No. 135   **13 February 2004**

Established in terms of Act 58 of 1995

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

Telecommunication

Registered by NSB 06, Manufacturing, Engineering and Technology, publishes the following unit standards for public comment.

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

Comment on the unit standards should reach SAQA at the address *below and no later than 13 March 2004.* All correspondence should be marked **Standards Setting – SGB for Telecommunication** and addressed to

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JOE SAMUELS
DIRECTOR: STANDARDS SETTING AND DEVELOPMENT

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

Established in terms of Act 58 of 1995

National Certificate in Telecommunications Technology: NQF Level 4

1. Field: Manufacturing, Engineering and Technology

2. Sub-field: Engineering and Related Design

3. Level: 4

4. Credit: 120

5. Issue date:

6. Review date:

7. Rationale for the qualification

The telecommunications sector serves the needs of the society and the economy. The National Certificate in Telecommunications Technology: NQF Level 4 is designed to contribute to developing telecommunications technical and related entrepreneurial competencies. Practitioners in the telecommunications sector require a sound knowledge of the telecommunications environment, the capacity to understand broad telecommunications aspects and entrepreneurship. In the Telecommunications sector, practitioners are appointed on technical knowledge, experience and potential entrepreneurial ability. It is therefore assumed that learners attempting this qualification are competent in numeric and communication skills and/or learners are technically competent in a specific aspect of telecommunications or related engineering fields.

The National Certificate in Telecommunications Technology: NQF Level 4 is designed to meet the needs of learners in the Telecommunications sector (or those who wish to enter the telecommunications sector) who require technical expertise and entrepreneurial skills in telecommunications business units including SMMEs. The qualification facilitates access for previously disadvantaged groups and other learners to acquire the telecommunications technical knowledge and skills required to build the learners' technical and entrepreneurial expertise and enable the sector to meet employment Equity targets.

At NQF Level4, there is greater specialization in telecommunications aspects and entrepreneurial flair. Workplace based needs of the telecommunications industry relate to installing and maintaining telecommunications equipment. Qualifying learners can be employed within the

telecommunications industry and have the flexibility to pursue different careers in the broader telecommunications industry.

This qualification will enhance the status, productivity and employability of the learner within the telecommunications industry as well as contribute to the quality, production rate and growth. This allows for access, progression, portability and mobility within and between the different occupational areas in the telecommunications industry. Through the core functional components of the qualification,

Learners are able to demonstrate vocational skills through which they are able to specialise in one or more of these areas.

- Learners, once qualified, are capable of installing and maintaining telecommunication equipment. This will allow the learner to provide a more effective service that will improve customer satisfaction.

This qualification will contribute towards transformation within the telecommunications industry This will attract quality people and allows for the aspiration of people to be part of the industry. The recognition of prior learning policies will formalise informal and non-formal learning and learners will be able to obtain a national qualification. This will improve the level of participation of employees in the industry.

8. Purpose of the qualification:

This qualification will allow a learner in the telecommunications industry to obtain a nationally recognized qualification in installing and maintaining telecommunications equipment. It will also contribute to the upliftment of the telecommunications industry and will set a standard for professionalism in the industry. This will also assist in improving relationships between employer and employees. The attainment of this qualification will also attract and retain quality learners and employees. This qualification will also provide for recognition of prior learning to allow for the recognition of existing and common knowledge and skills that will not only allow a learner to gain credits towards this qualification, but also to move across the different occupational areas.

A person acquiring this qualification will have skills, knowledge and experience to:

- Demonstrate familiarity with specific knowledge in the installation of telecommunication equipment
- Demonstrate familiarity with specific knowledge in handing over of telecommunication equipment
- Demonstrate familiarity with specific knowledge in maintenance of telecommunication equipment

- Demonstrate an understanding of, and the ability to carry out simple operations (including testing of telecommunication equipment), using the fundamental systems and procedures
- Communicate with peers, customers and members of supervisory/management levels by demonstrating the ability to summarise information and express opinions on given information in verbal and/or written form
- Explore broader competencies required for planning, designing and/or supervising the construction of telecommunication equipment

RANGE:

Planning, designing and/or supervising the construction of telecommunication equipment relates to the installation of telecommunications equipment.

9. LEVEL, CREDITS AND LEARNING COMPONENTS ASSIGNED TO THE QUALIFICATION:

This qualification is made up of a planned combination of learning outcomes that have a defined purpose and will provide the qualifying learners with applied competence and a basis for further learning. It is a building block for the National Certificate in Telecommunications Technology: NQF Level 5. The qualification is made up of unit standards that are classified as Fundamental, Core and Electives for the purpose of this qualification.

A minimum of 136 credits is required to complete the qualification. In this qualification, credits are allocated as follows:

Fundamental	43 credits
Core	50 credits
Electives	27 credits
TOTAL	**120 Credits**

10. Access to the Qualification

- There is access to this qualification to all learners except those who are blind, have physical disabilities, suffer from colour blindness and fear of heights or confined spaces.

11. Learning assumed to be in place

It is assumed that the leaner entering this qualification will be competent in communication and mathematical literacy at NQF Level 3.

12. Exit Level Outcomes and Associated assessment criteria

The outcomes are specified in terms of a combination of specific and critical cross-field outcomes as defined in the different unit standards. On achieving this qualification, a learner is able to:

Exit Level outcome 1:

- Describe, interpret, relate and apply knowledge and competence in context while performing the tasks related to the installation of telecommunication equipment

Associated Assessment Criteria:

- The functions related to the installation of telecommunication equipment are correctly described, interpreted, analysed and assessed and the appropriate actions are taken.

- The functions related to the installations of telecommunication equipment are correctly described, interpreted, analysed and assessed and the appropriate actions are taken.

Exit Level Outcome 2

- Describe, interpret, relate and apply knowledge and competence in context while performing the tasks related to testing telecommunications equipment

Associated Assessment Criteria:

- The learner demonstrates an ability to consider a range of options and make correct decisions related to their context of work.

- The functions related to the testing of telecommunications equipment are correctly described, interpreted, analysed and assessed and the appropriate actions are taken.

Exit Level outcome 3

- Describe, interpret, relate and apply knowledge and competence in context while performing the tasks related to the handing over of telecommunication equipment

Associated Assessment Criteria

- The learner demonstrates the ability to quality inspect the telecommunications equipment for correct equipment and deliver the equipment in working order.

- The learner completes and signs off the necessary documentation associated with the handing over of telecommunications equipment.

Exit Level outcome 4

- Communicate with peers, customers and members of supervisory/management levels by demonstrating the ability to process information and express opinions on given information in verbal and/or written form.

Associated Assessment Criteria

- Learners are able to communicate effectively with internal and external customers.

13. International comparability

The unit standards were compared against unit standards and qualifications from the Australian National Training Authority, German standards and qualifications.

A direct comparison of the specific outcomes, assessment criteria, exit level outcomes and embedded knowledge were undertaken with the ·above similar outcomes based qualifications. These unit standards were found to be job specific and this resulted in a large selection of standards.

- **German Qualifications**
    - o Telecommunications Artisan (TACK 1)
    - o Telecommunications Technician (TACK 2)
    - o Degree in Telecommunications (Tack 3)

14. Integrated Assessment

The applied competence (foundational, practical and reflective competencies) of this qualification will be achieved if a learner is competent in all of the unit standards. Identification and solving of known problems, teamwork, self-organisation and the processing of data must be assessed. This assessment can take place using any combination of practical, foundational and reflective competency assessment methods and tools to determine the development of the whole person and the integration of applied knowledge and skills. Competence will be assessed when conducting formative and summative assessment in the context of the telecommunications environment.

