

No. 1126

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### 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

#### **Electrical Engineering and Construction**

Registered by NSB 12, Physical Planning and Construction, publishes the following qualifications 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 upon which qualifications are based. The full qualification and unit standards can be accessed via the SAQA web-site at [www.saga.org.za](http://www.saga.org.za). Copies may also be obtained from the Directorate of Standards Setting and Development at the SAQA offices, Hatfield Forum West, 1067 Arcadia Street, Hatfield.

Comment on the unit standards should reach SAQA at the address ***below and no later than 30 October 2004***. All correspondence should be marked **Standards Setting – SGB Electrical Engineering and Construction** and addressed to

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## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### QUALIFICATION:

#### National Certificate: Railway Signalling: Assembly and Wiring of Equipment

| SAQA QUAL ID               | QUALIFICATION TITLE  |  |
|----------------------------|--|--|
| 49068                      | National Certificate: Railway Signalling: Assembly and Wiring of Equipment |  |
| SGB NAME                   | SGB Electrical Engineering & Construction                                  |  |
| ABET BAND                  | PROVIDER NAME  |  |
| Undefined                  |  |  |
| QUALIFICATION CODE         | QUAL TYPE  | SUBFIELD                               |
| PPC-2-National Certificate | National Certificate   | Electrical Infrastructure Construction |
| MINIMUM CREDITS            | NQF LEVEL  | QUALIFICATION CLASS                    |
| 169                        | Level 2  | Regular-Unit Stds Based                |
| SAQA DECISION NUMBER       | REGISTRATION START DATE  | REGISTRATION END DATE                  |
|                            |  |  |

#### PURPOSE OF THE QUALIFICATION

This qualification will:

- > Enable the qualifying learner to safely and effectively assemble and wire railway signalling equipment.
- > Prepare the learner to progress through learning in the railway signalling environment to a qualification in the installation and scheduled maintenance of railway signalling equipment at NQF Level 3.

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. The social status, productivity and employability of the qualifying learner within the electrical engineering and construction field will be enhanced, thereby contributing to the quality and skills required in this field. Learners would be able to demonstrate occupational skills which enable them to engage in life skills activities, creation of small businesses and health and environmental issues, through the critical cross-field component of the qualification. Hand skills play a vital role in this qualification.

Qualified learners will also understand:

- > The basics of how the business functions and their role in the business, i.e. in railway signalling maintenance and related activities.
- > How they are affected by legislation, regulations, agreements and policies related to their particular work environment.

With this understanding, learners will be able to participate in workplace activities.

#### Rationale for the qualification

This qualification forms the basis for learners who want to follow a career in railway signalling and related fields. Railway signalling 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 signalling equipment be safely and correctly assembled and wired in order to meet standards set in associated railway signal engineering specifications.

The qualification equips the learner with the skills, knowledge and understanding to safely and correctly assemble and wire railway signalling equipment, such as, track circuits, signals and points 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 railway signalling industry.

For the new learner, this qualification recognises the applied competence needed by a productive person in a structured workplace and forms the basis for further development.

For learners who have acquired experience in the workplace, this qualification may be obtained in part or in whole through RPL by formally acknowledging workplace skills acquired without the benefit of formal education or training.

### **RECOGNIZE PREVIOUS LEARNING?**

Y

### **LEARNING ASSUMED TO BE IN PLACE**

This qualification assumes that learners have a General Education and Training Certificate at NQF Level 1 including mathematics, or equivalent.

#### 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.

### **QUALIFICATION RULES**

Level, credits and learning components assigned to this qualification

The fundamental, core and elective learning components that make up this qualification are listed below.

#### Fundamental

- > 4 credits at Level 1
- > 53 credits at Level 2
- > 57 credits

#### Core

- > 5 credits at Level 1
- > 57 credits at Level 2
- > 38 credits at Level 3
- > 100 credits

#### Elective

- > 41 credits at Level 2
- > 19 credits at level 3
- > 60 credits (Select a minimum of 12 credits)

The total credits for this qualification are 217, of which a minimum of 169 credits must be done to achieve this qualification.

Motivation for the number of credits assigned.

- > Fundamental Credits.

SAQA stipulates that a minimum of 20 compulsory credits should be allocated to Communication Studies and Languages and 16 credits are allocated to Mathematics and Mathematical Literacy. 57 compulsory credits have been allocated to these fundamental competencies.

- > Core.

SAQA stipulates that a minimum of 72 credits should be required at or above the level at which the certificate is awarded.

100 compulsory credits have been allocated to the core unit standards to cover the field of assembly and wiring of railway signalling equipment sufficiently.

- > Electives.

A minimum of 12 credits should be selected from the 60 listed elective credits. These credits have been grouped to give a learner a meaningful understanding of the section and to allow for progression to the next level of learning on the same railway signalling equipment.

### **EXIT LEVEL OUTCOMES**

1. Demonstrate the knowledge and ability to work effectively at a worksite when performing the assembly and wiring of railway signalling equipment.
2. Demonstrate the knowledge and ability to assemble and wire railway signalling equipment to specifications.
3. Demonstrate the knowledge and ability to apply quality checks on the assembled and wired railway signalling equipment.
4. Demonstrate an understanding of options for further learning in this or a related field of learning, as well as the preparation requirements for such learning.
5. Understand and apply health and safety regulations to a work area.

The table below shows the spread of critical cross-field outcomes across the core unit standards and qualification at level 2.

Critical cross-field outcomes supported by the unit standards:

#### Core

Perform basic first aid:

- > Information evaluation.
- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.
- > Inter-relatedness of systems.
- > Use of science and technology.

Perform basic fire fighting:

- > Information evaluation.
- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.
- > Inter-relatedness of systems.
- > Use of science and technology.

Select, use and care for electrical measuring instruments:

- > Information evaluation.
- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.

Select, use and care for power tools:

- > Problem-solving.
- > Self-organisation and self-management.
- > Communication.

Identify, inspect, use, maintain and care for engineering hand tools:

- > Problem-solving.
- > Self-organisation and self-management.
- > Communication.
- > Inter-relatedness of systems.
- > Use of science and technology.

Apply soldering techniques:

- > Problem-solving.
- > Team work.
- > Communication.

Apply and maintain safety in an electrical environment:

- > Problem-solving.

- > Team work.
- > Self-organisation and self-management.
- > Communication.
- > Use of science and technology.

Apply health and safety to a work area:

- > Information evaluation.
- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.
- > Inter-relatedness of systems.
- > Use of science and technology.

Understand fundamentals of electricity:

- > Information evaluation.
- > Team work.
- > Self-organisation and self-management.
- > Communication.
- > Use of science and technology.

Demonstrate an understanding of the fundamental elements of railway signalling:

- > Information evaluation.
- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.
- > Inter-relatedness of systems.
- > Use of science and technology.
- > Learner and societal development

Identify, route, harness and terminate electrical conductors used in railway signalling:

- > Information evaluation.
- > Self-organisation and self-management.
- > Inter-relatedness of systems.
- > Learner and societal development

Assemble an apparatus case:

- > Information evaluation.
- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.
- > Inter-relatedness of systems.
- > Use of science and technology.
- > Learner and societal development

Assemble an electrical points machine:

- > Information evaluation.
- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.
- > Inter-relatedness of systems.
- > Use of science and technology.
- > Learner and societal development

Assemble components of a railway signalling interlocking system:

- > Information evaluation.
- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.
- > Inter-relatedness of systems.

- > Use of scienceand technology.
- > Learner and societal development

Assemble an electrical railway signal:

- > Informationevaluation.
- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.
- > Inter-relatedness of systems.
- > Use of scienceand technology.
- > Learner and societal development

Assemble a railway track circuit:

- > Informationevaluation.
- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.
- > Inter-relatedness of systems.
- > Use of scienceand technology.
- > Learner and societal development

Wire an apparatus case:

- > Informationevaluation.
- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.
- > Inter-relatedness of systems.
- > Use of scienceand technology.
- > Learner and societal development

Wire an electrical points machine:

- > Informationevaluation.
- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.
- > Inter-relatedness of systems.
- > Use of scienceand technology.
- > Learner and societal development

Wire components of an electrical railway signalling interlocking system:

- > Informationevaluation.
- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.
- > Inter-relatedness of systems.
- > Use of scienceand technology.
- > Learner and societal development

Wire an electrical railway signal:

- > Informationevaluation.
- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.
- > Inter-relatedness of systems.
- > Use of scienceand technology.
- > Learner and societal development

Wire a railway track circuit:

- > Informationevaluation.
- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.
- > Inter-relatedness of systems.
- > Use of scienceand technology.
- > Learner and societal development

#### Electives

Assemble components of an axle counter:

- > Informationevaluation.
- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.
- > Inter-relatedness of systems.
- > Use of scienceand technology.
- > Learner and societal development

Assemble components of a flashlight and boom level crossing warning system:

- > Informationevaluation.
- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.
- > Inter-relatedness of systems.
- > Use of scienceand technology.
- > Learner and societal development

Assemble railway signalling power supply equipment:

- > informationevaluation.
- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.
- > Inter-relatedness of systems.
- > Use of scienceand technology.
- > Learner and societal development

Assemble components of a remote control system:

- > Informationevaluation.
- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.
- > Inter-relatedness of systems.
- > Use of scienceand technology.
- > Learner and societal development

Wire components of an axle counter:

- > Informationevaluation.
- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.
- > Inter-relatedness of systems.
- > Use of scienceand technology.
- > Learner and societal development

Wire components of a flashlight and boom level crossing warning system:

- > Informationevaluation.

- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.
- > Inter-relatedness of systems.
- > Use of scienceand technology.
- > Learner and societal development

Wire railway signalling power supply equipment:

- > Informationevaluation.
- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.
- > Inter-relatedness of systems.
- > Use of scienceand technology.
- > Learner and societal development

Wire components of a remote control system:

- > Informationevaluation.
- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.
- > Inter-relatedness of systems.
- > Use of scienceand technology.
- > Learner and societal development

Carry out basic electric arc welding in an electrical environment:

- > Informationevaluation.
- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.

Carry out basic gas welding, brazing and cutting in an electrical environment:

- > Informationevaluation.
- > Problem-solving.
- > Team work.
- > Self-organisation and self-management.
- > Communication.

Demonstrate an understanding of the uses and safety aspects associated with flammable energy sources:

- > Problem-solving.
- > Self-organisation and self-management.
- > Communication.
- > Inter-relatedness of systems.
- > Use of scienceand technology.

#### **ASSOCIATED ASSESSMENT CRITERIA**

1.

- > The planning and procurement of railway signalling equipment is performed according to procurement guidelines.
- > The contents of assembly and wiring plans and relevant documents is interpreted in such a manner as to enable the procurement of the correct resources.
- > Problems regarding the correctness, quantity and quality of tools, material, parts and components required for the assembly and wiring of railway signalling equipment are solved effectively according to worksite procedures.
- > Effective communication skills related to the work are demonstrated by communicating clearly and concisely and by adhering to company-specific communication protocols.
- > Learners would organise and manage themselves effectively by executing the task responsibly and safely.
- > The work site is safely and correctly restored as per company-specific procedures, policies and instructions and the non-compliance of these policies, procedures and instructions are clearly understood.

2.

- > The assembly and wiring of railway signalling equipment is performed according to assembly and wiring specifications.
- > Problems regarding the suitability and functionality of equipment and tools are solved within the parameters of the worksite procedures and suitability to the task.
- > Learners would organise and manage themselves effectively by having the knowledge to utilise the resources and to execute the task responsibly and safely, by adhering to safety and company-specific policies and procedures.
- > Effective communication with relevant role-players related to the assembly and wiring of railway signalling equipment is demonstrated by communicating clearly and concisely, and by knowing how to apply and adhere to company-specific communication protocols.
- > Working effectively in teams is understood and demonstrated by displaying participative interaction when assembling and wiring railway signalling equipment.
- > Safety in the workplace as well as in the whole environment is understood and demonstrated by applying safe working practices according to safe working procedures while performing the tasks.
- > The role of the relevant equipment being assembled and wired is understood and explained in relation to the railway signalling system.
- > The role of the individual in the work situation and organisation is demonstrated by:
  - > Organising and managing themselves and their activities related to assembly and wiring of railway signalling equipment, by understanding and applying organisational procedures and concepts.
  - > Describing how the organisation functions, by the collection, analysis, organisation and critical evaluation of related information.

3.

- > The reasons for performing quality checks on railway signalling equipment are understood, and the quality checks are performed correctly, according to assembly and wiring test procedure.
- > Learners would use science and technology by knowing how to use, and demonstrating the use of measuring instruments, test instruments and gauges to comply with specifications.
- > Problems with regard to the suitability and functionality of equipment and tools are solved effectively by knowing and applying the methods used to solve problems.
- > Learners would organise and manage themselves effectively by having the knowledge to utilise the resources and to execute the task responsibly and safely, by adhering to safety and company-specific policies and procedures.

4.

- > Learners would organise and manage themselves and their activities to gather a portfolio of evidence.
  - > Learners would collect, analyse, organise and critically evaluate information to:
    - > Analyse qualifications and assess self to determine learning plan requirements.
    - > Analyse unit standards and assess self to determine readiness for assessment and evidence requirements.
  - > Clear and concise communication would be demonstrated when presenting a:
    - > Learning plan
    - > Portfolio of evidence for assessment
  - > An understanding of the world as a set of related systems is demonstrated by explaining the relationship between stakeholders within the learning and assessment system.
  - > The learner can demonstrate an understanding of how the knowledge and skills obtained in this qualification can contribute to the creation of a small business.

5.

- > Health and safety regulations are understood and 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 illness or injury in the work area
- > Communication with relevant role players is clear and concise and is demonstrated effectively in the case of:
  - > An incident/accident
  - > A fire
  - > An injury or sickness
- > Learners would 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.
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- > Problems with regard to the following would 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.

#### 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 practical, applied and foundational competencies 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 railway signalling as generated in Australia were obtained from the National Training Information Service (Web Site: [www.ntis.gov.au](http://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 of 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 Railway Signalling in other African countries where Railway Signalling 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.

The core and elective unit standards that form part of this qualification have been developed to ensure alignment with the engineering practices embraced by the Institution of Railway Signal Engineers (IRSE).

The IRSE is an international professional institution associated with railway signalling and allied professions. The institution aims to advance for public benefit, the science and practice of signalling engineering within the industry and to maintain high standards of knowledge of the profession. The IRSE recognises and encourages Continuing Professional Development (CPD) to keep abreast of new developments in science and technology within the railway signalling and associated disciplines.

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 of railway signalling qualifications from NQF Level 2 to 5. This series of qualifications articulates directly to learning programs and qualifications in railway signalling. It also opens the possibility for further learning in the sub-fields of Electrical Infrastructure Construction, Engineering and Related Design and Manufacturing and Assembly. As one of the focus areas within the Railway Signalling domain is on safety, the embedded safety consciousness within the working environment will be favourable to any employer.

