wastewater environment

SAQA US ID	UNIT STANDARD TITLE		
246473	Demonstrate knowledge of elementary biology in the water wastewater environment		
ORIGINATOR		PROVIDER	
SGB Water Sector			
FIELD	SUBFIELD		
12 - Physical Planning and Construction	Civil Engineering Construction		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	3

SPECIFIC OUTCOME 1

Identify and describe the classification of different living organisms.

SPECIFIC OUTCOME 2

Identify and explain micro and macro organisms.

SPECIFIC OUTCOME 3

Demonstrate knowledge of the importance of bacteria in water and wastewater environment.

SPECIFIC OUTCOME 4

Demonstrate knowledge of the potential dangers of viruses in the wastewater environment.

SPECIFIC OUTCOME 5

Explain the significance of aquatic plants in water and wastewater process.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:**Operate water recovery unit**

SAQA US ID	UNIT STANDARD TITLE		
246486	Operate water recovery unit		
ORIGINATOR			PROVIDER
SGB Water Sector			
FIELD			SUBFIELD
12 - Physical Planning and Construction			Civil Engineering Construction
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	4

SPECIFIC OUTCOME 1

Identify and explain the principles of water recovery unit.

SPECIFIC OUTCOME 2

Demonstrate knowledge and ability to use operating instructions.

SPECIFIC OUTCOME 3

Perform calculations relevant to recovery unit.

SPECIFIC OUTCOME 4

Maintain a recovery unit.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Operate the chlorine dosing process***

SAQA US ID	UNIT STANDARD TITLE		
246535	Operate the chlorine dosing process		
ORIGINATOR			PROVIDER
SGB Water Sector			
FIELD			SUBFIELD
12 - Physical Planning and Construction			Civil Engineering Construction
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	5

SPECIFIC OUTCOME 1

Demonstrate knowledge of the dangers of chlorine gas and chlorine compounds.

SPECIFIC OUTCOME 2

Apply safety procedures in handling chlorine and products.

SPECIFIC OUTCOME 3

Identify and describe a layout plan of the chlorine dosing installation.

SPECIFIC OUTCOME 4

Operate chlorine dosing equipment.

SPECIFIC OUTCOME 5

Measure the effectiveness of chlorine dosing.

SPECIFIC OUTCOME 6

Measure chlorine residual.