No. 749

22 July 2005



SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

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

Physical Planning and Construction

publishes the following qualification for public comment.

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

Comment on the qualification and unit standards should reach SAQA at the address below and no later than 22 August 2005. All correspondence should be marked Standards Setting = Electrical Engineering and Construction and addressed to

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

DUGNORE MPHUTHING ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT



QUALIFICATION:

SAQA QUAL IL	QUALIFICATION	QUALIFICATION TITLE		
49773	National Certificate	National Certificate: Overhead Track Equipment		
SGB NAME		NSB 12	PROVIDER NAME	
SGB Electrical Engineering & Construction		Physical Planning and Construction		
QUAL TYPE		FIELD	SUBFIELD	
National Certificate		Physical Planning and Construction	Electrical Infrastructure Construction	
ABET BAND	MINIMUM CREDITS	NQF LEVEL	QUALIFICATION CLASS	
Undefined	137	Level 2	Regular-Unit Stds Based	

PURPOSE AND RATIONALE OF THE QUALIFICATION

Purpose:

The primary purpose of this qualification is to develop competencies in a learner as required for a career in the overhead track systems.

A learner credited with this qualification will be able to:

> safely and effectively maintain overhead track structures and return circuits.

> progress through learning in the overhead track environment.

Qualified learners will be able to:

> Understand the basics of how the business functions and its role in the rail sector, i.e. overhead track systems and related activities.

> Safely and correctly clean and paint overhead track structures.

> Safely and correctly perform bonding and earthing on 3 kV DC and 25/50 kV AC systems.

> Communicate effectively with relevant role players (e.g. peers, managers, etc.) by expressing opinions in spoken and written form.

> Calculate quantities and distances correctly.

> The Core and Elective Unit Standards provide credits that allow the learner access to both vertically and horizontally articulated qualifications in the electrical engineering and construction field.

Rationale:

This qualification forms the basis for learners who want to follow a career in overhead track equipment and related fields. Overhead track equipment forms a critical part of the infrastructure of a rail transport system and contributes to reliable, available, safe and efficient train operations. It is therefore vitally important that overhead track equipment be safely and correctly maintained on 3 kV DC and 25/50 kV AC in order to meet standards set in associated overhead track equipment engineering specifications.

There are 3 qualifications in OHTE, Level 2, 3 and 4. This is the first qualification in the learning pathway. The qualification equips the learner with the skills, knowledge and understanding to safely and correctly perform cleaning, painting, bonding and earthing on overhead track equipment, such as overhead track structures and to return circuits to the required standards.

Learners credited with this qualification and who apply the acquired knowledge and skills can help address the critical shortage of qualified personnel in the industry. For the new learner, this qualification and its

standards, which are instrumental to the development and recognition of the foundational, practical and reflective competence (applied competence), are needed to be a productive person in a structured workplace and form the basis for further development.

These skills are essential in and to the following domains:

- > Enabling the rendering of electrical continuity to the rail transport service.
- > Enabling the rendering of a rail transport service.
- > Contributing to economic growth.

RECOGNIZE PREVIOUS LEARNING?

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LEARNING ASSUMED TO BE IN PLACE

It is assumed that learners are already competent in the following:

> Communication at NQF Level 1

> Mathematical Literacy at NQF Level 1

Recognition of prior learning

This qualification may be obtained in part or in whole through RPL. The learner should be thoroughly briefed on the mechanism to be used and support and guidance should be provided. Care should be taken that the mechanism used provides the learner with an opportunity to demonstrate competence and is not so onerous as to prevent learners from taking up the RPL option towards gaining a qualification.

The following tools may be used to supplement the above minimum assessment methods:

Valid, reliable and authentic evidence (presented as a portfolio of evidence) from past achievements and experience may serve to supplement the assessment of applied competence. The portfolio should include inter alia:

> Written statements from persons (e.g. current and / or previous employer, colleague, peer, manager, external customers) confirming competence of the learner.

- > Relevant certificates or awards.
- > Previous assessment records.
- > Logbook or register stating evidence of performance.

ACCESS TO THE QUALIFICATION

Access to the qualification is open to any learner bearing in mind the learning assumed to be in place. Learners need to be physically fit and robust.