Formative assessment

The assessment criteria for formative assessment are described in the various unit standards. Formative assessment takes place during the process of learning and assessors should use a range of assessment methods and tools that support each other to assess total competence. These tools may include but are not limited to the following:

- In-situ (work place) observations
- Role-play simulations
- Structured group discussions
- Knowledge tests, exams, case studies, projects, registers, logbooks, workbooks
- Verbal report backs (presentations)
- Portfolios of evidence
- Projects
- Experiential learning
- Working in teams
- Scenario sketching

The assessment method and or tools used by the assessor must conform to the following criteria:

- It must be fair in the sense that it does not hinder or advantage the learner.

- It must be valid in the sense that it measures the critical components of learning.

- It must be reliable in the sense that it is consistent and delivers the same output across a range of learners.

- It must be practical in the sense that it takes into account the available financial resources, facilities, equipment and time.

Summative assessment

Summative assessment is carried out at the end of the learning programme to assess the acquired competencies of the learner. A detailed portfolio of evidence is required to prove the foundational, practical and reflective competencies of the learner.

15. Assessors and moderators

Assessors and moderators should develop and conduct their own workplace specific assessments by making use of a range of formative and summative assessment methods and should assess combinations of foundational, practical and reflective competencies. Assessors should give credit for the evidence of learning that has already been acquired through formal, informal and non-formal learning and work experience.

Unit standards associated with the qualification must be used to assess specific and critical cross-field outcomes.

16. Recognition of prior learning

This qualification may be achieved in part or completely through the recognition of prior learning, which includes formal, informal and non-formal learning and work experience and must adhere to the policies and procedures specified by the SETA/ETQA.

17. Articulation possibilities

The qualification allows for both horizontal (persons with the qualification at the same or higher level can pursue this qualification for career orientation) and vertical (persons completing this qualification can proceed to a relevant NQF 5 Telecommunications qualifications) articulation.

- Diploma in Telecommunications (NQF 5)

18. Moderation Options

- Anyone assessing a learner or moderating the assessment of a learner against this qualification must be registered as an assessor with relevant ETQAs.

- Any institution offering learning that will enable the achievement of this qualification must be accredited as a provider with the relevant ETQA.

- Assessment and moderation of assessment will be overseen by the relevant ETQA according to the ETQAs policies and guidelines for assessment and moderation; in terms of agreements reached around assessment and moderation between ETQAs (including professional bodies); and in terms of the moderation guideline detailed immediately below.

- Moderation must include both internal and external moderation of assessments at exit points of the qualification, unless ETQA policies specify otherwise. Moderation should also encompass achievement of the competence described both in individual unit standards and exit level outcomes, as well as the integrated competence described in the qualification.

Anyone wishing to be assessed against this qualification may apply to be assessed by any assessment agency, assessor or provider institution that is accredited by the relevant ETQA.

19. Criteria for registration of assessors

The assessor must have completed:

A similar qualification, which is one level above the level of the qualification. Or

- A similar qualification at the level with a minimum of 12 months field experience after s/he has completed the qualification or,

- The subject matter experience of the assessor can be established by recognition of prior learning.

Assessors need to be registered with relevant SETA/ETQAs.

CONSISTENCY OF EXIT LEVEL OUTCOMES WITH CRITICAL CROSSFIELD OUTCOMES

SAQA Critical Cross-Field Outcomes	Equivalent Exit Level Outcome
Identifying and solving problems in which responses display that responsible decisions using critical thinking have been made.	ELO 2
Working effectively with others as a member of a team, group, organization and community.	ELO 1
Organising and managing oneself and one's activities responsibly and effectively	ELO 1,2
Collecting, analyzing, organizing and critically evaluating information.	ELO 3,4
Communicating effectively using visual, mathematical and/or language skills	ELO 1
Using science and technology effectively and critically, showing responsibility toward the environment and health of others	ELO 1,4
Demonstrating an understanding of the world as a set of related systems by recognizing that problem contexts do not exist in isolation	ELO 3,4
Contributing to the full personal development of each	

learner and the social and economic development of society at large, by making it an underlying intention of the programme of learning to make an individual aware of:	
• reflecting on and exploring a variety of strategies to learn more effectively	ELO 1
• participating as responsible citizens in the life of local, national and global communities	ELO 4
• being culturally and aesthetically sensitive across a range of contexts	ELO 1,2,3
• exploring education and career opportunities	ELO 4
• Developing entrepreneurial opportunities	ELO 4

Rules of combination:

(All the core unit standards are compulsory)

Generic core unit standards:

Apply basic electronic principals (L3, C4)

Apply basic electrical principals (L3, C4)

Perform basic rigging of equipment (L3, C4)

Apply analytical fault finding techniques (L4, C3)

Project management skills (L4, C5)

Soldering techniques (L3, C5)

Wiring Techniques (L3, C5)

Use and care of hand tools (L3, C3)

Use and care of power tools (L3, C3)

Interpret Engineering drawings (L3, C3)

Use and care of specialized tools and equipment (L3, C5)

Operate a personal computer system (L2, C6)

Core Functional:

Characterise, splice and measure optic fiber (L4, C5)

Apply basic business concepts (L3, C8)

Demonstrate and understanding of entrepreneurship and develop entrepreneurial qualities (L1, C2)

Elective unit standards:

Elective in one of the four areas Radio, Transmission, Switching or customer Premises Equipment to acquire the credits required to achieving a qualification.

The learner may elect to complete 27 credits from the elective units to make up 120 credits for the completion of this qualification.

The learners may elect Unit standards from the NQF, relevant to the acquisition of competencies, articulating with an occupation and related NQF qualifications.

NATIONAL CERTIFICATE IN TELECOMMUNICATIONS TECHNOLOGY: NQF LEVEL 4:

Fundamental			
Title	**Level**	**Credits**	**NLRD**
Use mathematics to investigate and monitor the financial aspects of personal, business and national issues	4	2	
Apply knowledge of statistical probability to critically interrogate and effectively communicate findings on life related problems	4	6	
Measure, estimate and calculate physical quantities using mathematics	4	4	
Interact orally and in writing in the workplace	4	10	
Measure, estimate and calculate physical quantities using geometrical relations	4	5	
Facilitate an additional language at ABET levels 1 and 2	4	16	
TOTAL FUNDAMENTAL COMPONENTS		**43**	

Core Functional			
Characterise, splice and measure optic fiber	4	5	
Apply basic business concepts	4	8	
Demonstrate and understanding of entrepreneurship and develop entrepreneurial qualities	4	2	

Core Generic			
Apply basic electronic principles	3	4	
Apply basic electrical principles	3	4	
Perform basic rigging of equipment	3	4	
Apply analytical fault finding techniques	4	3	
Project management skills	4	5	
Soldering techniques	3	5	
Wiring Techniques	3	5	

Use and care of hand tools	3	3
Use and care of power tools	3	3
Interpret Engineering drawings	3	3
Use and care of specialized tools and equipment	3	5
Operate a personal computer system	3	6
TOTAL CORE COMPONENTS		**50**
Electives		
Install indoor radio frequency antennae (microcell)	4	3
Install Telecommunication Equipment	4	7
Maintain and repair feeder cables	4	10
Operate very complex test equipment	4	2
Program PC based equipment	4	12
Maintain and repair radio frequency antennae	4	3
Identify, Organize and co-ordinate project life cycle phases for control purposes	4	5
TOTAL ELECTIVE COMPONENTS		**42**
MINIMUM CREDITS FROM ELECTIVE UNIT STANDARDS		27
TOTAL FOR THIS QUALIFICATION		120

TITLE: **Interpret engineering drawings**

UNIT STANDARD ID:

LEVEL: 3

CREDITS: 3

FIELD: Manufacturing, Engineering and Technology

SUB-FIELD: Engineering and related design

ISSUE DATE

REVIEW DATE

PURPOSE OF THE UNIT STANDARD:

Learners credited with this Unit Standard are able to read and interpret mechanical and electrical drawings and comply with: any policies, procedures, and requirements of the organisations involved.