### **MODERATION OPTIONS**

1. An individual wishing to apply for assessment against this qualification, may apply to an assessment agency, assessor or provider institution that has been accredited by the relevant ETQA.
2. Any person assessing a learner or moderating the assessment of a learner against this qualification must be registered as an assessor with the relevant ETQA.
3. Any institution offering learning that will enable achievement of this unit standard must be registered and accredited as a provider with the relevant ETQA as prescribed.
4. Moderation of assessment will be done by the relevant ETQA as prescribed.
5. Assessment and moderation of assessment 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 ETQA's (including professional bodies); and in terms of the moderation guideline detailed in Item 6.
6. 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.

### **CRITERIA FOR THE REGISTRATION OF ASSESSORS**

1. Assessors need experience in the following areas:
  - > Interpersonal skills.
  - > Subject matter.
  - > Assessment.
2. The assessor needs to be competent in planning, conducting and providing feedback on assessment of learning outcomes and in the design and development of assessments as described in the Unit Standards. The assessor must also be able to plan, conduct and provide feedback on the assessment of the learning outcomes at NQF Level 2. Subject matter experience must be well developed within the field of railway signalling, quality assurance tests and practices. The assessor must comply with the criteria set by the relevant ETQA.
3. The subject matter experience of the assessor can be established by recognition of prior learning.
4. Assessors need to be registered with the relevant Education and Training Quality Assurance Body.
5. Anyone assessing a learner against a unit standard must be certified as competent against that specific unit standard and registered as an assessor to assess such unit standard.

### **NOTES**

N/A

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

|             | <b>UNIT STANDARD ID AND TITLE</b>   | <b>LEVEL</b> | <b>CREDITS</b> | <b>STATUS</b>              |
|-------------|---|--------------|----------------|----------------------------|
| Core        | 9839 Apply and maintain safety in an electrical environment   | Level 1      | 5              | Reregistered               |
| Core        | 9964 Apply health and safety to a work area   | Level 2      | 3              | Reregistered               |
| Core        | 10237 Select, use and care for electrical measuring instruments   | Level 2      | 4              | 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              | Reregistered               |
| Core        | 12483 Perform basic first aid   | Level 2      | 4              | Reregistered               |
| Core        | 12484 Perform basic fire fighting   | Level 2      | 4              | Reregistered               |
| Core        | 113863 Apply soldering techniques   | Level 2      | 2              | Registered                 |
| Core        | 113877 Understand fundamentals of electricity   | Level 2      | 8              | Registered                 |
| Core        | 116839 Assemble a railway track circuit   | Level 2      | 2              | Draft - Prep for P Comment |
| Core        | 116841 Assemble an apparatus case   | Level 2      | 3              | Draft - Prep for P Comment |
| Core        | 116842 Assemble an electrical railway signal  | Level 2      | 5              | Draft - Prep for P Comment |
| Core        | 116853 Identify, route, harness and terminate electrical conductors used in railway signalling                                  | Level 2      | 6              | Draft - Prep for P Comment |
| Core        | 116844 Assemble an electrical points machine  | Level 3      | 6              | Draft - Prep for P Comment |
| Core        | 116847 Assemble components of a railway signalling interlocking system  | Level 3      | 6              | Draft - Prep for P Comment |
| Core        | 116851 Wire an electrical points machine  | Level 3      | 3              | Draft - Prep for P Comment |
| Core        | 116855 Wire an apparatus case   | Level 3      | 3              | Draft - Prep for P Comment |
| Core        | 116856 Wire a railway track circuit   | Level 3      | 3              | Draft - Prep for P Comment |
| Core        | 116858 Demonstrate an understanding of the fundamental elements of railway signalling   | Level 3      | 8              | Draft - Prep for P Comment |
| Core        | 116860 Wire an electrical railway signal  | Level 3      | 4              | Draft - Prep for P Comment |
| Core        | 116863 Wire components of an electrical railway signalling interlocking system  | Level 3      | 5              | Draft - Prep for P Comment |
| Elective    | 7547 Operate a personal computer system   | Level 2      | 6              | Reregistered               |
| Elective    | 7568 Demonstrate knowledge of and produce word processing documents using basic functions                                       | Level 2      | 3              | Reregistered               |
| Elective    | 7572 Demonstrate knowledge of and produce computer spreadsheets using basic functions   | Level 2      | 3              | Reregistered               |
| Elective    | 113860 Demonstrate an understanding of the uses and safety aspect associated with flammable energy sources                      | Level 2      | 3              | Registered                 |
| 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    | 116891 Assemble components of an axle counter   | Level 2      | 2              | Draft - Prep for P Comment |
| Elective    | 116894 Assemble components of a remote control system   | Level 2      | 3              | Draft - Prep for P Comment |
| Elective    | 116897 Wire components of a flashlight and boom level crossing warning system   | Level 2      | 3              | Draft - Prep for P Comment |
| Elective    | 116898 Assemble components of a flashlight and boom level crossing warning system   | Level 2      | 3              | Draft - Prep for P Comment |
| Elective    | 116892 Wire railway signalling power supply equipment   | Level 3      | 6              | Draft - Prep for P Comment |
| Elective    | 116893 Wire components of a remote control system   | Level 3      | 4              | Draft - Prep for P Comment |
| Elective    | 116895 Assemble railway signalling power supply equipment   | Level 3      | 6              | Draft - Prep for P Comment |
| Elective    | 116896 Wire components of a remote control system   | Level 3      | 3              | Draft - Prep for P Comment |
| Fundamental | 13169 Describe and discuss issues relating to HIV-AIDS, TB and sexually transmitted illnesses and their impact on the workplace | Level 1      | 4              | Registered                 |

|             |   |         |   |            |
|-------------|---|---------|---|------------|
| Fundamental | 7469 Use mathematics to investigate and monitor the financial aspects of personal and community life  | Level 2 | 2 | Registered |
| Fundamental | 7480 Demonstrate understanding of rational and irrational numbers and number systems  | Level 2 | 3 | Registered |
| Fundamental | 8962 Maintain and adapt oral communication  | Level 2 | 5 | Registered |
| Fundamental | 8963 Access and use information from texts  | Level 2 | 5 | Registered |
| Fundamental | 8964 Write for a defined context  | Level 2 | 5 | Registered |
| Fundamental | 8967 Use language and communication in occupational learning programmes   | Level 2 | 5 | Registered |
| Fundamental | 9007 Work with a range of patterns and functions and solve problems   | Level 2 | 2 | Registered |
| Fundamental | 9008 Identify, describe, compare, classify, explore shape and motion in 2-and 3-dimensional shapes in different contexts  | Level 2 | 3 | Registered |
| 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 | 4 | Registered |
| Fundamental | 12444 Measure, estimate and calculate physical quantities and explore, describe and represent geometrical relationships in 2-dimensions in different life or workplace contexts | Level 2 | 3 | Registered |
| Fundamental | 12465 Develop a learning plan and a portfolio for assessment  | Level 2 | 6 | Registered |
| Fundamental | 12466 Explain the individual's role within business   | Level 2 | 4 | Registered |
| Fundamental | 13217 Collect and use information   | Level 2 | 5 | Registered |



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### QUALIFICATION:

#### **National Certificate: Railway Signalling: Installation and Scheduled Maintenance of Equipment**

| SAQA QUAL ID               | QUALIFICATION TITLE   |  |
|----------------------------|---|--|
| 49066                      | National Certificate: Railway Signalling: Installation and Scheduled Maintenance of Equipment |  |
| SGB NAME                   | SGB Electrical Engineering & Construction   |  |
| ABET BAND                  | Undefined   |  |
| PROVIDER NAME              |   |  |
| QUALIFICATION CODE         | QUAL TYPE   | SUBFIELD                               |
| PPC-3-National Certificate | National Certificate  | Electrical Infrastructure Construction |
| MINIMUM CREDITS            | NQF LEVEL   | QUALIFICATION CLASS                    |
| 136                        | Level 3   | Regular-Unit Stds Based                |
| SAQA DECISION NUMBER       | REGISTRATION START DATE   | REGISTRATION END DATE                  |
|                            |   |  |

#### **PURPOSE OF THE QUALIFICATION**

This qualification will:

- > Enable the qualifying learner to safely and effectively install railway signalling equipment and perform scheduled maintenance tasks
- > Prepare the learner to progress through learning in the railway signalling environment to a qualification in the fault-finding and repair of railway signalling equipment at NQF Level 4

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.

The social status, productivity and employability of the qualifying learner within the electrical engineering and construction field will be enhanced, thereby contributing to the quality and skills required in this field. Learners will acquire occupational skills, which will enable them to engage in other technically related activities and the creation of small businesses, through the critical cross-field component of the qualification.

#### Rationale for the qualification

Railway signalling forms a critical part of the infrastructure of a rail transport system and contributes to the safe and efficient control of rail traffic. In a railway environment, emphasis is placed on safety, reliability and availability of operating systems. It thus follows that for railway signalling systems and equipment to align to these criteria, it is vitally important that signalling equipment be installed safely and correctly to meet standards as depicted in railway signalling engineering specifications. It is equally important that scheduled maintenance be performed timeously as per specifications to enhance and maintain the reliability, availability and safety of train operations.

This qualification equips the learner with the required skills, knowledge and understanding required to effectively perform installation and scheduled maintenance of railway signalling equipment 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 railway signalling industry.

For the new learner, this qualification recognises the applied competence needed by a productive person in a structured workplace and forms the basis for further development.

For learners who have acquired experience in the workplace, this qualification may be obtained in part or in whole through RPL by formally acknowledging workplace skills acquired without the benefit of formal education or training.

#### **RECOGNIZE PREVIOUS LEARNING?**

Y

**LEARNING ASSUMED TO BE IN PLACE**

This qualification assumes that the learner's competencies include but are not limited to the following:

- > Knowledge and ability to effectively use engineering hand and power tools.
- > Knowledge of electrical wiring techniques and the ability to harness, route and terminate electrical conductors.
- > Knowledge and ability to solder electrical conductors and components.
- > An understanding of health and safety in a working environment and the application thereof.
- > Knowledge and ability to perform first-aid and fire-fighting
- > An understanding of the principles of electricity.
- > Knowledge and understanding of railway signalling principles, elements and philosophies.
- > Assembly of railway signalling equipment which must include but is not limited to a railway track circuit, an electrical railway signal, an electrical points machine, components of an electrical signalling interlocking system and an apparatus case.
- > Electrical wiring of railway signalling equipment which must include but is not limited to a railway track circuit, an electrical railway signal, an electrical points machine, components of an electrical signalling interlocking system and an apparatus case.

**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.

**QUALIFICATION RULES**

Level, credits and learning components assigned to this qualification

The fundamental, core and elective learning components that make up this qualification are listed below.

**Fundamental**

12 credits at Level 2  
35 credits at Level 3  
Total 47

**Core**

7 credits at Level 2  
34 credits at Level 3  
36 credits at Level 4  
Total 77

**Elective**

22 credits at Level 3  
3 credits at Level 4  
Total 25 (Select a minimum of 12)

The available credits for this qualification are at least 150, of which a minimum of 136 credits must be done to achieve this qualification.

**Motivation for the number of credits assigned****Fundamental Credits**

SAQA stipulates that a minimum of 20 compulsory credits are allocated to Communication Studies and Languages and 16 credits are allocated to Mathematics and Mathematical Literacy. 47 compulsory credits have been allocated to these fundamental competencies.

**Core**

SAQA stipulates that a minimum of 72 credits are required at or above the level at which the certificate is awarded. Therefore, 77 compulsory credits have been allocated to the core unit standards to sufficiently cover the field of installation and scheduled maintenance of railway signalling equipment.

## Electives

A minimum of 12 credits has to be selected from the 25 listed elective credits. These credits have been meaningfully grouped together to allow for progression to the next level of learning on the same railway signalling equipment and provide an appropriate understanding of the concepts.

**EXIT LEVEL OUTCOMES**

1. Demonstrate the knowledge and ability to plan and prepare the execution of installation and scheduled maintenance tasks on railway signalling equipment, communicate tasks and responsibilities within the work team and solve potential problems that may arise.
2. Demonstrate the knowledge and ability to safely install railway signalling equipment according to signalling practice and specifications within a team environment, by using effective communication, and the correct application of specific tools, instrumentation and equipment.
3. Demonstrate knowledge and the ability to safely perform scheduled maintenance on railway signalling equipment according to signalling practice and specifications within a team environment, by using effective communication and the correct application and use of specific tools, instrumentation and equipment and adhering to company maintenance policies and safe working procedures.
4. Understand the need for safety and demonstrate the ability to apply safe working before, during and after the execution of the tasks related to the railway signalling equipment being installed or maintained.
5. Understand the need for communication and demonstrate verbal and written communication skills.

Critical cross-field outcomes across the core unit standards and qualification at Level 3.

Critical cross-field outcomes supported by the unit standards

Demonstrate an understanding of the principles of mechanical railway signalling - supports:

- > Information evaluation
- > Self-organisation and self-management
- > Inter-relatedness of systems
- > Learner and societal development

Joint electrical railway signalling cables - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Install electrical railway signalling cables - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Apply train working rules as applicable to railway signalling maintenance personnel - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Perform infrastructure maintenance in the vicinity of or near exposed live high-voltage overhead track equipment - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology

Maintain and repair a bank of batteries as used in railway signalling - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Install components of flashlights and booms - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Install an apparatus case - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Install components of a railway signalling interlocking system - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Install an electrical railway signal - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Install a railway track circuit - supports:

- > Information evaluation
- > Problem-solving
- > Team work

- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Install electrical points - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Perform routine preventive maintenance on an apparatus case - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Perform routine preventive maintenance on electrical points - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Perform routine preventive maintenance on an electrical railway signal - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Perform routine preventive maintenance on a railway track circuit - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Critical cross-field outcomes across the elective unit standards and qualification at Level 3.  
Critical cross-field outcomes supported by the unit standards

Install batteries - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management

## &gt; Communication

Install components of an axle counter - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication□
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Install components of a flashlight and boom level crossing warning system - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication□
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Install railway signalling power supply equipment - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication□
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Install components of a remote control system - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication□
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Perform routine preventive maintenance on an axle counter - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication□
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Perform routine preventive maintenance on a flashlight and boom level crossing warning system - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication□
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Perform routine preventive maintenance on power supply equipment - supports:

- > Information evaluation

- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication □
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

### **ASSOCIATED ASSESSMENT CRITERIA**

1.