Due to the safety requirements in the overhead track environment, learners must:

- > Not be colour blind
- > Not be claustrophobic
- > Be able to gauge distance
- > Be able to work at heights

QUALIFICATION RULES

Level, credits and learning components assigned to this qualification

Fundamental

- > Communication at NQF Level 2, 25 Credits
- > Mathematical Literacy at NQF Level 2, 16 Credits
- > Total: 41 credits

Core

- > 16 Credits at Level 1
- > 53 Credits at Level 2
- > 15 Credits at Level 3
- > Total: 84 credits

Elective

²⁰⁰⁵⁻⁰⁷⁻¹⁴

> 5 Credits at Level 1

> 16 Credits at Level 2

> 5 Credits at Level 3

> Total: 12 credits

The total credits for this qualification is 137.

Motivation for the number of credits assigned

> Fundamental Credits

16 credits are allocated to Mathematical Literacy and 25 for Communication.

> Core Credits

84 compulsory credits have been allocated to the Core Unit Standards to cover the field sufficiently.

> Elective Credits

A minimum of 12 credits has to be selected from the 26 listed Elective credits. These credits have been grouped to allow for progression to the next level of learning on the same railway signalling equipment.

EXIT LEVEL OUTCOMES

1. Perform bonding and earthing on 3 KV DC and 25/50KV AC on OHTE.

2. Clean and paint OHTE steel structures under isolated and earthed conditions.

3. Estimate, measure and calculate physical quantities to solve problems in practical situations.

4. Understand, maintain and apply health and safety regulations to a work area.

5. Demonstrate an understanding of the electrical environment in the rail sector.

6. Apply electrical high voltage safety instructions when working in the vicinity of or near exposed "live" high-voltage overhead track equipment.

ASSOCIATED ASSESSMENT CRITERIA

1.

> Preparations to perform bonding and earthing on 3 kV DC and 25/50 kV AC on OHTE are executed in accordance with company specific instructions and procedures.

> Bonding and earthing process is performed on 3 kV DC and 25/50 kV AC on OHTE according to company specific instructions and manufacturer's specifications.

> The process to perform bonding and earthing on 3 KV DC and 25/50KV AC on OHTE are finalised according to company specific instructions and procedures.

> The correct tools and personal protective equipment are identified, selected and used in accordance with company specific instructions and procedures.

> Problems related to the bonding and earthing process are identified and solved according to company specific instructions.

> Effective communication with relevant role-players relating to the execution of the bonding and earthing process on 3 kV DC and 25/50 kV AC on OHTE can be demonstrated by communicating clearly qnd concisely, in accordance with company-specific communication protocols.

> Working effectively in teams is understood and can be demonstrated by displaying participation when performing the bonding and earthing process on 3 kV DC and 25/50 kV AC on OHTE.

> The role of the individual in the work situation and organisation is demonstrated by organising and managing themselves and their activities related to the bonding and earthing process on 3 kV DC and 25/50 kV AC on OHTE by understanding and applying organisational procedures.

2.

> Preparations to perform the cleaning and painting on OHTE steel structures under isolated and earthed conditions are executed in accordance with company specific instructions and procedures.

> The cleaning and painting process on OHTE steel structures under isolated and earthed conditions is performed according to company specific instructions and manufacturer's specifications.

> The process to perform cleaning and painting on OHTE steel structures under isolated and earthed conditions are finalised according to company specific instructions and procedures.

> Information related to the cleaning and painting process on OHTE steel structures under isolated and earthed conditions is collected, analysed, organised and critically evaluated according to company specific instructions and manufacturer's specifications.

> The correct tools and personal protective equipment are identified, selected and used in accordance with company specific instructions and procedures.

> Working effectively in teams is understood and can be demonstrated by displaying participation when performing the cleaning and painting process on OHTE steel structures under isolated and earthed conditions.

> Science and technology is used in the preparation and application when cleaning and painting OHTE steel structures under isolated and earthed conditions according to company specific instructions and manufacturer's specifications.

> The role of the individual in the work situation and organisation is demonstrated by organising and managing themselves and their activities related to the cleaning and painting process of OHTE steel structures under isolated and earthed conditions by understanding and applying organisational procedures.

> Effective communication with relevant role-players relating to the execution of the cleaning and painting process of OHTE steel structures under isolated and earthed conditions can be demonstrated by communicating clearly and concisely, in accordance with company-specific communication protocols.

3.

> Scales on the measuring instruments are read correctly.

> Quantities are estimated to a tolerance acceptable in the context of the estimation.