A learner credited with this unit standard will be able to:

- Interpret and understand mechanical drawings within company standards
- Interpret and understand electrical drawings within company standards
- Measurements are to be expressed in System International (SI) units, and, where required, converted from Imperial units into SI units.

This unit standard will partially contribute to the full development of any learner within the Telecommunications & Electronic Industry and more specifically in the manufacturing environment.

LEARNING ASSUMED TO BE IN PLACE:

The following knowledge, skills, attitude and/or equivalent on level 2:

- Electrical components
- The use of hand tools
- Life Sciences
- Wiring techniques

RANGE STATEMENTS:

- The typical scope of this unit standard includes but is not limited to:
  - Drawing content
  - Scaling

- Labelling

- Reference points

- Drawings - two dimensional and three dimensional

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific outcome 1:

Identify different engineering drawings

Assessment criteria:

1.1 Understand the meaning of dimensions, tolerances.

1.2 Measurements are read in System International (SI) units, and, where required, converted from Imperial units into SI units.

1.3 Understand the structure used for mechanical drawing as in company specifications

1.4 Understand symbols used in a mechanical drawings as per company specifications

1.5 Understand symbols used in electrical drawings as per company specifications

1.6 Able to do summations and calculations with regards to measurements taken.

1.7 Able to read scale factors used in drawings.

1.8 The unique features and purpose of each type of diagram is explained by reference to a particular application.

Specific outcome 2:

Interpreting of mechanical drawings

Assessment criteria:

2.1 Understand reference points used on a mechanical drawing

2.2 The layout and content can be identified with regard to mechanical

2.2 Able to do conversions with regard to mechanical drawings

2.3 Able to read and convert the different dimensions used in a mechanical drawing

2.4 Material requirements are recognized from drawings and interpreted as per job requirements.

2.5 Dimensions and detailed instructions are identified as per job requirements.

2.6 Components and assemblies are identified and interpreted as per job requirements.

Specific outcome 3:

Diagnose of mechanical drawings

Assessment criteria:

2.1 Actual measurement from drawing can be measured from a practical example

2.2 Measurements of pre-forms of conventional components as per drawing

2.3 Interpret component placement as per drawing

2.3 Check for the correct placement and orientation of components

2.4 Special mounting provisions are identified on the components

2.5 Material requirements are interpreted and placed correctly as per job requirements.

Specific outcome 4:

Interpret of electrical drawings with regard to low-voltage related components not exceeding 1000 V a.c. at frequencies not exceeding 1000 Hz, or 1500 V d.c.

Assessment criteria:

2.1 Understand reference points used

2.2 Components are identified by name and their function on a site assembly is stated

2.3 Able to read and convert the different dimensions used in a electronic drawings
2.4 Material requirements are recognized from drawings and interpreted as per job requirements.

2.5 Dimensions and detailed instructions are identified as per job requirements.

2.6 Components and assemblies are identified and interpreted as per job requirements

2.7 Circuit connection points on components are located with an explanation of any required polarities.

2.8 Colour coding is explained according to current industry standards and codes.

2.9 Specific details are identified in each of a set of diagrams for a particular drawing

Specific outcome 5:

Diagnose of electrical drawings with regard to low-voltage related components not exceeding 1000 V a.c. at frequencies not exceeding 1000 Hz, or 1500 V d.c.

Assessment criteria:

2. Actual measurement from drawing can be measured from a practical example

2.2 Measurements of pre-forms of conventional components as per drawing

2.3 Interpret electrical component placement as per drawing

2.3 Check for the correct placement and orientation of components

2.4 Special mounting provisions are identified on the components

2.5 Material requirements are interpreted and placed correctly as per job requirements.

ACCREDITATION AND MODERATION OPTIONS:

1. Anyone assessing a learner against this unit standard, must be registered as an assessor with the relevant ETQA

2. Any institution offering learning that will enable achievement of this unit standard must be accredited as a provider through the relevant SETA/ETQA

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

NOTES:

1. CRITICAL CROSS-FIELD OUTCOMES:

The following critical cross-field outcomes are addressed in this unit standard:

1.1 Collect, evaluate, organise and critically evaluate information related to the termination of telecommunication cables so that these are accurately interpreted into application performance standards.

1.2 Understand the world as a set of related systems in that the termination of telecommunication cables does not exist in isolation.

1.3 Organise oneself and one's activities so that all requirements are met in achieving competence in the termination of telecommunication cables.

1.4 Identify and solve problems related to the achievement of the termination of telecommunication cables relevant competencies.

1.5 Work effectively with others as a member of a team when terminating of telecommunication cables.

1.6 Being culturally sensitive across a range of social contexts when consulting customers.

2. ESSENTIAL EMBEDDED KNOWLEDGE:

- Able to speak English
- Able to work with mechanical tools
- Able to read basic electrical & mechanical schematics
- Work with a measuring tools and calculator

SUPPLEMENTARY INFORMATION:

1. Glossary of terms:

"Symbols" and *"components"* refer to items commonly used in switchboard manufacture and interfacing equipment. For assessment purposes candidates need to demonstrate competence with the types of drawings and symbols used in their particular workplace.

"Work bench" refers to the work area were equipment and task is completed.

"Convention" means the standards or practice that applies to a given drawing presentation.

"Drawing entity" refers to items such as lines, arcs, circles, text or dimensions that comprise a drawing.

"Drawing attributes" are the characteristics associated with a drawing entity such as layer, level, line type, line width, colour, and text font.

"Specifications" refer to all aspects of a technical engineering drawing which detail the

2. Assessment methods:

Integrated assessment methods and tools will allow the candidate to demonstrate that she/ he has acquired knowledge of and can safely and effectively apply competence identified in this unit standard.

These tools may include the following:

Engineering drawing ruler

T-square

Protractor

Tape measurer

Compass

Calculator

These methods must be carefully selected based on the purpose of the assessment (For example, the written method of assessing knowledge or on-job demonstration of practical competence). The assessment must integrate a number of different methods in order to give the assessor reliable and valid proof of competence and evidence of required attitudes.

3. Notes to Assessors

Assessors should keep the following general principles in mind when designing and conducting assessments against this unit standard:

•   Focus the assessment activities on gathering evidence in terms of the main outcome expressed in the title to ensure assessment is integrated rather than fragmented.

Remember we want to declare the person competent in terms of the title. Where assessment at title level is unmanageable, then focus assessment around each specific outcome, or groups of specific outcomes.

- Make sure evidence is gathered across the entire range, wherever it applies. Assessment activities should be as close to the real performance as possible, and where simulations or role-plays are used, there should be supporting evidence to show the candidate is able to perform in the real situation.

- Do not focus the assessment activities on each assessment criterion. Ensure that the assessment activities focus on outcomes and are sufficient to enable evidence to be gathered around all the assessment criteria.