- > The planning of the task is performed correctly by evaluating and interpreting relevant documentation.
- > The correct resources and materials are procured after evaluating and interpreting relevant documentation. This includes but is not limited to required personnel, transport, tools, lifting equipment and lubricating and cleaning materials.
- > Problems regarding the correctness, quantity and quality of materials, parts and components as measured against quantities needed and material specifications, to perform the tasks of installation and scheduled maintenance of railway signalling equipment, can be solved effectively.
- > Effective communication in the work environment is demonstrated

2.

- > The installation of, and quality checks on railway signalling equipment is performed safely and correctly as per railway signalling practices and specifications.
- > Problems regarding the suitability and functionality of equipment, instrumentation and tools are solved effectively by demonstrating the knowledge required for identifying sub-standards and by being able to improvise within acceptable signalling practices.
- > Learners would organise and manage themselves effectively by utilising the resources and executing the task responsibly and safely.
- > Effective communication with relevant role-players related to the installation of railway signalling equipment is demonstrated by communicating clearly and concisely and within the framework of company specific communication protocols.
- > The need for working effectively in teams is understood and is demonstrated by displaying participative interaction when installing railway signalling equipment.
- > The use and function of the equipment being installed in relation to the railway signalling system is explained correctly in terms of signalling practices and philosophies.

3.

- > The scheduled maintenance tasks and quality checks on railway signalling equipment are understood and performed safely and correctly by implementing safe working procedures and adhering to maintenance policies.
- > Problems regarding the suitability and functionality of equipment, instrumentation and tools are solved effectively by demonstrating the knowledge required for identifying sub-standards and by being able to improvise within acceptable signalling practices.
- > Learners would organise and manage themselves effectively by utilising the resources and executing the task responsibly and safely.
- > Effective communication with relevant role-players related to the scheduled maintenance of railway signalling equipment is demonstrated by communicating clearly and concisely and within the framework of company specific communication protocols.
- > The need for working effectively in teams is understood and demonstrated by displaying participative interaction whilst performing scheduled maintenance.
- > The use and function of the equipment being maintained in relation to the railway signalling system as a whole is explained correctly.
- > The ability to identify, prioritise and report the corrective action to take after a defect or substandard has been identified is demonstrated correctly as measured against equipment standards, company maintenance procedures and reporting lines

4.

- > Personal and equipment safety are understood and applied while executing the tasks.
- > The inter-relatedness of various railway signalling elements and the safety implications of not considering such interrelationships is understood and demonstrated.
- > Learners would understand the use of science and technology that is utilised during performance of tasks by using electrical test instruments, measuring instruments and gauges to check compliance with safety specifications.
- > Problems with regard to the safety of equipment and tools are understood, identified, and solved effectively by applying judgement of the state of equipment and tools against tool and equipment standards

and implementing company policies related to safety in the workplace.

- > Learners would organise and manage themselves by adhering to safety and company-specific policies and procedures.
- > Safety in the workplace as well as in the whole environment is understood and demonstrated while performing the tasks.
- > The ability to restore the work site and solve any related problems effectively is demonstrated by adherence to company-specific procedures, policies and instructions and the non-compliance of these policies, procedures and instructions are clearly understood.

5.

- > Information is clearly presented in a timely manner in the required format and to appropriate parties as stipulated in company specific policies and procedures.
- > The relevant communication media and protocol is used correctly while performing tasks.
- > Verbal communication is clear and concise.
- > Documentation related to the task is fully completed in recognisable writing and as per company specific language policies.

#### 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 practical, applied and foundational competencies 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 railway signalling as generated in Australia were obtained from the National Training Information Service (Web Site: [www.ntis.gov.au](http://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 of 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 Railway Signalling in other African countries where Railway Signalling 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.

The core and elective unit standards that form part of this qualification have been developed to ensure alignment with the engineering practices embraced by the Institution of Railway Signal Engineers (IRSE).

The IRSE is an international professional institution associated with railway signalling and allied professions. The institution aims to advance for public benefit, the science and practice of signalling engineering within the industry and to maintain high standards of knowledge of the profession. The IRSE recognises and encourages Continuing Professional Development (CPD) to keep abreast of new developments in science and technology within the railway signalling and associated disciplines.

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 of qualifications in railway signalling from NQF Level 2 to 5. These qualifications articulate directly to other learning programs and qualifications in railway signalling technology. It also opens the possibility for further learning in the sub-fields of Electrical Infrastructure Construction, Engineering and Related Design and Manufacturing and Assembly. On successful completion of this qualification, the learner will be equipped with skills that will be useful in any electrical construction environment.

### **MODERATION OPTIONS**

1. An individual wishing to apply for assessment against this qualification may apply to an assessment agency, assessor or provider institution that has been accredited by the relevant ETQA.
2. Any person assessing a learner or moderating the assessment of a learner against this qualification must be registered as an assessor with the relevant ETQA.
3. Any institution offering learning that will enable achievement of this unit standard must be registered and accredited as a provider with the relevant ETQA as prescribed.
4. Moderation of assessment will be done by the relevant ETQA as prescribed.
5. Assessment and moderation of assessment 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 in item 6.
6. 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

### **CRITERIA FOR THE REGISTRATION OF ASSESSORS**

1. Assessors need experience in the following areas:
  - > Interpersonal skills
  - > Subject matter
  - > Assessment
2. The assessor needs to be competent in planning, conducting and providing feedback on assessment of learning outcomes and in the design and development of assessments as described in the Unit Standards. The assessor must also be able to plan, conduct and provide feedback on the assessment of the learning outcomes at NQF Level 3. Subject matter experience must be well developed within the field of railway signalling, quality assurance tests and practices. The assessor must comply with the criteria set by the relevant ETQA.
3. The subject matter experience of the assessor can be established by recognition of prior learning.
4. Assessors need to be registered with the relevant Education and Training Quality Assurance Body.

5. Anyone assessing a learner against a unit standard must be certified as competent against that specific unit standard and registered as an assessor to assess such unit standard

## NOTES

N/A

## UNIT STANDARDS

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

|             | UNIT STANDARD ID AND TITLE  | LEVEL   | CREDITS | STATUS                     |
|-------------|---|---------|---------|----------------------------|
| Core        | 116846 Demonstrate an understanding of the principles of mechanical railway signalling  | Level 2 | 6       | Draft - Prep for P Comment |
| Core        | 116900 Apply electrical high voltage safety instructions when working in the vicinity of or near exposed "live" high-voltage overhead track equipment | Level 2 | 1       | Draft - Prep for P Comment |
| Core        | 116843 Perform routine preventive maintenance on a railway track circuit  | Level 3 | 2       | Draft - Prep for P Comment |
| Core        | 116845 Perform routine preventive maintenance on an electrical railway signal   | Level 3 | 2       | Draft - Prep for P Comment |
| Core        | 116848 Perform routine preventive maintenance on electrical points  | Level 3 | 3       | Draft - Prep for P Comment |
| Core        | 116850 Install an electrical railway signal   | Level 3 | 4       | Draft - Prep for P Comment |
| Core        | 116852 Install an apparatus case  | Level 3 | 3       | Draft - Prep for P Comment |
| Core        | 116867 Install electrical railway signalling cables   | Level 3 | 5       | Draft - Prep for P Comment |
| Core        | 116875 Joint electrical railway signalling cables   | Level 3 | 5       | Draft - Prep for P Comment |
| Core        | 116882 Maintain and repair a bank of batteries as used in railway signalling  | Level 3 | 8       | Draft - Prep for P Comment |
| Core        | 116887 Perform routine preventive maintenance on an apparatus case  | Level 3 | 2       | Draft - Prep for P Comment |
| Core        | 116865 Install a railway track circuit  | Level 4 | 6       | Draft - Prep for P Comment |
| Core        | 116866 Apply train working rules as applicable to railway signalling maintenance personnel  | Level 4 | 13      | Draft - Prep for P Comment |
| Core        | 116870 Install electrical points  | Level 4 | 11      | Draft - Prep for P Comment |
| Core        | 116871 Install components of a railway signalling interlocking system   | Level 4 | 6       | Draft - Prep for P Comment |
| Elective    | 113902 Install batteries  | Level 3 | 4       | Registered                 |
| Elective    | 116840 Perform routine preventive maintenance on an axle counter  | Level 3 | 3       | Draft - Prep for P Comment |
| Elective    | 116849 Perform routine preventive maintenance on railway signalling power supply equipment  | Level 3 | 3       | Draft - Prep for P Comment |
| Elective    | 116854 Install components of a flashlight and boom level crossing warning system  | Level 3 | 3       | Draft - Prep for P Comment |
| Elective    | 116857 Install components of a remote control system  | Level 3 | 3       | Draft - Prep for P Comment |
| Elective    | 116862 Install components of an axle counter  | Level 3 | 3       | Draft - Prep for P Comment |
| Elective    | 116873 Install railway signalling power supply equipment  | Level 3 | 3       | Draft - Prep for P Comment |
| Elective    | 116861 Perform routine preventive maintenance on a flashlight and boom level crossing warning system  | Level 4 | 3       | Draft - Prep for P Comment |
| Fundamental | 7569 Demonstrate understanding of the basic concepts of databases and the ability to plan and create a simple database                                | Level 2 | 3       | Reregistered               |
| Fundamental | 8420 Operate in a team  | Level 2 | 4       | Registered                 |
| Fundamental | 110001 Communicate effectively in teams   | Level 2 | 5       | Registered                 |
| Fundamental | 7455 Identify and work with simple forms of complex numbers   | Level 3 | 1       | Reregistered               |
| Fundamental | 8968 Accommodate audience and context needs in oral communication   | Level 3 | 5       | Registered                 |
| Fundamental | 8969 Interpret and use information from texts   | Level 3 | 5       | Registered                 |
| Fundamental | 8970 Write texts for a range of communicative contexts  | Level 3 | 5       | Registered                 |
| Fundamental | 8973 Use language and communication in occupational learning programmes   | Level 3 | 5       | Registered                 |

|             |       |   |         |   |            |
|-------------|-------|---|---------|---|------------|
| 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 | Registered |
| Fundamental | 9012  | Investigate life and work related problems using data and probabilities   | Level 3 | 5 | Registered |
| Fundamental | 9013  | Describe, apply, analyse and calculate shape and motion in 2-and 3-dimensional space in different contexts  | Level 3 | 4 | Registered |
| Fundamental | 14086 | Work with a wide range of patterns and basic functions and solve related problems   | Level 3 | 3 | Registered |



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### QUALIFICATION:

#### **Further Education and Training Certificate: Railway Signalling: Fault-finding and Repair of Equipment.**

| SAQA QUAL ID               | QUALIFICATION TITLE  |  |
|----------------------------|--|--|
| 49067                      | Further Education and Training Certificate: Railway Signalling: Fault-finding and Repair of Equipment. |  |
| SGB NAME                   | SGB Electrical Engineering & Construction  |  |
| ABET BAND                  | Undefined  |  |
| PROVIDER NAME              |  |  |
| QUALIFICATION CODE         | QUAL TYPE  | SUBFIELD                               |
| PPC-4-National Certificate | National Certificate   | Electrical Infrastructure Construction |
| MINIMUM CREDITS            | NQF LEVEL  | QUALIFICATION CLASS                    |
| 169                        | Level 4  | Regular-Unit Stds Based                |
| SAQA DECISION NUMBER       | REGISTRATION START DATE  | REGISTRATION END DATE                  |
|                            |  |  |

#### **PURPOSE OF THE QUALIFICATION**

This qualification will prepare the qualifying learner to progress through learning in the railway signalling environment to a qualification in the safe and effective fault-finding and repair of railway signalling equipment at an NQF Level 5.

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.

The social status, productivity and employability of the qualifying learner within the electrical engineering and construction field will be enhanced, thereby contributing to the quality and skills required in this field. Learners are able to demonstrate occupational skills which enable them to engage in life skills activities, creation of small businesses and health and environmental issues, through the critical cross-field component of the qualification. Analysis and logical deduction play an important role in this qualification.

#### **Rationale for the qualification**

Railway signalling forms a critical part of the infrastructure of a rail transport system and contributes to the safe and efficient control of rail traffic. Due to the density of rail traffic and the emphasis placed on reliability, availability and safety of signalling systems, it is vitally important that malfunctioning signalling equipment be repaired in a timeous and safe manner. To enable safe and timeous repair on railway signalling equipment, maintenance personnel must have a sound knowledge of various railway signalling systems and must follow predetermined fault-finding procedures based on recognised signal engineering practices and specifications.

This qualification equips the learner with the required skills, knowledge and understanding to safely and correctly perform faultfinding on malfunctioning railway signalling systems in order to identify a faulty element and to implement the necessary repair task(s) to re-establish availability of the system and hence safe and reliable rail operations.

Learners credited with this qualification and who apply the acquired knowledge and skills can help address the critical shortage of qualified personnel in the railway signalling industry.

For the new learner, this qualification recognises the applied competence needed by a productive person in a structured workplace and forms the basis for further development.

For learners who have acquired experience in the workplace, this qualification may be obtained in part or in whole through RPL by formally acknowledging workplace skills acquired without the benefit of formal education or training.

**RECOGNIZE PREVIOUS LEARNING?**

Y

**LEARNING ASSUMED TO BE IN PLACE**

This qualification assumes that the learner's competencies include but are not limited to the following:

- > Knowledge of mechanical signalling
- > Knowledge of company rules and regulations applicable when performing maintenance in the vicinity of or near exposed (live) high voltage overhead track equipment.
- > Knowledge of and be able to apply Train Working rules
- > Knowledge and ability to perform maintenance and repairs on a bank of batteries
- > Knowledge and ability to joint electrical signal cables
- > Knowledge and ability to install electrical signal cables
- > Knowledge and ability to install an apparatus case
- > Knowledge and ability to install an electrical railway signal
- > Knowledge and ability to install components of an interlocking system
- > Knowledge and ability to install a track circuit
- > Knowledge and ability to install electrical points
- > Knowledge and ability to perform routine preventive maintenance on electrical points
- > Knowledge and ability to perform routine preventive maintenance on and apparatus case
- > Knowledge and ability to perform routine preventive maintenance on a colour light signal
- > Knowledge and ability to perform routine preventive maintenance on a railway track circuit

**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.

**QUALIFICATION RULES**

Level, credits and learning components assigned to this qualification

The fundamental, core and elective learning components that make up this qualification are listed below.

**Fundamental - Core - Elective**

18 credits at Level 3 - 10 credits at Level 3 - 2 credits at Level 3

56 credits at Level 4 - 73 credits at Level 4 - 38 credits at level 4

□□

74 credits □ 83 credits □ 40 credits (Select a minimum of 12)

The available credits for this qualification are at least 197, of which a minimum of 169 credits must be done to achieve this qualification.

**Motivation for the number of credits assigned****Fundamental Credits**

SAQA stipulates that a minimum of 20 compulsory credits at level 4 and a further 20 compulsory credits at a minimum of level 3 are allocated to Communication Studies and Languages. A further 16 credits at level 4 are allocated to Mathematics and Mathematical Literacy.