> The appropriate instrument is chosen to measure a particular quantity.

- > Calculations are carried out correctly.
- > Appropriate units are used in measurement and calculation.

> Problems related to the measurement and calculation of physical quantities are solved.

4.

- > Health and safety regulations are understood and can be applied by:
- > Identifying potential hazards in the work area correctly.
- > Effectively limiting damage to persons or property in case of an emergency.
- > Correctly following procedures that apply to emergency, illness or injury in the work area.

> Communication with relevant role players is clear and concise and can be demonstrated effectively in the case of:

- > An incident/accident.
- > A fire.
- > An injury or sickness.

> Learners can organise and manage themselves by understanding and correctly.

> Following procedures that apply to illness or injury in the work area.

> Demonstrating the procedures for reporting and recording of potential hazards.

> Identifying and using protective clothing.

> Problems with regard to the following can be solved effectively by:

> Identifying the potential hazards in the work area.

> Limiting damage to persons or property in case of an emergency.

> Limiting exposure to, and correctly disposing of hazardous substances.

5.

> Safe work procedures and instructions to work safely in the vicinity of or near low/high-voltage electrical systems are explained and applied according to company specifications.

> An understanding of the rail and OHTE environment is demonstrated clearly.

> Information from visual low/high-voltage indicators is evaluated and reacted to critically.

> The role of the individual in the work situation and organisation is demonstrated by organising and managing themselves and their activities when identifying and reacting to various electrical signs and warning boards and related sub-standard conditions.

> The interrelatedness of systems within the rail sector is understood by understanding the importance of applying the electrical safety instructions in an electrical environment.

6.

> Safe work procedures and instructions to work safely in the vicinity of or near live high-voltage overhead track equipment are explained and applied to using work procedures

> Signs and warning boards related to high-voltage overhead track equipment are identified and reacted to correctly

> Sub standards conditions related to high-voltage overhead track equipment are identified and reported in accordance with company-specific instructions.

> The role of the individual in the work situation and organisation is demonstrated by organising and managing themselves and their activities when identifying and reacting **to** various signs or warning boards and performing maintenance under, near **ar** in the vicinity of live high-voltage overhead track equipment.

Integrated assessment:

Assessors and moderators should develop and conduct their own integrated assessment by using a range of formative and summative assessment methods.

Unit standards in the qualification must be used to assess specific outcomes, **critical** cross-field outcomes and essential embedded knowledge.

During integrated assessments the assessor should use formative and summative assessment methods and should assess applied competence.

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.

Assessors should assess and give credit for the evidence of learning that has already been acquired through formal, informal and non-formal learning and work experience.

A detailed portfolio of evidence is required to prove foundational, practical and reflective competencies (applied competence) of the learner.

INTERNATIONAL COMPARABILITY

This qualification was compared with the Transport and Distribution Qualifications (Rail Infrastructure) on the Australian National Training Information Service.

Units of competencies related to overhead track equipment as generated in Australia were obtained from the National Training Information Service (Web Site: www.ntis.gov.au), Certificate (levels i - iv) in Transport and Distribution (Rail Infrastructure).

After scrutinising these, it was evident that the format and structure utilised within the Transport and Distribution Industry Specific Units (TDT02) - Equipment Checking and Maintenance, was different to those prescribed by SAQA. The technical content in the units d competencies were not specific **and** covered a

broad spectrum of equipment and tasks. This resulted in broad assessment criteria.

It was also found that although the Australian Qualifications Framework comprises thirteen national qualifications, the first five qualifications in the vocational education and training sector compare favourably with the FET levels within the NQF.

The SGG/SGA could not find any standards within the discipline of OHTE in other African countries where OHTE is utilised

Various Railway companies in Africa have approached Transnet to assist in the training of their signalling maintenance officials. Once this is effected, the Unit Standards generated in South Africa will be utilised for such training.

Efforts to obtain British National Vocational Qualifications (NVQs) related railway signalling were unsuccessful. The NVQs are not accessible and could not be used for benchmarking.

During the development of the unit standards cognisance was taken of the implementation of a National Railway Safety Regulator. The National Railway Safety Regulator promotes and controls safe rail operations and recognises that this is fundamental to the safety of all persons and the environment. The unit standards in railway signalling were aligned to these ideals.

ARTICULATION OPTIONS

This is a qualification in a series in overhead track equipment qualifications varying from NQF Level 2 to 4.