- The assessment criteria provide the specifications against which assessment judgements should be made. In most cases, knowledge can be inferred from the quality of the performances, but in other cases, knowledge and understanding will have to be tested through questioning techniques. Where this is required, there will be assessment criteria to specify the standard required.

- The task of the assessor is to gather sufficient evidence, of the prescribed type and quality, as specified in this unit standard, that the candidate can achieve the outcomes again and again and again. This means assessors will have to judge how many repeat performances are required before they believe the performance is reproducible.

- All assessments should be conducted in line with the following well documented principles of assessment: appropriateness, fairness, manageability, integration into work or learning, validity, direct, authentic, sufficient, systematic, open and consistent

TITLE: **Apply basic electrical principles**

UNIT STANDARD ID:

LEVEL: 3

CREDITS: 4

FIELD: Manufacturing, Engineering and Technology

SUB-FIELD: Engineering and related design

ISSUE DATE

REVIEW DATE

PURPOSE OF THE UNIT STANDARD:

Learners credited with this Unit Standard are able to do electrical wiring according to company standards

A learner credited with this unit standard will be able to:

• Explain safety measures and to do basic first Aid

• Able to draw the basic symbols in electronics and electrical wiring

• Able to wire to company standards and regulations

• Able to wire the basic electrical single phase house wiring

This unit standard will partially contribute to the full development of any learner within the Telecommunications & Electronic Industry and more specifically in the manufacturing environment.

LEARNING ASSUMED TO BE IN PLACE:

The following knowledge, skills, attitude and/or equivalent on level 2:

• Life Sciences.

• Recognition and use of general hand tools.

• Languages

• How to learn.

RANGE STATEMENTS:

• The typical scope of this unit standard includes but is not limited to:

    • Company specific electrical components.

    • Basic Fault finding

    • Practical wiring of electrical components

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific outcome 1:

Safety measures and basic First aid

Assessment criteria:

1.1 Understand what is the consequences of electrical shocks to the body

1.2 Able to do basic safety precautions before working on high voltage equipment

1.3 Able to understand how to safe a person in contact with live high voltage lines

1.4 Understand the theoretical procedures to follow how to treat a person a victim in shock

Specific outcome 2:

Electrical wiring symbols

Assessment criteria:

2.1 understand the reason for using wiring symbols and the need to standardize

2.2 Able to draw and read electrical diagram with regard to electronic components

2.2 Able to differentiate between alternative symbols of electronic components

2.3 Able to draw and read electrical diagram with regard to electrical components

2.4 Able to differentiate between alternative symbols of electrical components

Specific outcome 3:

Electrical wiring of distribution board, isolating switches and circuit breakers to company specifications

Assessment criteria:

3.1 Able to do understand and do actual electrical installation of a distribution board to company specifics

3.2 Understand why circuit breakers are used in a distribution board

3.3 Able to bend conduit pipes

3.4 Understand what is meant by earth leakage protection

3.5 Able to do earth installation to company specifications

3.6 Understand the operation of a isolated switch

3.7 Understand the operation of a circuit breaker

Specific outcome 4:

Current balance earth leakage relay

Assessment criteria:

4.1 Understand the principle and interworking of a current balance earth leakage relay

4.2 Able to wire and install such a device

Specific outcome 5:

Electrical wiring of fuses, switches.

Assessment criteria:

5.1 Understand the principle behind fuses and differences

5.2 Able to install a fuse

5.3 Understand the theoretical difference of the different switching methods

5.4 Able to install the different methods of switching

Specific outcome 6:

Connected- and estimated load calculation and testing of an installation

Assessment criteria:

6.1 Understand the principle behind diversity factors

6.2 Able to do a mathematical calculation of a residential installation

6.3 Able to do a earth continuity test

6.4 Able to do a polarity test

6.5 Able to do a installation resistance between conductors test

6.6 Able to do a a installation resistance between conductors and earth test

6.7 Able to do a earth leakage relay test

6.8 Able to do a general inspections to company specifications

ACCREDITATION AND MODERATION OPTIONS:

1. Anyone assessing a learner against this unit standard, must be registered as an assessor with the relevant ETQA

2. Any institution offering learning that will enable achievement of this unit standard must be accredited as a provider through the relevant SETA/ETQA

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

NOTES:

1. CRITICAL CROSS-FIELD OUTCOMES:

The following critical cross-field outcomes are addressed in this unit standard:

1.1 Collect, evaluate, organise and critically evaluate information related to the termination of telecommunication cables so that these are accurately interpreted into application performance standards.

1.2 Understand the world as a set of related systems in that the termination of telecommunication cables does not exist in isolation.

1.3 Organize oneself and one's activities so that all requirements are met in achieving competence in the termination of telecommunication cables.

1.4 Identify and solve problems related to the achievement of the termination of telecommunication cables relevant competencies.

1.5 Work effectively with others as a member of a team when terminating of telecommunication cables.

1.6 Communicate effectively when terminating of telecommunication cables.

1.7 Being culturally sensitive across a range of social contexts when consulting customers.

2. ESSENTIAL EMBEDDED KNOWLEDGE:

- Language skills
- Mathematical skills
- Health and safety

SUPPLEMENTARY INFORMATION:

1. Assessment methods:

Integrated assessment methods and tools will allow the candidate to demonstrate that she/ he has acquired knowledge of and can safely and effectively apply competence identified in this unit standard.

These methods must be carefully selected based on the purpose of the assessment (For example, the written method of assessing knowledge or on-job demonstration of practical competence). The assessment must integrate a number of different methods in

order to give the assessor reliable and valid proof of competence and evidence of required attitudes.

2. Notes to Assessors

Assessors should keep the following general principles in mind when designing and conducting assessments against this unit standard:

- Focus the assessment activities on gathering evidence in terms of the main outcome expressed in the title to ensure assessment is integrated rather than fragmented. Remember we want to declare the person competent in terms of the title. Where assessment at title level is unmanageable, then focus assessment around each specific outcome, or groups of specific outcomes.

- Make sure evidence is gathered across the entire range, wherever it applies. Assessment activities should be as close to the real performance as possible, and where simulations or role-plays are used, there should be supporting evidence to show the candidate is able to perform in the real situation.

- Do not focus the assessment activities on each assessment criterion. Ensure that the assessment activities focus on outcomes and are sufficient to enable evidence to be gathered around all the assessment criteria.

- The assessment criteria provide the specifications against which assessment judgements should be made. In most cases, knowledge can be inferred from the quality of the performances, but in other cases, knowledge and understanding will have to be tested through questioning techniques. Where this is required, there will be assessment criteria to specify the standard required.

- The task of the assessor is to gather sufficient evidence, of the prescribed type and quality, as specified in this unit standard, that the candidate can achieve the outcomes again and again and again. This means assessors will have to judge how many repeat performances are required before they believe the performance is reproducible.

- All assessments should be conducted in line with the following well documented principles of assessment: appropriateness, fairness, manageability, integration into work or learning, validity, direct, authentic, sufficient, systematic, open and consistent

TITLE: **Use and care of power tools**

UNIT STANDARD ID:

LEVEL: 3

CREDITS: 3

FIELD: Manufacturing, Engineering and Technology

SUB-FIELD: Engineering and related design

ISSUE DATE

REVIEW DATE

PURPOSE OF THE UNIT STANDARD:

Learners credited with this Unit Standard are able to use and understand how to care for power tools.

A learner credited with this unit standard will be able to:

- Differentiate between different power tools in use

- Able to work with the various power tools within safety limits

- Able to clean and care power tools

- Able to store power tools correctly to company specifics

This unit standard will partially contribute to the full development of any learner within the Telecommunications & Electronic Industry and more specifically in the manufacturing environment.