74 compulsory credits have been allocated to these fundamental competencies.

**Core**

> SAQA stipulates that a minimum of 72 credits are required at or above the level at which the certificate is awarded.

> 83 compulsory credits have been allocated to the core unit standards to cover the field of assembly and wiring of railway signalling equipment sufficiently.

**Electives**

A minimum of 12 credits have to be selected from the 40 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. Demonstrate the knowledge and ability to plan and prepare the execution of fault-finding and repair tasks on railway signalling equipment, communicate with roleplayers and solve potential problems that may arise.
2. Demonstrate the knowledge and ability to perform fault-finding and repair tasks safely and effectively on railway signalling equipment according to railway signalling engineering practice and specifications
3. Demonstrate the knowledge and ability to apply safety before, during and after the execution of the fault-finding and repair tasks.
4. Understand the need for communications and demonstrate the ability to communicate effectively while working on live equipment under operational conditions.

Critical cross-field outcomes across the core unit standards and qualification at Level 4.

Critical cross - field outcomes supported by the unit standards

Understand basic electrical and mechanical engineering principles - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Understand basic electronic theory and components - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Construct basic electronic circuits - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Perform corrective preventive maintenance on an apparatus case - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Perform corrective preventive maintenance on an electrical railway signal - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management

- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Perform corrective preventive maintenance on a railway track circuit - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Perform corrective preventive maintenance on electrical points - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Perform fault-finding and repairs on railway signalling interlocking equipment - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Perform fault-finding and repairs up to modular level on a remote control system - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Perform fault-finding and repairs on an electrical railway signal - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Perform fault-finding and repairs on a railway track circuit - supports:

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Perform fault-finding and repair on electrical points

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Perform fault-finding and repairs on an electrical railway signalling cable

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Critical cross-field outcomes across the elective unit standards and qualification at Level 4.

Critical cross-field outcomes supported by the unit standards

Perform corrective preventive maintenance on an axle counter

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Perform corrective preventive maintenance on a flashlight and boom level crossing warning system

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Perform corrective preventive maintenance on railway signalling power supply equipment

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Perform fault-finding and repairs up to modular level on an axle counter

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Perform fault-finding and repairs on a flashlight and boom level crossing warning system

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

Perform fault-finding and repairs on power supply equipment

- > Information evaluation
- > Problem-solving
- > Team work
- > Self-organisation and self-management
- > Communication
- > Inter-relatedness of systems
- > Use of science and technology
- > Learner and societal development

### **ASSOCIATED ASSESSMENT CRITERIA**

1.1 The planning of the task is understood and performed correctly by evaluating and interpreting all fault information.

1.2 The correct resources and materials are procured after evaluating and interpreting all fault information. These resources include but are not limited to personnel, transport, spare equipment, tools and testing instruments

1.3 Problems regarding the resources required for the fault-finding and repair tasks of railway signalling equipment are solved effectively as measured against company policies and procedures. Problems related to the following include but is not limited to personnel, transport, spare equipment, tools and testing instruments

1.4 Effective communication with all roleplayers is demonstrated by communicating clearly and concisely and within the framework of company specific communication protocols..

1.5 The planning for the scheduled repair tasks is performed effectively according to company-specific procedures

2.1 The fault-finding and repairs, quality checks and functional tests on railway signalling equipment are understood and performed safely, correctly and timeously as per associated company policies procedures and instructions.

2.2 The correct tools, instruments and equipment are used safely and correctly as per tools, instruments and equipment handling procedures.

2.3 Problems regarding the suitability and functionality of equipment, instrumentation and tools are identified and solved effectively thus preventing delays in the faultfinding and repair tasks.

2.4 Learners would organise and manage themselves effectively by utilising the resources and executing the tasks responsibly and safely as per company policies and procedures.

2.5 Effective communication with relevant role-players related to the fault-finding and repair of railway signalling equipment is demonstrated by communicating clearly and concisely to the correct role players and within the framework of company specific communication protocols.

2.6 The impact of the fault-finding and repair tasks on the equipment being repaired in relation to the railway signalling system is correctly explained.

2.7 The scheduled repair tasks are executed effectively according to company-specific procedures.

2.8 The fault-finding process is performed logically and timeously by using analytical skills.

3.1. Personal and equipment safety is understood and applied as per company policies while executing faultfinding and repair tasks.

3.2 The inter-relatedness of various railway signalling elements and implications thereof on safety is understood and demonstrated.

3.3. The electrical test and measuring instruments and gauges are checked to ensure that they comply with manufacturers and company safety specifications.

3.4. Problems with regard to the safety of equipment and tools are identified and solved effectively as per company policies and instructions.

3.5. Learners would organise and manage themselves by adhering to safety and company-specific policies and procedures.

3.6. Safety in the workplace, as well as in the whole environment is understood and demonstrated while performing the tasks.

3.7 The knowledge and ability to restore the work site and solve any related problems effectively as per company policies and procedures is demonstrated.

4.1 The relevant communication media, protocols and procedures are used correctly while performing tasks as per company policies, procedures and instructions.

4.2 Verbal communication is done in an assertive, clear and concise manner.

4.3 Written reports are presented clearly in a timely manner in the required format to appropriate parties as per company specific policies.

4.4 Technical and work-related documentation is analysed, interpreted and/or completed correctly to prevent ambiguity and promote operational safety.

#### 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 practical, applied and foundational competencies 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 railway signalling as generated in Australia were obtained from the National Training Information Service (Web Site: [www.ntis.gov.au](http://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 of competencies was 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 Railway Signalling in other African countries where Railway Signalling 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.

The core and elective unit standards that form part of this qualification have been developed to ensure alignment with the engineering practices embraced by the Institution of Railway Signal Engineers (IRSE).

The IRSE is an international professional institution associated with railway signalling and allied professions. The institution aims to advance for public benefit, the science and practice of signalling engineering within the industry and to maintain high standards of knowledge of the profession. The IRSE recognises and encourages Continuing Professional Development (CPD) to keep abreast of new developments in science and technology within the railway signalling and associated disciplines.

Efforts to obtain British National Vocational Qualifications (NVQs) related railway signalling were unsuccessful. The registered qualifications on the NVQs were not accessible from the website due to some financial implications 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 of railway signalling qualifications from NQF Level 2 to 5. These qualifications articulate directly to other learning programmes and qualifications in railway signalling technology. It also opens the possibility for further learning in the sub-fields of Electrical Infrastructure Construction, Engineering and Related Design and Manufacturing and Assembly.

Faultfinding and repair of railway signalling equipments, will skill the learner in logical electrical faultfinding procedures, which may be articulated to faultfinding and repair on other commercial type electrical equipment as well as to non-commercial apparatus. The focus on reliability and availability of equipment, and the safety consciousness embedded in learners, will develop learners into delivering work compatible with international best practice.

### **MODERATION OPTIONS**

1. An individual wishing to apply for assessment against this qualification, may apply to an assessment agency, assessor or provider institution that has been accredited by the relevant ETQA.
2. Any person assessing a learner or moderating the assessment of a learner against this qualification must be registered as an assessor with the relevant ETQA.
3. Any institution offering learning that will enable achievement of this unit standard must be registered and accredited as a provider with the relevant ETQA as prescribed.
4. Moderation of assessment will be done by the relevant ETQA as prescribed.
5. Assessment and moderation of assessment 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 in Item 6.
6. 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

### **CRITERIA FOR THE REGISTRATION OF ASSESSORS**

1. Assessors need experience in the following areas:
  - > Interpersonal skills
  - > Subject matter
  - > Assessment
2. The assessor needs to be competent in planning, conducting and providing feedback on assessment of learning outcomes and in the design and development of assessments as described in the Unit Standards. The assessor must also be able to plan, conduct and provide feedback on the assessment of the learning outcomes at NQF Level 3. Subject matter experience must be well developed within the field of railway signalling, quality assurance tests and practices. The assessor must comply with the criteria set by the relevant ETQA.
3. The subject matter experience of the assessor can be established by recognition of prior learning.
4. Assessors need to be registered with the relevant Education and Training Quality Assurance Body.

5. Anyone assessing a learner against a unit standard must be certified as competent against that specific unit standard and registered as an assessor to assess such unit standard.

### NOTES

N/A

### UNIT STANDARDS

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

|             | UNIT STANDARD ID AND TITLE  | LEVEL   | CREDITS | STATUS                     |
|-------------|---|---------|---------|----------------------------|
| Core        | 10270 Construct Basic Electronic Circuits   | Level 3 | 4       | Reregistered               |
| Core        | 114406 Understand basic electronic theory and components  | Level 3 | 4       | Registered                 |
| Core        | 116884 Perform corrective preventive maintenance on an apparatus case   | Level 3 | 2       | Draft - Prep for P Comment |
| Core        | 113873 Understand basic electrical and mechanical engineering principles  | Level 4 | 8       | Registered                 |
| Core        | 116868 Perform corrective preventive maintenance on electrical points   | Level 4 | 5       | Draft - Prep for P Comment |
| Core        | 116877 Perform corrective preventive maintenance on a railway track circuit   | Level 4 | 3       | Draft - Prep for P Comment |
| Core        | 116878 Perform fault-finding and repair up to modular level on a remote control system  | Level 4 | 10      | Draft - Prep for P Comment |
| Core        | 116879 Perform fault-finding and repairs on a railway track circuit   | Level 4 | 7       | Draft - Prep for P Comment |
| Core        | 116881 Perform corrective preventive maintenance on an electrical railway signal  | Level 4 | 5       | Draft - Prep for P Comment |
| Core        | 116883 Perform fault-finding and repairs on railway signalling interlocking equipment   | Level 4 | 16      | Draft - Prep for P Comment |
| Core        | 116886 Perform fault-finding and repairs on electrical points   | Level 4 | 8       | Draft - Prep for P Comment |
| Core        | 116889 Perform fault-finding and repairs on an electrical railway signalling cable  | Level 4 | 4       | Draft - Prep for P Comment |
| Core        | 116890 Perform fault-finding and repairs on an electrical railway signal  | Level 4 | 7       | Draft - Prep for P Comment |
| Elective    | 116888 Perform corrective preventive maintenance on an axle counter   | Level 3 | 2       | Draft - Prep for P Comment |
| Elective    | 11473 Manage individual and team performance  | Level 4 | 8       | Registered                 |
| Elective    | 116859 Perform fault-finding and repairs up to modular level on an axle counter   | Level 4 | 5       | Draft - Prep for P Comment |
| Elective    | 116872 Perform corrective preventive maintenance on railway signalling power supply equipment   | Level 4 | 6       | Draft - Prep for P Comment |
| Elective    | 116876 Perform corrective preventive maintenance on a flashlight and boom level crossing warning system   | Level 4 | 5       | Draft - Prep for P Comment |
| Elective    | 116880 Perform fault-finding and repairs on a flashlight and boom level crossing warning system   | Level 4 | 7       | Draft - Prep for P Comment |
| Elective    | 116885 Perform fault-finding and repairs on railway signalling power supply equipment   | Level 4 | 7       | Draft - Prep for P Comment |
| Fundamental | 8969 Interpret and use information from texts   | Level 3 | 5       | Registered                 |
| Fundamental | 8970 Write texts for a range of communicative contexts  | Level 3 | 5       | Registered                 |
| Fundamental | 13915 Demonstrate knowledge and understanding of HIV/AIDS in a workplace, and its effects on a business sub-sector, own organisation and a specific workplace | Level 3 | 4       | Registered                 |
| Fundamental | 116714 Lead a team, plan, allocate and assess their work  | Level 3 | 4       | Public Comment             |
| Fundamental | 7457 Work with a wide range of patterns and transformations of functions and solve related problems   | Level 4 | 3       | Registered                 |
| Fundamental | 7483 Solve problems involving sequences and series in real and simulated situations   | Level 4 | 2       | Registered                 |
| Fundamental | 7485 Demonstrate understanding of real and complex number systems   | Level 4 | 3       | Registered                 |
| Fundamental | 8974 Engage in sustained oral communication and evaluate spoken texts   | Level 4 | 5       | Registered                 |
| Fundamental | 8975 Read analyse and respond to a variety of texts   | Level 4 | 5       | Registered                 |
| Fundamental | 8976 Write for a wide range of contexts   | Level 4 | 5       | Registered                 |
| Fundamental | 9016 Represent analyse and calculate shape and motion in 2-and 3-dimensional space in different contexts  | Level 4 | 4       | Registered                 |
| Fundamental | 12153 Use the writing process to compose texts required in the business environment   | Level 4 | 5       | Registered                 |
| Fundamental | 12154 Apply comprehension skills to engage oral texts in a business environment   | Level 4 | 5       | Registered                 |

|             |  |         |   |                |
|-------------|--|---------|---|----------------|
| Fundamental | 12155 Apply comprehension skills to engage written texts in a business environment   | Level 4 | 5 | Registered     |
| Fundamental | 12417 Measure, estimate & calculate physical quantities & explore, critique & prove geometrical relationships in 2 and 3 dimensional space in the life and workplace of adult with increasing responsibilities | Level 4 | 4 | Reregistered   |
| Fundamental | 116380 Supervise workers at levels 2 and 3   | Level 4 | 6 | Public Comment |
| Fundamental | 116389 Write a technical report  | Level 4 | 4 | Public Comment |



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

1

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

| SAQA US ID                                | UNIT STANDARD TITLE  |  |         |
|---|--|--|---------|
| 116900                                    | Apply electrical high voltage safety instructions when working in the vicinity of or near exposed "live" high-voltage overhead track equipment |  |         |
| SGB NAME                                  | ABET BAND  | PROVIDER NAME                          |         |
| SGB Electrical Engineering & Construction | Undefined  |  |         |
| FIELD DESCRIPTION                         |  | SUBFIELD DESCRIPTION                   |         |
| Physical Planning and Construction        |  | Electrical Infrastructure Construction |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE   | NQF LEVEL                              | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular  | Level 2                                | 1       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Work safely in the vicinity of or near high-voltage overhead track equipment.

##### **SPECIFIC OUTCOME 2**

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

##### **SPECIFIC OUTCOME 3**

Identify and verify the correctness of track circuits and bonding.

##### **SPECIFIC OUTCOME 4**

Identify OHTE and report related sub standards conditions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

2

#### Assemble a railway track circuit

| SAQA US ID                                | UNIT STANDARD TITLE                    |               |         |
|---|--|---------------|---------|
| 116839                                    | Assemble a railway track circuit       |               |         |
| SGB NAME                                  | ABET BAND                              | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined                              |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION                   |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE                     | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular                                | Level 2       | 2       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to assemble a railway track circuit safely and correctly.