Vertical articulation is possible with:

> National Certificate: Railway Signalling, Installation and scheduled maintenance of Equipment at NQF Level 3.

> National Certificate: Electrical Engineering at NQF Level 3.

Horizontal articulation is possible with:

> National Certificate: Railway Signalling, Assembly and Wiring of Equipment at NQF Level 2.

MODERATION OPTIONS

> Anyone assessing a learner or moderating the assessment of a learner against this

> Qualification must be registered as an assessor with the relevant (ETQA) Body, or with an ETQA that has a Memorandum of Understanding with the relevant ETQA.

> Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant (ETQA) Body, or with an ETQA that has a Memorandum of Understanding with the relevant ETQA.

> Assessment and moderation of assessment will be overseen by the relevant (ETQA) Body, or by an ETQA that has a Memorandum of Understanding with the relevant ETQA, according to the ETQA's policies and guidelines for assessment and moderation.

> 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 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

> Assessors need to be registered as assessors with the relevant ETQA or with an ETQA that has a Memorandum of Understanding with the relevant ETQA body.

> Assessors and moderators must be in possession of a relevant qualification in OHTE or Electrical Engineering at least at NQF Level 3.

NOTES

N/A

UNIT STANDARDS

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

	UNIT STANDARD ID AND TITLE	LEVEL	CREDITS	STATUS
core	9839 Apply and maintain safety in an electricalenvironment	Level 1	5	Reregistered
Core	119882 Demonstrate an understanding of the electrical environment in the rail sector	Level 1	1	Draft - Prep for P Cornment
Core	119885 Identify. handle and care tor electrical systems material in the rail sector	Level 1	10	Draft - Prep for P Comment
Core	9964 Apply health and safety to a work area	Level 2	3	Reregistered
core	10252 Identify, inspect, use, maintain and care for engineering hand tools	Level 2	6	Reregistered
(Core	10255 Select. use and care for power tools	Level 2	5	Rereoistered
core	12037 Demonstrate knowledge of mechanical and electrical equipment	Level 2	4	Registered
Core	12483 Perform basic first aid	Level2	4	Reregistered
Core	12484 Perform basic fire fighting	Level 2	4	Rereoistered
lcore	113868 Handle and care of electrical earthing gear and related equipment	Level2	2	Reaistered
Core	113877 Understand fundamentals of electricity	Level 2	8	Reaistered
Core	115234 Demonstrate knowledge of electrical safe working practices	Level 2	2	Registered
Core	116900 Apply electrical high voltage safety instructions when working in the vicinity of or near exposed 'lie' high-voltage overhead track equipment	Level 2	1	Registered
Core	119880 Clean and paint OHTE steel structures under isolated and earthed conditions	Level2	4	Draft - Prep for P Comment
Core	119886 Perform bonding and earthing on 3 KV DC and 25/50KV AC on OHTE	Level 2	15	Draft - Prep for P Comment
Core	119889 Work to clearance from "live" high-voltage overhead track equipment to perform maintenance work	Level2	9	Draft - Prep for P Comment
Elective	8215 Use and care for I in g equipment	Level 1	5	Reregistered
Elective	114616 Carry out basic gas welding, brazing and cutting in an electrical environment	Level 2	8	Registered
Elective	114669 Carry out basic electric arc welding in an electrical environment	Level 2	8	Registered
Elective	14623 Afford on-back protection	Level 3	5	Registered
Fundamental	7469 Use mathematics to investigate and monitor the financial aspects of personal and community life	Level 2	2	Reregistered
Fundamental	7480 Demonstrate understanding of rational and irrational numbers and number svstems	Level 2	3	Reregistered
Fundamental	8962 Maintain and adapt oral communication	Level 2	5	Reregistered
Fundamental	8963 Access and use information from texts	Level 2	5	Reregistered
Fundamental	8964 Write for a defined context	Level 2	5	Reregistered
Fundamental	8967 Use language and communication in occupational learning programmes	Level 2	5	Reregistered
Fundamental	9007 Work with a range of patterns and functions and solve problems	Level 2	5	Reregistered
Fundamental	9008 Identify, describe, compare, classify, explore shape and motion in 2-and 3- dimensional shapes in different contexts	Level 2	3	Reregistered
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	Reregistered
Fundamental	13217 Collect and use information	Level2	5	Registered

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UNIT STANDARD:

Clean and paint OHTE steel structures under isolated and earthed conditions

SAQA US ID	UNIT STANDARD TITLE Clean and paint OHTE steel structures under isolated and earthed conditions		
119880			
SGB NAME		NSB 12	PROVIDER NAME
SGB Electrical Engineering & Construction		Physical Planning and Construction	
UNIT STANDA	ARD TYPE	FIELD DESCRIPTION	SUBFIELD DESCRIPTION
Regular		Physical Planning and Construction	Electrical Infrastructure Construction
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	4	Level 2	Regular

SPECIFIC OUTCOME 1

 $Communicate \ clearly \ and \ concisely \ with \ relevant \ role \ players \ and \ complete \ relevant \ documentation.$

SPECIFIC OUTCOME 2

Prepare to clean and paint OHTE steel structures.

SPECIFIC OUTCOME 3

Clean and paint OHTE steel structures according to company-specific instructions and manufacturer's specifications.

SPECIFIC OUTCOME 4

Finalise the cleaning and painting of OHTE steel structures.



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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

SAQA US ID	UNIT STANDARD TITLE			
119882	Demonstrate an understanding of the electrical environment in the rail sector			
SGB NAME		NSB 12	PROVIDER NAME	
SGB Electrical Engineering & Construction		Physical Planning and Construction		
UNIT STANDARD TYPE		FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular		Physical Planning and Construction	Electrical Infrastructure Construction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE	
Undefined	1	Level 1	Regular	

SPECIFIC OUTCOME 1

Demonstrate an understanding of the rail and OHTE environment.

SPECIFIC OUTCOME 2

Work safely in the vicinity \boldsymbol{d} or near low/high-voltage electrical systems.



UNIT STANDARD:

hed in terms of Act 58 of 1995

Identify, handle and care for electrical systems material in the rail sector

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SAQA US ID	UNIT STANDARD TITLE ,			
119885	Identify, handle and care for electrical systems material in the rail sector			
SGB NAME		NSB12	PROVIDER NAME	
SGB Electrical Engineering & Construction		Physical Planning and Construction		
UNIT STANDARD TYPE		FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular		Physical Planning and Construction	Electrical InfrastructureConstruction	
ABET BAND	CREDITS	NQFLEVEL	UNIT STANDARD TYPE	
Undefined	10	Level 1	Regular	

SPECIFIC OUTCOME 1

Identify electrical systems material.

SPECIFIC OUTCOME 2

Handleand 'care for electrical systems material.

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

SAQA US ID	UNIT STANDARD TITLE			
1 19886	Perform bonding and earthing on 3 KV DC and 25/50KV AC on OHTE			
SGB NAME		NSB 12	PROVIDERNAME	
SGB Electrical Engineering & Construction		Physical Planning and Construction		
UNIT STANDARD TYPE		FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular		Physical Planning and Construction	Electrical infrastructure Construction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE	
Undefined	15	Level 2	Regular	

SPECIFIC OUTCOME 1

Communicate clearly and concisely without misunderstanding with relevant role players and complete relevant documentation.

SPECIFIC OUTCOME 2

Prepare to perform bonding and earthing on 3 KV DC and 25/50KV AC on OHTE.

SPECIFIC OUTCOME 3

Perform bonding and earthing on 3 KV DC and 25/50KV AC on OHTE according to company specific instructions and manufacturer's specifications.

SPECIFIC OUTCOME 4

Finalise bonding and earthing process on 3 KV DC and 25/50KV AC on OHTE.



UNIT STANDARD:

SAQA US ID	UNIT STANDARD TITLE			
119889 '	Work to clearance from "live" high-voltage overhead track equipment to perform maintenance work			
SGB NAME		NSB12	PROVIDER NAME	
SGB Electrical Engineering & Construction		Physical Planning and Construction		
UNIT STANDARD TYPE		FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular		Physical Planning and Construction	Electrical Infrastructure Construction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE	
Undefined	9	Level 2	Regular	

SPECIFIC OUTCOME 1

Work safely to clearance from "live" high-voltage overhead track equipment.

SPECIFIC OUTCOME 2

Identify and react upon signs and warning boards related to high-voltage overhead track equipment.

SPECIFIC OUTCOME 3

Apply and remove portable earth connections on high-voltage electrical systems under supervision.

SPECIFIC OUTCOME 4

Perform switching on high-voltage electrical systems under supervision.