LEARNING ASSUMED TO BE IN PLACE:

The following knowledge, skills, attitude and/or equivalent on level 2:

- Life Sciences

- Languages skills

- Use and care of hand tools

RANGE STATEMENTS:

- The typical scope of this unit standard includes but is not limited to:

    - Hand held drill

    - Portable electric saw

- Bench grinder

- Angle grinder

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific outcome 1:

Identify different power tools

Assessment criteria:

1.1 Understand why the right tool need to be used

1.2 Power tools selected according to tool function, length, weight, opening width, blade width, tool type.

1.3 Understand the work requirements with regard to size and type of material, risk of damage to the work

1.4 Understand different safety procedures for different power tools

Specific outcome 2:

Usage and care of power tools

Assessment criteria:

2.1 Able to use a power tool assigned for a certain task

2.2 Able to distinguish between difference of power tools to be used for a task assigned

2.3 Able to describe the safety mechanisms provided for in power tools

2.3 Understand the different cleaning materials used for cleaning power tools

2.4 Able to clean power tools to company specifics

2.5 Power tools are selected for cutting and drilling applications to match the size, nature, and environment of the task to be performed.

2.5 Additional precautions are taken when hand tools are used near live equipment, and ensuring they are adequately insulated

Specific outcome 3:

Storage of power tools

Assessment criteria:

3.1 Power tools are maintained according to industry practice, in terms of cleaning, lubricating, sharpening, storage, and protection against damage

3.2 Hand tools are regularly inspected for signs of wear and repaired or discarded when damaged, according to industry practice.

3.2 Able to store tools in a workshop to company specifics

3.3 Power tool are kept in a state of good repair and protected from damage according to the industry practice and manufacturer's recommendations

3.4 Cords and, where appropriate, pneumatic hoses are coiled and stored in a manner that avoids strain, twists, and kinks.

ACCREDITATION AND MODERATION OPTIONS:

1. Anyone assessing a learner against this unit standard, must be registered as an assessor with the relevant ETQA

2. Any institution offering learning that will enable achievement of this unit standard must be accredited as a provider through the relevant SETA/ETQA

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

NOTES:

1. CRITICAL CROSS-FIELD OUTCOMES:

The following critical cross-field outcomes are addressed in this unit standard:

1.1 Collect, evaluate, organise and critically evaluate information related to the termination of telecommunication cables so that these are accurately interpreted into application performance standards.

1.2 Understand the world as a set of related systems in that the termination of telecommunication cables does not exist in isolation.

1.3 Organize oneself and one's activities so that all requirements are met in achieving competence in the termination of telecommunication cables.

1.4 Identify and solve problems related to the achievement of the termination of telecommunication cables relevant competencies.

1.5 Work effectively with others as a member of a team when terminating of telecommunication cables.

1.6 Communicate effectively when terminating of telecommunication cables.

1.7 Being culturally sensitive across a range of social contexts when consulting customers.

2. ESSENTIAL EMBEDDED KNOWLEDGE:

- Able to speak English
- Be able to measurements

- Safety procedures of power tools

SUPPLEMENTARY INFORMATION:

1. Assessment methods:

Integrated assessment methods and tools will allow the candidate to demonstrate that she/ he has acquired knowledge of and can safely and effectively apply competence identified in this unit standard.

These tools may include the following:

Knife

Hacksaw

Wood saw

Hole saw

File

Screwdriver

Phillips screw driver

Combination Pliers

Long nose pliers

Side Cutter (diagonal cutter)

Vice grips

Allan keys

Wrenches

Crimp tool

Hammer

Tool box

These methods must be carefully selected based on the purpose of the assessment (For example, the written method of assessing knowledge or on-job demonstration of practical competence). The assessment must integrate a number of different methods in order to give the assessor reliable and valid proof of competence and evidence of required attitudes.

2. Notes to Assessors

Assessors should keep the following general principles in mind when designing and conducting assessments against this unit standard:

- Focus the assessment activities on gathering evidence in terms of the main outcome expressed in the title to ensure assessment is integrated rather than fragmented. Remember we want to declare the person competent in terms of the title. Where assessment at title level is unmanageable, then focus assessment around each specific outcome, or groups of specific outcomes.

- Make sure evidence is gathered across the entire range, wherever it applies. Assessment activities should be as close to the real performance as possible, and where simulations or role-plays are used, there should be supporting evidence to show the candidate is able to perform in the real situation.

- Do not focus the assessment activities on each assessment criterion. Ensure that the assessment activities focus on outcomes and are sufficient to enable evidence to be gathered around all the assessment criteria.

- The assessment criteria provide the specifications against which assessment judgements should be made. In most cases, knowledge can be inferred from the quality of the performances, but in other cases, knowledge and understanding will have to be tested through questioning techniques. Where this is required, there will be assessment criteria to specify the standard required.

- The task of the assessor is to gather sufficient evidence, of the prescribed type and quality, as specified in this unit standard, that the candidate can achieve the outcomes again and again and again. This means assessors will have to judge how many repeat performances are required before they believe the performance is reproducible.

- All assessments should be conducted in line with the following well documented principles of assessment: appropriateness, fairness, manageability, integration into work or learning, validity, direct, authentic, sufficient, systematic, open and consistent

TITLE: **Apply basic electronic principles**

UNIT STANDARD REFERENCE NUMBER:

LEVEL: 3

CREDITS: 4

FIELD: Manufacturing, Engineering and Technology

SUB-FIELD: Engineering and related design

ISSUE DATE

REVIEW DATE

PURPOSE OF THE UNIT STANDARD:

Learners credited with this Unit Standard are able to understand what is meant with the basics of electronics and electrical theory.

A learner credited with this unit standard will be able to:

- Explain atomic theory
- Understand the different international standards used
- Understand the different terms and units in use
- Understand the basic concepts and mathematics behind different electronic components.

This unit standard will partially contribute to the full development of any learner within the Telecommunications & Electronic Industry and more specifically in the manufacturing environment.

LEARNING ASSUMED TO BE IN PLACE:

The following knowledge, skills, attitude and/or equivalent on level 2:

- Life Sciences.
- Recognition and use of general hand tools.
- Languages
- Mathematics and Science NQF 3

RANGE STATEMENTS:

- The typical scope of this unit standard includes but is not limited to:

  - Company specific components.