##### **SPECIFIC OUTCOME 2**

Assemble a railway track circuit safely and correctly according to an assembly plan within the alloc

##### **SPECIFIC OUTCOME 3**

Perform quality checks on an assembled railway track circuit according to procedures, policies and i

##### **SPECIFIC OUTCOME 4**

Restore the site and store or secure an assembled railway track circuit as per company-specific proc



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

3

#### Assemble an apparatus case

| SAQA US ID                                | UNIT STANDARD TITLE                    |               |         |
|---|--|---------------|---------|
| 116841                                    | Assemble an apparatus case             |               |         |
| SGB NAME                                  | ABET BAND                              | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined                              |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION                   |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE                     | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular                                | Level 2       | 3       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to safely and correctly perform the assembly of an apparatus

##### **SPECIFIC OUTCOME 2**

Assemble an apparatus case safely and correctly according to an assembly plan within the allocated t

##### **SPECIFIC OUTCOME 3**

Perform quality checks on an assembled apparatus case according to procedures, policies and instruct

##### **SPECIFIC OUTCOME 4**

Restore the site and store or secure an assembled apparatus case as per company-specific procedures,



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

4

#### Assemble an electrical railway signal

| SAQA US ID                                | UNIT STANDARD TITLE                   |  |               |
|---|---------------------------------------|--|---------------|
| 116842                                    | Assemble an electrical railway signal |  |               |
| SGB NAME                                  |                                       | ABET BAND                              | PROVIDER NAME |
| SGB Electrical Engineering & Construction |                                       | Undefined                              |               |
| FIELD DESCRIPTION                         |                                       | SUBFIELD DESCRIPTION                   |               |
| Physical Planning and Construction        |                                       | Electrical Infrastructure Construction |               |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE                    | NQF LEVEL                              | CREDITS       |
| PPC-EIC-0-SGB ECC                         | Regular                               | Level 2                                | 5             |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to safely and correctly perform the assembly of an electrical railway signal

##### **SPECIFIC OUTCOME 2**

Assemble an electrical railway signal safely and correctly according to an assembly plan within the specified time frame

##### **SPECIFIC OUTCOME 3**

Perform quality checks on an assembled electrical railway signal according to procedures, policies and standards

##### **SPECIFIC OUTCOME 4**

Restore the site and store or secure an assembled electrical railway signal as per company-specific procedures



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

5

#### Assemble components of a flashlight and boom level crossing warning system

| SAQA US ID                                | UNIT STANDARD TITLE  |               |         |
|---|--|---------------|---------|
| 116898                                    | Assemble components of a flashlight and boom level crossing warning system |               |         |
| SGB NAME                                  | ABET BAND  | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined  |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION   |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction                                     |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE   | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular  | Level 2       | 3       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to safely and correctly perform the assembly of components o

##### **SPECIFIC OUTCOME 2**

Assemble components of a flashlight and boom level crossing warning system safely and correctly acco

##### **SPECIFIC OUTCOME 3**

Perform quality checks on components of a flashlight and boom level crossing warning system accordin

##### **SPECIFIC OUTCOME 4**

Restore the site and store or secure assembled components of a flashlight and boom level crossing wa



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

6

#### Assemble components of a remote control system

| SAQA US ID                                | UNIT STANDARD TITLE                            |  |               |
|---|--|--|---------------|
| 116894                                    | Assemble components of a remote control system |  |               |
| SGB NAME                                  |  | ABET BAND                              | PROVIDER NAME |
| SGB Electrical Engineering & Construction |  | Undefined                              |               |
| FIELD DESCRIPTION                         |  | SUBFIELD DESCRIPTION                   |               |
| Physical Planning and Construction        |  | Electrical Infrastructure Construction |               |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE                             | NQF LEVEL                              | CREDITS       |
| PPC-EIC-0-SGB ECC                         | Regular  | Level 2                                | 3             |

#### **Specific Outcomes:**

##### ***SPECIFIC OUTCOME 1***

Plan and procure the resources required to safely and correctly perform the assembly of components f

##### ***SPECIFIC OUTCOME 2***

Assemble components of a remote control system safely and correctly according to an assembly plan wi

##### ***SPECIFIC OUTCOME 3***

Perform quality checks on assembled components of a remote control system according to procedures, p

##### ***SPECIFIC OUTCOME 4***

Restore the site and store or secure (where applicable) the assembled components of a remote control



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

7

#### Assemble components of an axle counter

| SAQA US ID                                | UNIT STANDARD TITLE                    |               |         |
|---|--|---------------|---------|
| 116891                                    | Assemble components of an axle counter |               |         |
| SGB NAME                                  | ABET BAND                              | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined                              |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION                   |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE                     | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular                                | Level 2       | 2       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to safely and correctly perform the assembly of components o

##### **SPECIFIC OUTCOME 2**

Assemble components of an axle counter safely and correctly according to an assembly plan and specif

##### **SPECIFIC OUTCOME 3**

Perform quality checks on assembled components of an axle counter according to procedures, policies

##### **SPECIFIC OUTCOME 4**

Restore the site and store or secure (where applicable) components of an assembled axle counter as p



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

8

#### Demonstrate an understanding of the principles of mechanical railway signalling

| SAQA US ID                                | UNIT STANDARD TITLE   |  |               |
|---|---|--|---------------|
| 116846                                    | Demonstrate an understanding of the principles of mechanical railway signalling |  |               |
| SGB NAME                                  |   | ABET BAND                              | PROVIDER NAME |
| SGB Electrical Engineering & Construction |   | Undefined                              |               |
| FIELD DESCRIPTION                         |   | SUBFIELD DESCRIPTION                   |               |
| Physical Planning and Construction        |   | Electrical Infrastructure Construction |               |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE  | NQF LEVEL                              | CREDITS       |
| PPC-EIC-0-SGB ECC                         | Regular   | Level 2                                | 6             |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Demonstrate an understanding of mechanical points operation.

##### **SPECIFIC OUTCOME 2**

Demonstrate an understanding of the mechanical signal operation.

##### **SPECIFIC OUTCOME 3**

Demonstrate an understanding of a mechanical interlocking system.

##### **SPECIFIC OUTCOME 4**

Demonstrate an understanding of one-way and two-way points indicators.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

9

#### Identify, route, harness and terminate electrical conductors used in railway signalling

| SAQA US ID                                | UNIT STANDARD TITLE   |               |         |
|---|---|---------------|---------|
| 116853                                    | Identify, route, harness and terminate electrical conductors used in railway signalling |               |         |
| SGB NAME                                  | ABET BAND   | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined   |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION  |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction  |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE  | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular   | Level 2       | 6       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Identify electrical conductors and insulation according to railway signalling specifications.

##### **SPECIFIC OUTCOME 2**

Route and harness electrical conductors according to railway signalling specifications.

##### **SPECIFIC OUTCOME 3**

Terminate electrical conductors according to railway signalling specifications.

##### **SPECIFIC OUTCOME 4**

Perform quality checks on the terminated electrical conductors according to company procedures, poli

##### **SPECIFIC OUTCOME 5**

Restore the site as per company-specific procedures, policies and instructions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

10

#### Wire components of a flashlight and boom level crossing warning system

| SAQA US ID                                | UNIT STANDARD TITLE  |               |         |
|---|--|---------------|---------|
| 116897                                    | Wire components of a flashlight and boom level crossing warning system |               |         |
| SGB NAME                                  | ABET BAND  | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined  |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION   |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction                                 |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE   | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular  | Level 2       | 3       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform the wiring of components of a flashlight and boom

##### **SPECIFIC OUTCOME 2**

Wire components of a flashlight and boom level crossing warning system safely and correctly accordin

##### **SPECIFIC OUTCOME 3**

Perform quality checks on a wired component of a flashlight and boom level crossing warning system a

##### **SPECIFIC OUTCOME 4**

Restore the site and store or secure a wired component of a flashlight and boom level crossing warni



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

11

#### Assemble an electrical points machine

| SAQA US ID                                | UNIT STANDARD TITLE                   |  |         |
|---|---------------------------------------|--|---------|
| 116844                                    | Assemble an electrical points machine |  |         |
| SGB NAME                                  | ABET BAND                             | PROVIDER NAME                          |         |
| SGB Electrical Engineering & Construction | Undefined                             |  |         |
| FIELD DESCRIPTION                         |                                       | SUBFIELD DESCRIPTION                   |         |
| Physical Planning and Construction        |                                       | Electrical Infrastructure Construction |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE                    | NQF LEVEL                              | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular                               | Level 3                                | 6       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to safely and correctly perform the assembly of an electrical

##### **SPECIFIC OUTCOME 2**

Assemble an electrical points machine safely and correctly according to an assembly plan within the

##### **SPECIFIC OUTCOME 3**

Perform quality checks on an assembled electrical points machine according to procedures, policies a

##### **SPECIFIC OUTCOME 4**

Restore the site and store or secure an assembled electrical points machine as per company-specific



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

## UNIT STANDARD:

12

## Assemble components of a railway signalling interlocking system

| SAQA US ID                                | UNIT STANDARD TITLE   |               |         |
|---|---|---------------|---------|
| 116847                                    | Assemble components of a railway signalling interlocking system |               |         |
| SGB NAME                                  | ABET BAND   | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined   |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION  |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction                          |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE  | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular   | Level 3       | 6       |

**Specific Outcomes:****SPECIFIC OUTCOME 1**

Plan and procure the resources required to safely and correctly perform the assembly of components f

**SPECIFIC OUTCOME 2**

Assemble components of a railway signalling interlocking system safely and correctly according to an

**SPECIFIC OUTCOME 3**

Perform quality checks on assembled components of a railway signalling interlocking system according

**SPECIFIC OUTCOME 4**

Restore the site and store or secure (where applicable) the assembled components of a railway signal



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

13

### Assemble railway signalling power supply equipment

| SAQA US ID                                | UNIT STANDARD TITLE                                |  |         |
|---|--|--|---------|
| 116895                                    | Assemble railway signalling power supply equipment |  |         |
| SGB NAME                                  | ABET BAND  | PROVIDER NAME                          |         |
| SGB Electrical Engineering & Construction | Undefined  |  |         |
| FIELD DESCRIPTION                         |  | SUBFIELD DESCRIPTION                   |         |
| Physical Planning and Construction        |  | Electrical Infrastructure Construction |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE                                 | NQF LEVEL                              | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular  | Level 3                                | 6       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to safely and correctly perform the assembly of railway sign

##### **SPECIFIC OUTCOME 2**

Assemble railway signalling power supply equipment safely and correctly according to an assembly pla

##### **SPECIFIC OUTCOME 3**

Perform quality checks on assembled railway signalling power supply equipment according to procedure

##### **SPECIFIC OUTCOME 4**

Restore the site and store or secure (where applicable) the assembled railway signalling power suppl



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

## UNIT STANDARD:

14

## Demonstrate an understanding of the fundamental elements of railway signalling

| SAQA US ID                                | UNIT STANDARD TITLE  |               |         |
|---|--|---------------|---------|
| 116858                                    | Demonstrate an understanding of the fundamental elements of railway signalling |               |         |
| SGB NAME                                  | ABET BAND  | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined  |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION   |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction   |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE   | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular  | Level 3       | 8       |

**Specific Outcomes:****SPECIFIC OUTCOME 1**

Demonstrate an understanding of the reasons for single, double and uni/bi-directional lines, crossin

**SPECIFIC OUTCOME 2**

Demonstrate an understanding of the position, purpose, function and methods of operating points in r

**SPECIFIC OUTCOME 3**

Demonstrate an understanding of the position, purpose, function and methods of operating signals in

**SPECIFIC OUTCOME 4**

Demonstrate an understanding of the purpose and function of train detection systems in railway signa

**SPECIFIC OUTCOME 5**

Demonstrate an understanding of the purpose and function of various types of railway signalling inte

**SPECIFIC OUTCOME 6**

Demonstrate an understanding of the purpose and function of various methods of control systems in ra



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

15

### Install an apparatus case

| SAQA US ID                                | UNIT STANDARD TITLE                    |               |         |
|---|--|---------------|---------|
| 116852                                    | Install an apparatus case              |               |         |
| SGB NAME                                  | ABET BAND                              | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined                              |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION                   |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE                     | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular                                | Level 3       | 3       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to install an apparatus case safely and correctly.

##### **SPECIFIC OUTCOME 2**

Install an apparatus case safely and correctly according to the installation plans/diagrams within t

##### **SPECIFIC OUTCOME 3**

Perform quality checks on the installation of an apparatus case according to procedures, policies an

##### **SPECIFIC OUTCOME 4**

Restore the installation site as per company-specific procedures, policies and instructions.

##### **SPECIFIC OUTCOME 5**

Hand over the installed apparatus case for commissioning.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

16

### Install an electrical railway signal

| SAQA US ID                                | UNIT STANDARD TITLE                    |               |         |
|---|--|---------------|---------|
| 116850                                    | Install an electrical railway signal   |               |         |
| SGB NAME                                  | ABET BAND                              | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined                              |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION                   |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE                     | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular                                | Level 3       | 4       |

#### Specific Outcomes:

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to install an electrical railway signal safely and correctly

##### **SPECIFIC OUTCOME 2**

Install an electrical railway signal safely and correctly according to the installation plans/diagram

##### **SPECIFIC OUTCOME 3**

Perform quality checks on the installation of an electrical railway signal according to procedures,

##### **SPECIFIC OUTCOME 4**

Restore the installation site as per company-specific procedures, policies and instructions.

##### **SPECIFIC OUTCOME 5**

Hand over the installed electrical railway signal for commissioning.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

17

#### Install components of a flashlight and boom level crossing warning system

| SAQA US ID                                | UNIT STANDARD TITLE   |               |         |
|---|---|---------------|---------|
| 116854                                    | Install components of a flashlight and boom level crossing warning system |               |         |
| SGB NAME                                  | ABET BAND   | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined   |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION  |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction                                    |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE  | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular   | Level 3       | 3       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to install components of a flashlight and boom level crossing

##### **SPECIFIC OUTCOME 2**

Install components of a flashlight and boom level crossing warning system safely and correctly accor

##### **SPECIFIC OUTCOME 3**

Perform quality checks on the installed components of a flashlight and boom level crossing warning s

##### **SPECIFIC OUTCOME 4**

Communication is performed according to procedures, policies and instructions.

##### **SPECIFIC OUTCOME 5**

Restore the installation site as per company-specific procedures, policies and instructions.

##### **SPECIFIC OUTCOME 6**

Hand over the installed components of a flashlight and boom level crossing warning system for commis



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

## UNIT STANDARD:

18

## Install components of a remote control system

| SAQA US ID                                | UNIT STANDARD TITLE                           |  |         |
|---|---|--|---------|
| 116857                                    | Install components of a remote control system |  |         |
| SGB NAME                                  | ABET BAND                                     | PROVIDER NAME                          |         |
| SGB Electrical Engineering & Construction | Undefined                                     |  |         |
| FIELD DESCRIPTION                         |   | SUBFIELD DESCRIPTION                   |         |
| Physical Planning and Construction        |   | Electrical Infrastructure Construction |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE                            | NQF LEVEL                              | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular                                       | Level 3                                | 3       |

**Specific Outcomes:****SPECIFIC OUTCOME 1**

Plan and procure the resources required to install components of a remote control system safely and

**SPECIFIC OUTCOME 2**

Install components of a remote control system safely and correctly according to the installation pla

**SPECIFIC OUTCOME 3**

Perform quality checks on the installation of components of a remote control system according to pro

**SPECIFIC OUTCOME 4**

Restore the installation site as per company-specific procedures, policies and instructions.

**SPECIFIC OUTCOME 5**

Hand over the installed components of a remote control system for commissioning.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

19

#### Install components of an axle counter

| SAQA US ID                                | UNIT STANDARD TITLE                   |  |         |
|---|---------------------------------------|--|---------|
| 116862                                    | Install components of an axle counter |  |         |
| SGB NAME                                  | ABET BAND                             | PROVIDER NAME                          |         |
| SGB Electrical Engineering & Construction | Undefined                             |  |         |
| FIELD DESCRIPTION                         |                                       | SUBFIELD DESCRIPTION                   |         |
| Physical Planning and Construction        |                                       | Electrical Infrastructure Construction |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE                    | NQF LEVEL                              | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular                               | Level 3                                | 3       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to install components of an axle counter safely and accordin

##### **SPECIFIC OUTCOME 2**

Install components of an axle counter safely and correctly according to the installation plans/diagr

##### **SPECIFIC OUTCOME 3**

Perform quality checks on the installation of axle counter components according to procedures, polic

##### **SPECIFIC OUTCOME 4**

Restore the installation site as per company-specific procedures, policies and instructions.

##### **SPECIFIC OUTCOME 5**

Hand over the installed axle counter components for commissioning.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

## UNIT STANDARD:

20

## Install electrical railway signalling cables

| SAQA US ID                                | UNIT STANDARD TITLE                          |               |         |
|---|--|---------------|---------|
| 116867                                    | Install electrical railway signalling cables |               |         |
| SGB NAME                                  | ABET BAND                                    | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined                                    |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION                         |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction       |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE                           | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular                                      | Level 3       | 5       |

**Specific Outcomes:****SPECIFIC OUTCOME 1**

Plan and procure the resources required to safely install electrical railway signalling cables accor

**SPECIFIC OUTCOME 2**

Install electrical railway signalling cables safely and correctly according to the installation plan

**SPECIFIC OUTCOME 3**

Perform quality checks on the installation of electrical railway signalling cables according to proc

**SPECIFIC OUTCOME 4**

Restore the installation site as per company-specific procedures, policies and instructions.

**SPECIFIC OUTCOME 5**

Hand over the installed electrical railway signalling cables for termination.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

21

### Install railway signalling power supply equipment

| SAQA US ID                                | UNIT STANDARD TITLE                               |               |         |
|---|---|---------------|---------|
| 116873                                    | Install railway signalling power supply equipment |               |         |
| SGB NAME                                  | ABET BAND   | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined   |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION                              |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction            |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE                                | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular   | Level 3       | 3       |

#### Specific Outcomes:

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to install railway signalling power supply equipment safely

##### **SPECIFIC OUTCOME 2**

Install railway signalling power supply equipment safely and correctly according to the installation

##### **SPECIFIC OUTCOME 3**

Perform quality checks on the installed railway signalling power supply equipment according to proce

##### **SPECIFIC OUTCOME 4**

Restore the installation site as per company-specific procedures, policies and instructions.

##### **SPECIFIC OUTCOME 5**

Hand over the installed railway signalling power supply equipment for commissioning.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

22

#### Joint electrical railway signalling cables

| SAQA US ID                                | UNIT STANDARD TITLE                        |               |         |
|---|--|---------------|---------|
| 116875                                    | Joint electrical railway signalling cables |               |         |
| SGB NAME                                  | ABET BAND                                  | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined                                  |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION                       |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction     |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE                         | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular                                    | Level 3       | 5       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to safely and correctly joint electrical railway signalling

##### **SPECIFIC OUTCOME 2**

Correctly prepare electrical railway signalling cables for jointing according to company-specific po

##### **SPECIFIC OUTCOME 3**

Correctly joint electrical railway signalling cables according to specification within the allocated

##### **SPECIFIC OUTCOME 4**

Perform quality checks on the jointed electrical railway-signalling cables according to company-spec

##### **SPECIFIC OUTCOME 5**

Restore the site as per company procedures, policies and instructions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

23

#### Maintain and repair a bank of batteries as used in railway signalling

| SAQA US ID                                | UNIT STANDARD TITLE   |  |         |
|---|---|--|---------|
| 116882                                    | Maintain and repair a bank of batteries as used in railway signalling |  |         |
| SGB NAME                                  | ABET BAND   | PROVIDER NAME                          |         |
| SGB Electrical Engineering & Construction | Undefined   |  |         |
| FIELD DESCRIPTION                         |   | SUBFIELD DESCRIPTION                   |         |
| Physical Planning and Construction        |   | Electrical Infrastructure Construction |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE  | NQF LEVEL                              | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular   | Level 3                                | 8       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to safely perform maintenance, fault-finding and repair task

##### **SPECIFIC OUTCOME 2**

Perform maintenance on a bank of batteries, battery room and an enclosure.

##### **SPECIFIC OUTCOME 3**

Diagnose, locate and repair a fault on a bank of batteries.

##### **SPECIFIC OUTCOME 4**

Communicate with control and/or relevant role players before, during and on completion of the maintenance task.

##### **SPECIFIC OUTCOME 5**

Restore the site as per company procedures, policies and instructions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

24

#### Perform corrective preventive maintenance on an apparatus case

| SAQA US ID                                | UNIT STANDARD TITLE  |  |         |
|---|--|--|---------|
| 116884                                    | Perform corrective preventive maintenance on an apparatus case |  |         |
| SGB NAME                                  | ABET BAND  | PROVIDER NAME                          |         |
| SGB Electrical Engineering & Construction | Undefined  |  |         |
| FIELD DESCRIPTION                         |  | SUBFIELD DESCRIPTION                   |         |
| Physical Planning and Construction        |  | Electrical Infrastructure Construction |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE   | NQF LEVEL                              | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular  | Level 3                                | 2       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform corrective preventive maintenance (CPM) tasks on

##### **SPECIFIC OUTCOME 2**

Perform corrective preventive maintenance (CPM) tasks on an apparatus case.

##### **SPECIFIC OUTCOME 3**

Perform relevant tests to verify the correct operation of the repaired equipment and re-instate the

##### **SPECIFIC OUTCOME 4**

Communicate with control and/or relevant role players before, during and on completion of the CPM pr

##### **SPECIFIC OUTCOME 5**

Restore the site as per company-specific procedures, policies and instructions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

25

#### Perform corrective preventive maintenance on an axle counter

| SAQA US ID                                | UNIT STANDARD TITLE  |  |               |
|---|--|--|---------------|
| 116888                                    | Perform corrective preventive maintenance on an axle counter |  |               |
| SGB NAME                                  |  | ABET BAND                              | PROVIDER NAME |
| SGB Electrical Engineering & Construction |  | Undefined                              |               |
| FIELD DESCRIPTION                         |  | SUBFIELD DESCRIPTION                   |               |
| Physical Planning and Construction        |  | Electrical Infrastructure Construction |               |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE   | NQF LEVEL                              | CREDITS       |
| PPC-EIC-0-SGB ECC                         | Regular  | Level 3                                | 2             |

#### **Specific Outcomes:**

##### ***SPECIFIC OUTCOME 1***

Plan and procure the resources required to perform corrective preventive maintenance (CPM) tasks on

##### ***SPECIFIC OUTCOME 2***

Perform corrective preventive maintenance (CPM) tasks on an axle counter.

##### ***SPECIFIC OUTCOME 3***

Perform relevant tests to verify the correct operation of the repaired equipment and re-instate the

##### ***SPECIFIC OUTCOME 4***

Communicate with control and/or relevant role players before, during and on completion of the CPM pr

##### ***SPECIFIC OUTCOME 5***

Restore the site as per company procedures, policies and instructions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

## UNIT STANDARD:

26

## Perform routine preventive maintenance on a railway track circuit

| SAQA US ID                                | UNIT STANDARD TITLE   |  |         |
|---|---|--|---------|
| 116843                                    | Perform routine preventive maintenance on a railway track circuit |  |         |
| SGB NAME                                  | ABET BAND   | PROVIDER NAME                          |         |
| SGB Electrical Engineering & Construction | Undefined   |  |         |
| FIELD DESCRIPTION                         |   | SUBFIELD DESCRIPTION                   |         |
| Physical Planning and Construction        |   | Electrical Infrastructure Construction |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE  | NQF LEVEL                              | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular   | Level 3                                | 2       |

**Specific Outcomes:****SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform routine preventive maintenance (RPM) tasks on a r

**SPECIFIC OUTCOME 2**

Perform routine preventive maintenance (RPM) tasks on a railway track circuit.

**SPECIFIC OUTCOME 3**

Identify, prioritise and report the corrective action to take after a defect or substandard has been

**SPECIFIC OUTCOME 4**

Effectively communicate with control and/or relevant role players before, during and on completion o

**SPECIFIC OUTCOME 5**

Restore the site as per company-specific procedures, policies and instructions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

27

#### Perform routine preventive maintenance on an apparatus case

| SAQA US ID                                | UNIT STANDARD TITLE   |  |               |
|---|---|--|---------------|
| 116887                                    | Perform routine preventive maintenance on an apparatus case |  |               |
| SGB NAME                                  |   | ABET BAND                              | PROVIDER NAME |
| SGB Electrical Engineering & Construction |   | Undefined                              |               |
| FIELD DESCRIPTION                         |   | SUBFIELD DESCRIPTION                   |               |
| Physical Planning and Construction        |   | Electrical Infrastructure Construction |               |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE  | NQF LEVEL                              | CREDITS       |
| PPC-EIC-0-SGB ECC                         | Regular   | Level 3                                | 2             |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform routine preventive maintenance (RPM) tasks on an

##### **SPECIFIC OUTCOME 2**

Perform routine preventive maintenance (RPM) tasks on an apparatus case.

##### **SPECIFIC OUTCOME 3**

Identify, prioritise and report the corrective action to take after a defect or substandard has been

##### **SPECIFIC OUTCOME 4**

Effectively communicate with control and/or relevant role players before, during and on completion o

##### **SPECIFIC OUTCOME 5**

Restore the site as per company-specific procedures, policies and instructions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

**UNIT STANDARD:**

28

**Perform routine preventive maintenance on an axle counter**

| SAQA US ID                                | UNIT STANDARD TITLE                                       |               |         |
|---|---|---------------|---------|
| 116840                                    | Perform routine preventive maintenance on an axle counter |               |         |
| SGB NAME                                  | ABET BAND   | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined   |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION                                      |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction                    |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE  | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular   | Level 3       | 3       |

**Specific Outcomes:****SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform routine preventive maintenance (RPM) tasks on an

**SPECIFIC OUTCOME 2**

Perform routine preventive maintenance (RPM) tasks on an axle counter.

**SPECIFIC OUTCOME 3**

Identify, prioritise and report the corrective action to take after a defect or substandard has been

**SPECIFIC OUTCOME 4**

Effectively communicate with control and/or relevant role players before, during and on completion o

**SPECIFIC OUTCOME 5**

Restore the site as per company-specific procedures, policies and instructions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

29

#### Perform routine preventive maintenance on an electrical railway signal

| SAQA US ID                                | UNIT STANDARD TITLE  |  |               |
|---|--|--|---------------|
| 116845                                    | Perform routine preventive maintenance on an electrical railway signal |  |               |
| SGB NAME                                  |  | ABET BAND                              | PROVIDER NAME |
| SGB Electrical Engineering & Construction |  | Undefined                              |               |
| FIELD DESCRIPTION                         |  | SUBFIELD DESCRIPTION                   |               |
| Physical Planning and Construction        |  | Electrical Infrastructure Construction |               |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE   | NQF LEVEL                              | CREDITS       |
| PPC-EIC-0-SGB ECC                         | Regular  | Level 3                                | 2             |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform routine preventive maintenance (RPM) tasks on an

##### **SPECIFIC OUTCOME 2**

Perform routine preventive maintenance (RPM) tasks on an electrical railway signal according to plan

##### **SPECIFIC OUTCOME 3**

Identify, prioritise and report the corrective action to take after a defect or substandard has been

##### **SPECIFIC OUTCOME 4**

Effectively communicate with control and/or relevant role players before, during and on completion o

##### **SPECIFIC OUTCOME 5**

Restore the site as per company-specific procedures, policies and instructions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

30

#### Perform routine preventive maintenance on electrical points

| SAQA US ID                                | UNIT STANDARD TITLE   |  |         |
|---|---|--|---------|
| 116848                                    | Perform routine preventive maintenance on electrical points |  |         |
| SGB NAME                                  | ABET BAND   | PROVIDER NAME                          |         |
| SGB Electrical Engineering & Construction | Undefined   |  |         |
| FIELD DESCRIPTION                         |   | SUBFIELD DESCRIPTION                   |         |
| Physical Planning and Construction        |   | Electrical Infrastructure Construction |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE  | NQF LEVEL                              | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular   | Level 3                                | 3       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform routine preventive maintenance (RPM) tasks on ele

##### **SPECIFIC OUTCOME 2**

Perform routine preventive maintenance (RPM) tasks on electrical points.

##### **SPECIFIC OUTCOME 3**

Identify, prioritise and report the corrective action to take after a defect or substandard has been

##### **SPECIFIC OUTCOME 4**

Effectively communicate with control and/or relevant role players before, during and on completion o

##### **SPECIFIC OUTCOME 5**

Restore the site as per company-specific procedures, policies and instructions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

31

#### Perform routine preventive maintenance on railway signalling power supply equipment

| SAQA US ID                                | UNIT STANDARD TITLE   |               |         |
|---|---|---------------|---------|
| 116849                                    | Perform routine preventive maintenance on railway signalling power supply equipment |               |         |
| SGB NAME                                  | ABET BAND   | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined   |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION  |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction  |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE  | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular   | Level 3       | 3       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform routine preventive maintenance (RPM) tasks on railway signalling power supply equipment.

##### **SPECIFIC OUTCOME 2**

Perform routine preventive maintenance (RPM) tasks on railway signalling power supply equipment according to company-specific procedures, policies and instructions.