  - Basic Fault finding

  - Practical wiring of electronic components

  - Data sheets

  - Multi meter and Oscilloscope readings (test equipment)

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific outcome 1:

Basic electronics and electrical theory

Assessment criteria:

1.1 Able to explain the science of electrons

1.2 Explain the atom theory behind conductors, insulators and semi conductors

1.3 Able to convert units in International systems of units(SI) Metric units

1.4 Understand the theory behind terms and the units connected to them

1.5 Theoretical knowledge of the definition of ohm's law and able to do mathematical formulae.

Specific outcome 2:

Resistors

Assessment criteria:

2.1 able to differentiate between the different resistors in use

2.2 Identifications and calculation of resistance from the different band colour codes in resistors

2.3 Understand and calculate the tolerance of a resistor

2.4 Able to do mathematical calculations on resistors in serial connections

2.5 Able to do mathematical calculations on resistors in parallel connections

2.6 Able to do mathematical calculations on resistors in serial and parallel connections

2.7 Understand the different types of variable resistor in use

2.8 Able to draw the symbol of a resistor

Specific outcome 3:

Power theory

Assessment criteria:

3.1 Understand the principles explaining the unit of electrical power

3.2 Able to write the three different power equations

3.3 Able to do basic power calculations

Specific outcome 4:

Batteries and voltage supplies

Assessment criteria:

4.1 Understand the concepts behind batteries and its electrical theory

4.2 Able to differentiate between the different categories of batteries

4.3 Understand what will be the effect of batteries in series and parallel

4.4 Able to draw the symbol of a Battery and voltage supply

Specific outcome 5:

Switches and fuses

Assessment criteria:

5.1 Understand the concepts behind the different switches in use

5.2 Understand the principle behind fuses and the reason for using

5.3 The process of changing a switch in practice

5.4 Able to draw the symbol of a switch and a fuse

Specific outcome 6:

Capacitors and diodes

Assessment criteria:

6.1 Understand the electronic theory behind capacitors and diodes

6.2 Understand the physical internal working of the capacitors and diodes

6.3 Able to do mathematic calculations with capacitors in series and parallel

6.4 Able to do a test with a diode and a multimeter

6.5 Understand the different capacitors in use

6.6 Understand the different diodes in use

6.3 Able to draw the symbol of the capacitors and diodes

ACCREDITATION AND MODERATION OPTIONS:

1. Anyone assessing a learner against this unit standard, must be registered as an assessor with the relevant ETQA

2. Any institution offering learning that will enable achievement of this unit standard must be accredited as a provider through the relevant SETA/ETQA

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

NOTES:

1. CRITICAL CROSS-FIELD OUTCOMES:

The following critical cross-field outcomes are addressed in this unit standard:

1.1 Collect, evaluate, organise and critically evaluate information related to the termination of telecommunication cables so that these are accurately interpreted into application performance standards.

1.2 Understand the world as a set of related systems in that the termination of telecommunication cables does not exist in isolation.

1.3 Organise oneself and one's activities so that all requirements are met in achieving competence in the termination of telecommunication cables.

1.4 Identify and solve problems related to the achievement of the termination of telecommunication cables relevant competencies.

1.5 Work effectively with others as a member of a team when terminating of telecommunication cables.

1.7 Being culturally sensitive across a range of social contexts when consulting customers.

2. ESSENTIAL EMBEDDED KNOWLEDGE:

• Language skills

• Mathematical skills

• Health and safety

SUPPLEMENTARY INFORMATION:

1. Assessment methods:

Integrated assessment methods and tools will allow the candidate to demonstrate that she/ he has acquired knowledge of and can safely and effectively apply competence identified in this unit standard.

These tools may include the following:

These methods must be carefully selected based on the purpose of the assessment (For example, the written method of assessing knowledge or on-job demonstration of practical competence). The assessment must integrate a number of different methods in order to give the assessor reliable and valid proof of competence and evidence of required attitudes.

2. Notes to Assessors

Assessors should keep the following general principles in mind when designing and conducting assessments against this unit standard:

- Focus the assessment activities on gathering evidence in terms of the main outcome expressed in the title to ensure assessment is integrated rather than fragmented. Remember we want to declare the person competent in terms of the title. Where assessment at title level is unmanageable, then focus assessment around each specific outcome, or groups of specific outcomes.

- Make sure evidence is gathered across the entire range, wherever it applies. Assessment activities should be as close to the real performance as possible, and where simulations or role-plays are used, there should be supporting evidence to show the candidate is able to perform in the real situation.

- Do not focus the assessment activities on each assessment criterion. Ensure that the assessment activities focus on outcomes and are sufficient to enable evidence to be gathered around all the assessment criteria.

- The assessment criteria provide the specifications against which assessment judgements should be made. In most cases, knowledge can be inferred from the quality of the performances, but in other cases, knowledge and understanding will have to be tested through questioning techniques. Where this is required, there will be assessment criteria to specify the standard required.

- The task of the assessor is to gather sufficient evidence, of the prescribed type and quality, as specified in this unit standard, that the candidate can achieve the outcomes again and again and again. This means assessors will have to judge how many repeat performances are required before they believe the performance is reproducible.

- All assessments should be conducted in line with the following well documented principles of assessment: appropriateness, fairness, manageability, integration into work or learning, validity, direct, authentic, sufficient, systematic, open and consistent

TITLE: **Wiring Techniques**

UNIT STANDARD ID:

FIELD: Manufacturing, Engineering and Technology

SUB-FIELD: Engineering and related design

LEVEL: 3

CREDITS: 5

ISSUE DATE

REVIEW DATE

PURPOSE OF THE UNIT STANDARD:

Learners credited with this Unit Standard are able to wire circuits and crimp conventional components and connectors.

A learner credited with this unit standard will be able to:

- Prepare for wiring of different components (conventional and company specific)
- Identify & maintain wiring- & soldering equipment.
- Be able to practice different wiring techniques.
- Evaluate connections.
- Able to read wiring diagram.
- Conclude wiring tasks according to quality specifications.

This unit standard will partially contribute to the full development of any learner within the Telecommunications & Electronic Industry and more specifically in the manufacturing environment.

LEARNING ASSUMED TO BE IN PLACE:

The following knowledge, skills, attitude and/or equivalent on level 2:

- Identify electronic components.
- Life Sciences.
- Recognition and use of general hand tools.
- Basic understanding of electricity.

RANGE STATEMENTS:

- The typical scope of this unit standard includes but is not limited to:

  - Company specific connectors.

  - Standard wiring equipment

  - Crimping techniques

  - Sealing and isolation techniques

  - Work-bench.

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific outcome 1:

Connectors and Wires

Assessment criteria:

1.1 Able to understand different types of connectors used.

1.2 Able to understand different types of terminals used.

1.3 Type/thickness of electrical wire.

1.4 Correct hand tools.

Specific outcome 2:

Wiring techniques

Assessment criteria:

2.1 Interpret wire diagram.

2.2 Technique of crimping different types of connectors, lugs, terminals and connections.

2.2 How to prepare wire.

2.3 Check for the correct placement and orientation of wires.

2.4 Evaluate connections according to applicable quality standard

2.5 Ensure connections are electrically and mechanically secured

2.6 Different Isolation methods

Specific outcome 3:

Apply Wire Techniques

Assessment criteria:

3.1 Correct hand tools selected for task

3.3 Correct crimping tools in conjunction with method selected.

3.4 Cleaning and preparation of wire.

3.4 Correct bending radius and placement from wiring schematic.

3.5 correct isolation method used

Specific outcome 4:

Quality and Completion of task

Assessment criteria:

4.1 Quality check as per customer specifications

4.2 Cleaning of work bench and/or customer premises.

4.3 Correct storing of equipment and materials.

ACCREDITATION AND MODERATION OPTIONS:

1. Anyone assessing a learner against this unit standard, must be registered as an assessor with the relevant ETQA

2. Any institution offering learning that will enable achievement of this unit standard must be accredited as a provider through the relevant SETA/ETQA

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

NOTES:

1. CRITICAL CROSS-FIELD OUTCOMES:

The following critical cross-field outcomes are addressed in this unit standard:

1.1 Collect, evaluate, organise and critically evaluate information related to the termination of telecommunication cables so that these are accurately interpreted into application performance standards.

1.2 Understand the world as a set of related systems in that the termination of telecommunication cables does not exist in isolation.

1.3 Organize oneself and one's activities so that all requirements are met in achieving competence in the termination of telecommunication cables.

1.4 Identify and solve problems related to the achievement of the termination of telecommunication cables relevant competencies.

1.5 Work effectively with others as a member of a team when terminating of telecommunication cables.

1.6 Communicate effectively when terminating of telecommunication cables.

1.7 Being culturally sensitive across a range of social contexts when consulting customers.

2. ESSENTIAL EMBEDDED KNOWLEDGE:

- Able to speak English
- Able to work with mechanical equipment
- Able to work with hand and power tools
- Able to interpret drawings
- Adhere to wiring regulations
- Health and safety

SUPPLEMENTARY INFORMATION:

1. Glossary of terms:

"Schematics" refers to the master working drawing.

"Work bench" refers to the work area were equipment and task is completed.

2. Assessment methods:

Integrated assessment methods and tools will allow the candidate to demonstrate that she/ he has acquired knowledge of and can safely and effectively apply competence identified in this unit standard.

These tools may include the following:

Soldering Station, Cooling stand and Solder tips

Heatgun

Soldering Wire

Isolation and sealing equipment

Hand Tools (Cutting and Bending pliers)

Hot-air jet

Wire and connecters

Cable

Wiring board

These methods must be carefully selected based on the purpose of the assessment (For example, the written method of assessing knowledge or on-job demonstration of practical competence). The assessment must integrate a number of different methods in order to give the assessor reliable and valid proof of competence and evidence of required attitudes.

3. Notes to Assessors

Assessors should keep the following general principles in mind when designing and conducting assessments against this unit standard:

- Focus the assessment activities on gathering evidence in terms of the main outcome expressed in the title to ensure assessment is integrated rather than fragmented. Remember we want to declare the person competent in terms of the title. Where assessment at title level is unmanageable, then focus assessment around each specific outcome, or groups of specific outcomes.

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- Do not focus the assessment activities on each assessment criterion. Ensure that the assessment activities focus on outcomes and are sufficient to enable evidence to be gathered around all the assessment criteria.

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many repeat performances are required before they believe the performance is reproducible.

- All assessments should be conducted in line with the following well documented principles of assessment: appropriateness, fairness, manageability, integration into work or learning, validity, direct, authentic, sufficient, systematic, open and consistent

TITLE: **Apply analytical fault finding techniques**

UNIT STANDARD ID:

LEVEL: 4

CREDITS: 3

FIELD: Manufacturing, Engineering and Technology

SUB-FIELD: Engineering and related design

ISSUE DATE

REVIEW DATE

PURPOSE OF THE UNIT STANDARD:

Learners credited with this Unit Standard are able to understand the basics concepts how to analyse faults

A person credited with this unit standard will be able to:

- Able to identify faults in a generic environment

- Able to describe faults

- Able to analyze faults

- Able to find solutions to a problem so that they do not recur.

This unit standard will contribute to the full development of any learner within the Telecommunications Industry and more specifically in the Installation medium discipline by providing recognition, further mobility and transportability within the field.

LEARNING ASSUMED TO BE IN PLACE:

The following knowledge, skills, attitude and/or equivalent on level 2:

- Communication and Language.

- Be able to work in groups and have a questioning skills

RANGE STATEMENTS:

- The typical scope of this unit standard includes but is not limited to:

  - Case studies

  - Practical assignments

  - Electronic and Electrical problem solving

- The context of this unit standard is performed within structures where stationery, support structure, electronics media, employer's policies and procedures, cultural ethics, business ethics, work environment, professional conduct, test instrumentation, tools, human resources, customer, material, equipment, quality standards, SABS standards, and anti-static procedures are applicable.

Level (for level 4)

A learning programme leading to the award of this unit standard should develop learners who demonstrate:

(a)   An understanding of the discipline/field's fundamental rules, concepts and principles   •

(b)   Familiarity with the essential procedures, operations and techniques of this field

(c)   An ability to use a range of procedures to solve routine problems

(d)   An ability to communicate and present information clearly and reliably following prescribed formats and conventions

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific outcome 1:

Objective of trouble shooting

Assessment criteria:

1.1 Analyze a complex situation

1.2 List the problems

1.3 Separate the problems

1.4 Prioritize the problems

1.5 Define an action plan

Specific outcome 2:

Able to priorities generic faults from least importance to high priority

Assessment criteria:

2.1 Define the problems/faults that needs to be repaired first

2.2 Use of documentation

2.3. Define the cause of the problem

2.4. Repair the problem/fault

Specific outcome 3:

Able find a solution to prevent future faults from reoccurring

Assessment criteria:

3.1 Effective use of equipment

3.2. Ensure that the problem/fault will not reoccur

3.3. Ensure proper completion of work carried out

ACCREDITATION AND MODERATION OPTIONS:

1. Anyone assessing a learner against this unit standard, must be registered as an assessor with the relevant ETQA

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NOTES:

1. CRITICAL CROSS-FIELD OUTCOMES:

The following critical cross-field outcomes are addressed in this unit standard:

1.1 Understand the basic concepts used in different manufacturers in electronic .

1.2 Able to design specific controllers with added hardware.

1.3 Organize oneself and one's activities so that all requirements are met in achieving competence in the workplace.

1.4 Identify and solve problems related to the scenario at hand

1.5 Work effectively with others as a member of a team.

1.6 Communicate effectively and using the correct jargon in the repairs environment

1.7 Being culturally sensitive across a range of social contexts when consulting engineers and customers.

2. ESSENTIAL EMBEDDED KNOWLEDGE:

2.1 Names, functions, locations of physical things, process, concepts

- Understanding of subject matter
- Use of tools
- Use of equipment
- Use of manuals

SUPPLEMENTARY INFORMATION:

1. Assessment methods:

Integrated assessment methods and tools will allow the candidate to demonstrate that she/ he has acquired knowledge of and can safely and effectively apply competence identified in this unit standard.

These tools may include the following:

- In-situ (on-the-job) observations
- Role-play simulations
- Structured group discussions
- Written reports (e.g. tests, exams, case studies, projects, registers, logbooks, workbooks)
- Verbal report backs (presentations)
- Portfolios of evidence
- Projects
- Experiential learning
- Working in teams
- Scenario sketching

These methods must be carefully selected based on the purpose of the assessment (For example, the written method of assessing knowledge or on-job demonstration of practical competence). The assessment must integrate a number of different methods in order to give the assessor reliable and valid proof of competence and evidence of required attitudes.

3. Notes to Assessors

Assessors should keep the following general principles in mind when designing and conducting assessments against this unit standard:

- Focus the assessment activities on gathering evidence in terms of the main outcome expressed in the title to ensure assessment is integrated rather than fragmented. Remember we want to declare the person competent in terms of the title. Where assessment at title level is unmanageable, then focus assessment around each specific outcome, or groups of specific outcomes.
- Make sure evidence is gathered across the entire range, wherever it applies. Assessment activities should be as close to the real performance as possible, and

where simulations or role-plays are used, there should be supporting evidence to show the candidate is able to perform in the real situation.

- Do not focus the assessment activities on each assessment criterion. Ensure that the assessment activities focus on outcomes and are sufficient to enable evidence to be gathered around all the assessment criteria.

- The assessment criteria provide the specifications against which assessment judgements should be made. In most cases, knowledge can be inferred from the quality of the performances, but in other cases, knowledge and understanding will have to be tested through questioning techniques. Where this is required, there will be assessment criteria to specify the standard required.

- The task of the assessor is to gather sufficient evidence, of the prescribed type and quality, as specified in this unit standard, that the candidate can achieve the outcomes again and again and again. This means assessors will have to judge how many repeat performances are required before they believe the performance is reproducible.