##### **SPECIFIC OUTCOME 3**

Identify, prioritise and report the corrective action to take after a defect or substandard has been identified.

##### **SPECIFIC OUTCOME 4**

Effectively communicate with control and/or relevant role players before, during and on completion of routine preventive maintenance (RPM) tasks on railway signalling power supply equipment.

##### **SPECIFIC OUTCOME 5**

Restore the site as per company-specific procedures, policies and instructions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

## UNIT STANDARD:

32

## Wire a railway track circuit

| SAQA US ID                                | UNIT STANDARD TITLE                    |               |         |
|---|--|---------------|---------|
| 116856                                    | Wire a railway track circuit           |               |         |
| SGB NAME                                  | ABET BAND                              | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined                              |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION                   |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE                     | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular                                | Level 3       | 3       |

**Specific Outcomes:****SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform the wiring of a railway track circuit safely and

**SPECIFIC OUTCOME 2**

Wire a railway track circuit safely and correctly according to a wiring plan within the allocated ti

**SPECIFIC OUTCOME 3**

Perform quality checks on a wired railway track circuit according to procedures, policies and instru

**SPECIFIC OUTCOME 4**

Restore the site and store or secure a wired railway track circuit as per company-specific procedure



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

33

#### Wire an apparatus case

| SAQA US ID                                | UNIT STANDARD TITLE    |  |               |
|---|------------------------|--|---------------|
| 116855                                    | Wire an apparatus case |  |               |
| SGB NAME                                  |                        | ABET BAND                              | PROVIDER NAME |
| SGB Electrical Engineering & Construction |                        | Undefined                              |               |
| FIELD DESCRIPTION                         |                        | SUBFIELD DESCRIPTION                   |               |
| Physical Planning and Construction        |                        | Electrical Infrastructure Construction |               |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE     | NQF LEVEL                              | CREDITS       |
| PPC-EIC-0-SGB ECC                         | Regular                | Level 3                                | 3             |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform the wiring of an apparatus case safely and accord

##### **SPECIFIC OUTCOME 2**

Wire an apparatus case safely and correctly according to a wiring diagram within the allocated time

##### **SPECIFIC OUTCOME 3**

Perform quality checks on the wiring of an apparatus case according to procedures, policies and inst

##### **SPECIFIC OUTCOME 4**

Restore the site and store or secure a wired apparatus case as per company-specific procedures, poli



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

## UNIT STANDARD:

34

## Wire an electrical points machine

| SAQA US ID                                | UNIT STANDARD TITLE               |  |         |
|---|-----------------------------------|--|---------|
| 116851                                    | Wire an electrical points machine |  |         |
| SGB NAME                                  | ABET BAND                         | PROVIDER NAME                          |         |
| SGB Electrical Engineering & Construction | Undefined                         |  |         |
| FIELD DESCRIPTION                         |                                   | SUBFIELD DESCRIPTION                   |         |
| Physical Planning and Construction        |                                   | Electrical Infrastructure Construction |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE                | NQF LEVEL                              | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular                           | Level 3                                | 3       |

**Specific Outcomes:****SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform the wiring of an electrical points machine safely

**SPECIFIC OUTCOME 2**

Wire an electrical points machine safely and correctly according to a wiring plan within the allocat

**SPECIFIC OUTCOME 3**

Perform quality checks on a wired electrical points machine according to procedures, policies and in

**SPECIFIC OUTCOME 4**

Restore the site and store or secure a wired electrical points machine as per company-specific proce



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

35

#### Wire an electrical railway signal

| SAQA US ID                                | UNIT STANDARD TITLE                    |               |         |
|---|--|---------------|---------|
| 116860                                    | Wire an electrical railway signal      |               |         |
| SGB NAME                                  | ABET BAND                              | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined                              |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION                   |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE                     | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular                                | Level 3       | 4       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform the wiring of an electrical railway signal safely

##### **SPECIFIC OUTCOME 2**

Wire an electrical railway signal safely and correctly according to a wiring diagram within the allo

##### **SPECIFIC OUTCOME 3**

Perform quality checks on the wiring of an electrical railway signal according to procedures, polici

##### **SPECIFIC OUTCOME 4**

Restore the site and store or secure a wired electrical railway signal as per company-specific proce



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

36

#### Wire components of a remote control system

| SAQA US ID                                | UNIT STANDARD TITLE                        |               |         |
|---|--|---------------|---------|
| 116893                                    | Wire components of a remote control system |               |         |
| SGB NAME                                  | ABET BAND                                  | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined                                  |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION                       |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction     |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE                         | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular                                    | Level 3       | 4       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform the wiring of components of a remote control syst

##### **SPECIFIC OUTCOME 2**

Wire components of a remote control system safely and correctly according to a wiring diagram/schedu

##### **SPECIFIC OUTCOME 3**

Perform quality checks on a remote control system according to procedures, policies and instructions

##### **SPECIFIC OUTCOME 4**

Restore the site and store or secure a wired component of a remote control system as per company-spe



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

37

#### Wire components of a remote control system

| SAQA US ID                                | UNIT STANDARD TITLE                        |  |         |
|---|--|--|---------|
| 116896                                    | Wire components of a remote control system |  |         |
| SGB NAME                                  | ABET BAND                                  | PROVIDER NAME                          |         |
| SGB Electrical Engineering & Construction | Undefined                                  |  |         |
| FIELD DESCRIPTION                         |  | SUBFIELD DESCRIPTION                   |         |
| Physical Planning and Construction        |  | Electrical Infrastructure Construction |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE                         | NQF LEVEL                              | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular                                    | Level 3                                | 3       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform the wiring of components of a remote control syst

##### **SPECIFIC OUTCOME 2**

Wire components of a remote control system safely and correctly according to a wiring diagram/schedu

##### **SPECIFIC OUTCOME 3**

Perform quality checks on a remote control system according to procedures, policies and instructions

##### **SPECIFIC OUTCOME 4**

Restore the site and store or secure a wired component of a remote control system as per company-spe



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

38

#### Wire components of an electrical railway signalling interlocking system

| SAQA US ID                                | UNIT STANDARD TITLE   |               |         |
|---|---|---------------|---------|
| 116863                                    | Wire components of an electrical railway signalling interlocking system |               |         |
| SGB NAME                                  | ABET BAND   | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined   |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION  |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction                                  |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE  | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular   | Level 3       | 5       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform the wiring of components of an electrical railway

##### **SPECIFIC OUTCOME 2**

Wire components of an electrical railway signalling interlocking system safely and correctly accordi

##### **SPECIFIC OUTCOME 3**

Perform quality checks on a wired component of an electrical railway signalling interlocking system

##### **SPECIFIC OUTCOME 4**

Restore the site and store or secure a wired component of an electrical railway signalling interlock



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

39

#### Wire railway signalling power supply equipment

| SAQA US ID                                | UNIT STANDARD TITLE                            |               |         |
|---|--|---------------|---------|
| 116892                                    | Wire railway signalling power supply equipment |               |         |
| SGB NAME                                  | ABET BAND                                      | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined                                      |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION                           |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction         |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE                             | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular  | Level 3       | 6       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform the wiring of railway signalling power supply equ

##### **SPECIFIC OUTCOME 2**

Wire railway signalling power supply equipment safely and correctly according to a wiring diagram/sc

##### **SPECIFIC OUTCOME 3**

Perform quality checks on railway signalling power supply equipment according to procedures, policie

##### **SPECIFIC OUTCOME 4**

Restore the site and store or secure wired railway signalling power supply equipment as per company-



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

40

#### Apply train working rules as applicable to railway signalling maintenance personnel

| SAQA US ID                                | UNIT STANDARD TITLE   |               |         |
|---|---|---------------|---------|
| 116866                                    | Apply train working rules as applicable to railway signalling maintenance personnel |               |         |
| SGB NAME                                  | ABET BAND   | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined   |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION  |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction  |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE  | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular   | Level 4       | 13      |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Demonstrate an understanding and knowledge of the definitions, rules and instructions related to Tra

##### **SPECIFIC OUTCOME 2**

Apply all Train Working Rules and Instructions applicable to an occupation.

##### **SPECIFIC OUTCOME 3**

Apply all Train Working Rules and Instructions related to the maintenance tasks and fault conditions

##### **SPECIFIC OUTCOME 4**

Apply all Train Working Rules and Instructions related to incidents.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

41

### Install a railway track circuit

| SAQA US ID                                | UNIT STANDARD TITLE             |  |         |
|---|---------------------------------|--|---------|
| 116865                                    | Install a railway track circuit |  |         |
| SGB NAME                                  | ABET BAND                       | PROVIDER NAME                          |         |
| SGB Electrical Engineering & Construction | Undefined                       |  |         |
| FIELD DESCRIPTION                         |                                 | SUBFIELD DESCRIPTION                   |         |
| Physical Planning and Construction        |                                 | Electrical Infrastructure Construction |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE              | NQF LEVEL                              | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular                         | Level 4                                | 6       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to install a railway track circuit safely and according to p

##### **SPECIFIC OUTCOME 2**

Install a railway track circuit safely and correctly according to the installation plans/diagrams wi

##### **SPECIFIC OUTCOME 3**

Perform quality checks on the installation of a railway track circuit according to procedures, polic

##### **SPECIFIC OUTCOME 4**

Restore the installation site as per company-specific procedures, policies and instructions.

##### **SPECIFIC OUTCOME 5**

Hand over the installed railway track circuit for commissioning.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

42

### Install components of a railway signalling interlocking system

| SAQA US ID                                | UNIT STANDARD TITLE  |               |         |
|---|--|---------------|---------|
| 116871                                    | Install components of a railway signalling interlocking system |               |         |
| SGB NAME                                  | ABET BAND  | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined  |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION   |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction                         |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE   | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular  | Level 4       | 6       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to install components of an electrical railway signalling in

##### **SPECIFIC OUTCOME 2**

Install a component of a railway signalling interlocking system safely and correctly according to th

##### **SPECIFIC OUTCOME 3**

Perform quality checks on the installation of railway signalling interlocking system components acco

##### **SPECIFIC OUTCOME 4**

Restore the installation site as per company-specific procedures, policies and instructions.

##### **SPECIFIC OUTCOME 5**

Hand over the installed railway signalling interlocking system components for commissioning.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

43

### Install electrical points

| SAQA US ID                                | UNIT STANDARD TITLE       |  |               |
|---|---------------------------|--|---------------|
| 116870                                    | Install electrical points |  |               |
| SGB NAME                                  |                           | ABET BAND                              | PROVIDER NAME |
| SGB Electrical Engineering & Construction |                           | Undefined                              |               |
| FIELD DESCRIPTION                         |                           | SUBFIELD DESCRIPTION                   |               |
| Physical Planning and Construction        |                           | Electrical Infrastructure Construction |               |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE        | NQF LEVEL                              | CREDITS       |
| PPC-EIC-0-SGB ECC                         | Regular                   | Level 4                                | 11            |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to install electrical points safely according to plan and sp

##### **SPECIFIC OUTCOME 2**

Install electrical points safely and correctly according to the installation plans/diagrams within t

##### **SPECIFIC OUTCOME 3**

Perform quality checks on the installation of electrical points according to procedures, policies an

##### **SPECIFIC OUTCOME 4**

Restore the installation site as per company-specific procedures, policies and instructions.

##### **SPECIFIC OUTCOME 5**

Hand over the installed electrical points for commissioning.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

44

#### Perform corrective preventive maintenance on a flashlight and boom level crossing warning system

| SAQA US ID                                | UNIT STANDARD TITLE  |  |         |
|---|--|--|---------|
| 116876                                    | Perform corrective preventive maintenance on a flashlight and boom level crossing warning system |  |         |
| SGB NAME                                  | ABET BAND  | PROVIDER NAME                          |         |
| SGB Electrical Engineering & Construction | Undefined  |  |         |
| FIELD DESCRIPTION                         |  | SUBFIELD DESCRIPTION                   |         |
| Physical Planning and Construction        |  | Electrical Infrastructure Construction |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE   | NQF LEVEL                              | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular  | Level 4                                | 5       |

#### Specific Outcomes:

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform corrective preventive maintenance (CPM) tasks saf

##### **SPECIFIC OUTCOME 2**

Perform corrective preventive maintenance (CPM) tasks on the flashlight and boom level crossing warn

##### **SPECIFIC OUTCOME 3**

Perform relevant tests to verify the correct operation of the repaired equipment and re-instate the

##### **SPECIFIC OUTCOME 4**

Communicate with control and/or relevant role players before, during and on completion of the CPM pr

##### **SPECIFIC OUTCOME 5**

Restore the site as per company-specific procedures, policies and instructions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

45

#### Perform corrective preventive maintenance on a railway track circuit

| SAQA US ID                                | UNIT STANDARD TITLE  |  |         |
|---|--|--|---------|
| 116877                                    | Perform corrective preventive maintenance on a railway track circuit |  |         |
| SGB NAME                                  | ABET BAND  | PROVIDER NAME                          |         |
| SGB Electrical Engineering & Construction | Undefined  |  |         |
| FIELD DESCRIPTION                         |  | SUBFIELD DESCRIPTION                   |         |
| Physical Planning and Construction        |  | Electrical Infrastructure Construction |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE   | NQF LEVEL                              | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular  | Level 4                                | 3       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform corrective preventive maintenance (CPM) tasks on

##### **SPECIFIC OUTCOME 2**

Perform corrective preventive maintenance CPM tasks on a railway track circuit.

##### **SPECIFIC OUTCOME 3**

Perform relevant tests to verify the correct operation of the repaired equipment and re-instate the

##### **SPECIFIC OUTCOME 4**

Communicate with control and/or relevant role players before, during and on completion of the CPM pr

##### **SPECIFIC OUTCOME 5**

Restore the site as per company-specific procedures, policies and instructions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

## UNIT STANDARD:

46

## Perform corrective preventive maintenance on an electrical railway signal

| SAQA US ID                                | UNIT STANDARD TITLE   |  |               |
|---|---|--|---------------|
| 116881                                    | Perform corrective preventive maintenance on an electrical railway signal |  |               |
| SGB NAME                                  |   | ABET BAND                              | PROVIDER NAME |
| SGB Electrical Engineering & Construction |   | Undefined                              |               |
| FIELD DESCRIPTION                         |   | SUBFIELD DESCRIPTION                   |               |
| Physical Planning and Construction        |   | Electrical Infrastructure Construction |               |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE  | NQF LEVEL                              | CREDITS       |
| PPC-EIC-0-SGB ECC                         | Regular   | Level 4                                | 5             |

**Specific Outcomes:****SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform corrective preventive maintenance (CPM) tasks on

**SPECIFIC OUTCOME 2**

Perform corrective preventive maintenance (CPM) tasks on an electrical railway signal.

**SPECIFIC OUTCOME 3**

Perform relevant tests to verify the correct operation of the repaired equipment and re-instate the

**SPECIFIC OUTCOME 4**

Communicate with control and/or relevant role players before, during and on completion of the CPM pr

**SPECIFIC OUTCOME 5**

Restore the site as per company-specific procedures, policies and instructions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

47

#### Perform corrective preventive maintenance on electrical points

| SAQA US ID                                | UNIT STANDARD TITLE  |               |         |
|---|--|---------------|---------|
| 116868                                    | Perform corrective preventive maintenance on electrical points |               |         |
| SGB NAME                                  | ABET BAND  | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined  |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION   |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction                         |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE   | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular  | Level 4       | 5       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform corrective preventive maintenance (CPM) tasks on

##### **SPECIFIC OUTCOME 2**

Perform corrective preventive maintenance (CPM) tasks on the electrical points.

##### **SPECIFIC OUTCOME 3**

Perform relevant tests to verify the correct operation of the repaired equipment and re-instate the

##### **SPECIFIC OUTCOME 4**

Communicate with control and/or relevant role players before, during and on completion of the CPM pr

##### **SPECIFIC OUTCOME 5**

Restore the site as per company-specific procedures, policies and instructions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

48

#### Perform corrective preventive maintenance on railway signalling power supply equipment

| SAQA US ID                                | UNIT STANDARD TITLE  |  |               |
|---|--|--|---------------|
| 116872                                    | Perform corrective preventive maintenance on railway signalling power supply equipment |  |               |
| SGB NAME                                  |  | ABET BAND                              | PROVIDER NAME |
| SGB Electrical Engineering & Construction |  | Undefined                              |               |
| FIELD DESCRIPTION                         |  | SUBFIELD DESCRIPTION                   |               |
| Physical Planning and Construction        |  | Electrical Infrastructure Construction |               |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE   | NQF LEVEL                              | CREDITS       |
| PPC-EIC-0-SGB ECC                         | Regular  | Level 4                                | 6             |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform corrective preventive maintenance (CPM) tasks saf

##### **SPECIFIC OUTCOME 2**

Perform corrective preventive maintenance tasks on railway signalling power supply equipment.

##### **SPECIFIC OUTCOME 3**

Perform relevant tests to verify the correct operation of the repaired equipment and re-instate the

##### **SPECIFIC OUTCOME 4**

Communicate with control and/or relevant role players before, during and on completion of the CPM ta

##### **SPECIFIC OUTCOME 5**

Restore the site as per company-specific procedures, policies and instructions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

49

#### Perform fault-finding and repair up to modular level on a remote control system

| SAQA US ID                                | UNIT STANDARD TITLE   |  |               |
|---|---|--|---------------|
| 116878                                    | Perform fault-finding and repair up to modular level on a remote control system |  |               |
| SGB NAME                                  |   | ABET BAND                              | PROVIDER NAME |
| SGB Electrical Engineering & Construction |   | Undefined                              |               |
| FIELD DESCRIPTION                         |   | SUBFIELD DESCRIPTION                   |               |
| Physical Planning and Construction        |   | Electrical Infrastructure Construction |               |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE  | NQF LEVEL                              | CREDITS       |
| PPC-EIC-0-SGB ECC                         | Regular   | Level 4                                | 10            |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform fault-finding and repair tasks up to modular level

##### **SPECIFIC OUTCOME 2**

Diagnose and locate a fault up to modular level on a remote control system.

##### **SPECIFIC OUTCOME 3**

Repair the faulty remote control system up to modular level.

##### **SPECIFIC OUTCOME 4**

Perform relevant functional tests to verify the correct operation of the repaired equipment and re-i

##### **SPECIFIC OUTCOME 5**

Communicate with control and/or relevant role players before, during and on completion of the fault-

##### **SPECIFIC OUTCOME 6**

Restore the site as per company-specific procedures, policies and instructions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

50

#### Perform fault-finding and repairs on a flashlight and boom level crossing warning system

| SAQA US ID                                | UNIT STANDARD TITLE  |  |               |
|---|--|--|---------------|
| 116880                                    | Perform fault-finding and repairs on a flashlight and boom level crossing warning system |  |               |
| SGB NAME                                  |  | ABET BAND                              | PROVIDER NAME |
| SGB Electrical Engineering & Construction |  | Undefined                              |               |
| FIELD DESCRIPTION                         |  | SUBFIELD DESCRIPTION                   |               |
| Physical Planning and Construction        |  | Electrical Infrastructure Construction |               |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE   | NQF LEVEL                              | CREDITS       |
| PPC-EIC-0-SGB ECC                         | Regular  | Level 4                                | 7             |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform fault-finding and repair tasks on a flashlight and boom level crossing warning system.

##### **SPECIFIC OUTCOME 2**

Diagnose and locate a fault on a flashlight and boom level crossing warning system.

##### **SPECIFIC OUTCOME 3**

Repair the faulty flashlight and boom level crossing warning system.

##### **SPECIFIC OUTCOME 4**

Perform relevant functional tests to verify the correct operation of the repaired equipment according to the manufacturer's instructions.

##### **SPECIFIC OUTCOME 5**

Communicate with control and/or relevant role players before, during and on completion of the fault-finding and repair tasks.

##### **SPECIFIC OUTCOME 6**

Restore the site as per company-specific procedures, policies and instructions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

51

#### Perform fault-finding and repairs on a railway track circuit

| SAQA US ID                                | UNIT STANDARD TITLE  |  |         |
|---|--|--|---------|
| 116879                                    | Perform fault-finding and repairs on a railway track circuit |  |         |
| SGB NAME                                  | ABET BAND  | PROVIDER NAME                          |         |
| SGB Electrical Engineering & Construction | Undefined  |  |         |
| FIELD DESCRIPTION                         |  | SUBFIELD DESCRIPTION                   |         |
| Physical Planning and Construction        |  | Electrical Infrastructure Construction |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE   | NQF LEVEL                              | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular  | Level 4                                | 7       |

#### Specific Outcomes:

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform fault-finding and repair tasks on a railway track

##### **SPECIFIC OUTCOME 2**

Diagnose and locate a fault on a railway track circuit.

##### **SPECIFIC OUTCOME 3**

Repair the faulty railway track circuit.

##### **SPECIFIC OUTCOME 4**

Perform relevant functional tests to verify the correct operation of the repaired equipment and re-i

##### **SPECIFIC OUTCOME 5**

Communicate with control and/or relevant role players before, during and on completion of the fault-

##### **SPECIFIC OUTCOME 6**

Restore the site as per company-specific procedures, policies and instructions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

52

### Perform fault-finding and repairs on an electrical railway signal

| SAQA US ID                                | UNIT STANDARD TITLE   |  |         |
|---|---|--|---------|
| 116890                                    | Perform fault-finding and repairs on an electrical railway signal |  |         |
| SGB NAME                                  | ABET BAND   | PROVIDER NAME                          |         |
| SGB Electrical Engineering & Construction | Undefined   |  |         |
| FIELD DESCRIPTION                         |   | SUBFIELD DESCRIPTION                   |         |
| Physical Planning and Construction        |   | Electrical Infrastructure Construction |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE  | NQF LEVEL                              | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular   | Level 4                                | 7       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform fault-finding and repair tasks on an electrical r

##### **SPECIFIC OUTCOME 2**

Diagnose and locate a fault on an electrical railway signal.

##### **SPECIFIC OUTCOME 3**

Repair the faulty electrical railway signal.

##### **SPECIFIC OUTCOME 4**

Perform relevant functional tests to verify the correct operation of the repaired equipment and re-i

##### **SPECIFIC OUTCOME 5**

Communicate with control and/or relevant role players before, during and on completion of the fault-

##### **SPECIFIC OUTCOME 6**

Restore the site as per company-specific procedures, policies and instructions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

53

#### Perform fault-finding and repairs on an electrical railway signalling cable

| SAQA US ID                                | UNIT STANDARD TITLE   |               |         |
|---|---|---------------|---------|
| 116889                                    | Perform fault-finding and repairs on an electrical railway signalling cable |               |         |
| SGB NAME                                  | ABET BAND   | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined   |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION  |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction                                      |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE  | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular   | Level 4       | 4       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform fault-finding and repair tasks on a railway signa

##### **SPECIFIC OUTCOME 2**

Diagnose and locate a fault on a railway signalling cable by using a prescribed fault-finding proced

##### **SPECIFIC OUTCOME 3**

Repair the faulty railway signalling cable.

##### **SPECIFIC OUTCOME 4**

Perform prescribed tests to verify that the cable is correctly repaired and hand over repaired railw

##### **SPECIFIC OUTCOME 5**

Communicate with control and/or relevant role players before, during and on completion of the fault-

##### **SPECIFIC OUTCOME 6**

Restore the site as per company-specific procedures, policies and instructions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

## UNIT STANDARD:

54

## Perform fault-finding and repairs on electrical points

| SAQA US ID                                | UNIT STANDARD TITLE                                    |               |         |
|---|--|---------------|---------|
| 116886                                    | Perform fault-finding and repairs on electrical points |               |         |
| SGB NAME                                  | ABET BAND  | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined  |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION                                   |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction                 |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE                                     | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular  | Level 4       | 8       |

**Specific Outcomes:****SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform fault-finding and repair tasks on an electrical p

**SPECIFIC OUTCOME 2**

Diagnose and locate a fault on electrical points.

**SPECIFIC OUTCOME 3**

Repair the faulty electrical points.

**SPECIFIC OUTCOME 4**

Perform relevant functional tests to verify the correct operation of the repaired equipment and re-i

**SPECIFIC OUTCOME 5**

Communicate with control and/or relevant role players before, during and on completion of the fault-

**SPECIFIC OUTCOME 6**

Restore the site as per company procedures, policies and instructions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

55

#### Perform fault-finding and repairs on railway signalling interlocking equipment

| SAQA US ID                                | UNIT STANDARD TITLE  |  |         |
|---|--|--|---------|
| 116883                                    | Perform fault-finding and repairs on railway signalling interlocking equipment |  |         |
| SGB NAME                                  | ABET BAND  | PROVIDER NAME                          |         |
| SGB Electrical Engineering & Construction | Undefined  |  |         |
| FIELD DESCRIPTION                         |  | SUBFIELD DESCRIPTION                   |         |
| Physical Planning and Construction        |  | Electrical Infrastructure Construction |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE   | NQF LEVEL                              | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular  | Level 4                                | 16      |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform fault-finding and repair tasks on railway signal

##### **SPECIFIC OUTCOME 2**

Diagnose and locate a fault on railway signalling interlocking equipment by using prescribed fault-f

##### **SPECIFIC OUTCOME 3**

Repair the faulty railway signalling interlocking equipment.

##### **SPECIFIC OUTCOME 4**

Perform prescribed functional tests to verify the correct operation of the repaired equipment and re

##### **SPECIFIC OUTCOME 5**

Communicate with control and/or relevant role players before, during and on completion of the fault-

##### **SPECIFIC OUTCOME 6**

Restore the site as per company-specific procedures, policies and instructions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

## UNIT STANDARD:

56

## Perform fault-finding and repairs on railway signalling power supply equipment

| SAQA US ID                                | UNIT STANDARD TITLE  |  |         |
|---|--|--|---------|
| 116885                                    | Perform fault-finding and repairs on railway signalling power supply equipment |  |         |
| SGB NAME                                  | ABET BAND  | PROVIDER NAME                          |         |
| SGB Electrical Engineering & Construction | Undefined  |  |         |
| FIELD DESCRIPTION                         |  | SUBFIELD DESCRIPTION                   |         |
| Physical Planning and Construction        |  | Electrical Infrastructure Construction |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE   | NQF LEVEL                              | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular  | Level 4                                | 7       |

**Specific Outcomes:****SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform fault-finding and repair tasks on railway signall

**SPECIFIC OUTCOME 2**

Diagnose and locate a fault on railway signalling power supply equipment.

**SPECIFIC OUTCOME 3**

Perform relevant functional tests to verify the correct operation of the repaired equipment and re-i

**SPECIFIC OUTCOME 4**

Communicate with control and/or relevant role players before, during and on completion of the fault-

**SPECIFIC OUTCOME 5**

Restore the site as per company-specific procedures, policies and instructions.



Established in terms of Act 58 of 1995

## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

57

#### Perform fault-finding and repairs up to modular level on an axle counter

| SAQA US ID                                | UNIT STANDARD TITLE  |               |         |
|---|--|---------------|---------|
| 116859                                    | Perform fault-finding and repairs up to modular level on an axle counter |               |         |
| SGB NAME                                  | ABET BAND  | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined  |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION   |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction                                   |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE   | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular  | Level 4       | 5       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform fault-finding and repair tasks safely and correct

##### **SPECIFIC OUTCOME 2**

Diagnose and locate a fault up to modular level on an axle counter.

##### **SPECIFIC OUTCOME 3**

Repair the faulty axle counter up to modular level.

##### **SPECIFIC OUTCOME 4**

Perform relevant functional tests to verify the correct operation of the repaired equipment and re-i

##### **SPECIFIC OUTCOME 5**

Communicate with control and/or relevant role players before, during and on completion of the fault-

##### **SPECIFIC OUTCOME 6**

Restore the site as per company-specific procedures, policies and instructions.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### UNIT STANDARD:

58

#### Perform routine preventive maintenance on a flashlight and boom level crossing warning system

| SAQA US ID                                | UNIT STANDARD TITLE   |               |         |
|---|---|---------------|---------|
| 116861                                    | Perform routine preventive maintenance on a flashlight and boom level crossing warning system |               |         |
| SGB NAME                                  | ABET BAND   | PROVIDER NAME |         |
| SGB Electrical Engineering & Construction | Undefined   |               |         |
| FIELD DESCRIPTION                         | SUBFIELD DESCRIPTION  |               |         |
| Physical Planning and Construction        | Electrical Infrastructure Construction  |               |         |
| UNIT STANDARD CODE                        | UNIT STANDARD TYPE  | NQF LEVEL     | CREDITS |
| PPC-EIC-0-SGB ECC                         | Regular   | Level 4       | 3       |

#### **Specific Outcomes:**

##### **SPECIFIC OUTCOME 1**

Plan and procure the resources required to perform routine preventive maintenance (RPM) tasks safely

##### **SPECIFIC OUTCOME 2**

Perform routine preventive maintenance (RPM) tasks on a flashlight and boom level crossing warning s

##### **SPECIFIC OUTCOME 3**

Identify, prioritise and report the corrective action to take after a defect or substandard has been

##### **SPECIFIC OUTCOME 4**

Effectively communicate with control and/or relevant role players before, during and on completion o

##### **SPECIFIC OUTCOME 5**

Restore the site as per company-specific procedures, policies and instructions.