- All assessments should be conducted in line with the following well documented principles of assessment: appropriateness, fairness, manageability, integration into work or learning, validity, direct, authentic, sufficient, systematic, open and consistent

TITLE: **Soldering Techniques**

UNIT STANDARD ID:

LEVEL: 3

CREDITS: 5

FIELD: Manufacturing, Engineering and Technology

SUB-FIELD: Engineering and related design

ISSUE DATE

REVIEW DATE

PURPOSE OF THE UNIT STANDARD:

Learners credited with this Unit Standard are able to solder & de-solder conventional components and surface mount devices on vero board and printed circuit boards.

A learner credited with this unit standard will be able to:

- Prepare for soldering of electronic components (conventional and SMD)
- Identify & maintain soldering equipment & components
- Be able to de-solder using different techniques
- Evaluate solder joints
- Conclude soldering tasks

This unit standard will partially contribute to the full development of any learner within the Telecommunications & Electronic Industry and more specifically in the manufacturing environment.

LEARNING ASSUMED TO BE IN PLACE:

The following knowledge, skills, attitude and/or equivalent on level 2:

- Identify electronic components.
- Life Sciences.
- Recognition and use of general hand tools.

RANGE STATEMENTS:

- The typical scope of this unit standard includes but is not limited to:
    - Electronic components
    - Standard soldering equipment
    - Printed circuit boards and vero boards
    - Work bench soldering & de-soldering

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific outcome 1:

Select equipment material and method for task at hand

Assessment criteria:

1.1 Appropriate method is selected for task

1.2 Solder tip is correctly selected

1.3 Type/thickness of solder wire.

1.4 Correct hand tools are selected.

1.5 Select correct cleaning materials and fluids

1.6 Correct antistatic measures taken

Specific outcome 2:

Apply solder techniques

Assessment criteria:

2.1 Interpret component placement diagram

2.2 Pre-forming of conventional components

2.3 Check for the correct placement and orientation of components

2.4 Evaluate solder joint according to applicable quality standard

2.5 Ensure joints are electrically and mechanically secured

Specific outcome 3:

Apply de-soldering techniques

Assessment criteria:

3.1 Interpret component placement diagram

3.2 Correct de-soldering method for the task at hand.

3.3 Correct tools and equipment in conjunction with method selected.

3.4 Cleaning and preparation of soldering joint.

Specific outcome 4:

Quality and Completion of task

Assessment criteria:

4.1 Quality check as per customer specifications

4.2 Cleaning of work bench.

4.3 Correct storing of equipment, cleaning fluids and materials.

ACCREDITATION AND MODERATION OPTIONS:

1. Anyone assessing a learner against this unit standard, must be registered as an assessor with the relevant ETQA

2. Any institution offering learning that will enable achievement of this unit standard must be accredited as a provider through the relevant SETA/ETQA

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

NOTES:

1. CRITICAL CROSS-FIELD OUTCOMES:

The following critical cross-field outcomes are addressed in this unit standard:

1.1 Collect, evaluate, organise and critically evaluate information related to the termination of telecommunication cables so that these are accurately interpreted into application performance standards.

1.2 Understand the world as a set of related systems in that the termination of telecommunication cables does not exist in isolation.

1.3 Organise oneself and one's activities so that all requirements are met in achieving competence in the termination of telecommunication cables.

1.4 Identify and solve problems related to the achievement of the termination of telecommunication cables relevant competencies.

1.5 Work effectively with others as a member of a team when terminating of telecommunication cables.

1.6 Communicate effectively when terminating of telecommunication cables.

1.7 Being culturally sensitive across a range of social contexts when consulting customers.

2. ESSENTIAL EMBEDDED KNOWLEDGE:

- Language skills
- Able to work with mechanical equipment
- Able to read basic electronic schematics
- Health and safety

SUPPLEMENTARY INFORMATION:

1. Glossary of terms:

"Schematics" refers to the master working drawing.

"Work bench" refers to the work area were equipment and task is completed.

"Joint" refer to the actual mechanical and electrical connection point between component and printed circuit board.

2. Assessment methods:

Integrated assessment methods and tools will allow the candidate to demonstrate that she/ he has acquired knowledge of and can safely and effectively apply competence identified in this unit standard.

These tools may include the following:

Soldering Station, Cooling stand and Solder tips

Heatgun

De-soldering station

Solder Wick

De-soldering pump

Soldering Wire

Hand Tools (Cutting and Bending pliers)

Printed Circuit Board Clamp

Magnifying Class

Cleaning Fluids

Hot-air jet

These methods must be carefully selected based on the purpose of the assessment (For example, the written method of assessing knowledge or on-job demonstration of practical competence). The assessment must integrate a number of different methods in order to give the assessor reliable and valid proof of competence and evidence of required attitudes.

3. Notes to Assessors

Assessors should keep the following general principles in mind when designing and conducting assessments against this unit standard:

• Focus the assessment activities on gathering evidence in terms of the main outcome expressed in the title to ensure assessment is integrated rather than fragmented. Remember we want to declare the person competent in terms of the title. Where

assessment at title level is unmanageable, then focus assessment around each specific outcome, or groups of specific outcomes.

- Make sure evidence is gathered across the entire range, wherever it applies. Assessment activities should be as close to the real performance as possible, and where simulations or role-plays are used, there should be supporting evidence to show the candidate is able to perform in the real situation.

- Do not focus the assessment activities on each assessment criterion. Ensure that the assessment activities focus on outcomes and are sufficient to enable evidence to be gathered around all the assessment criteria.

- The assessment criteria provide the specifications against which assessment judgements should be made. In most cases, knowledge can be inferred from the quality of the performances, but in other cases, knowledge and understanding will have to be tested through questioning techniques. Where this is required, there will be assessment criteria to specify the standard required.

- The task of the assessor is to gather sufficient evidence, of the prescribed type and quality, as specified in this unit standard, that the candidate can achieve the outcomes again and again and again. This means assessors will have to judge how many repeat performances are required before they believe the performance is reproducible.

- All assessments should be conducted in line with the following well documented principles of assessment: appropriateness, fairness, manageability, integration into work or learning, validity, direct, authentic, sufficient, systematic, open and consistent

TITLE: **Characterize, splice and measure optic fiber**

UNIT STANDARD ID:

FIELD: Manufacturing, Engineering and Technology

SUB-FIELD: Engineering and related design

LEVEL: 4

CREDITS: 5

ISSUE DATE:

REVIEW DATE:

PURPOSE OF THE UNIT STANDARD:

Learners credited with this Unit Standard are able to understand the basics of Optic Fibres and have a hands on approach to this technology.

A person credited with this unit standard will be able to:

- Describe the basics, Transmitting, Receiving and systems used in Optic Fibers

- Be able to describe and do different measurement with regards to Power source and power meter.

- Able to do a basics of link planning, site inspections and cable installation

This unit standard will contribute to the full development of any learner within the Telecommunications Industry and more specifically in the Installation medium discipline by providing recognition, further mobility and transportability within the field.

LEARNING ASSUMED TO BE IN PLACE:

The following knowledge, skills, attitude and/or equivalent on level 2:

- Communication and Language.

- Electronics

- Science and Mathematics NQF 3

RANGE STATEMENTS:

- The typical scope of this unit standard includes but is not limited to:

    - Cutting, Cleaving, Cleaning and preparation of Fibers

    - Mechanical Splicing

    - Fusion Splicing

- Connectorzing

- Measurements on a OTDR meter

- Measurements on Power source and power meter

- The context of this unit standard is performed within structures where stationery, support structure, electronics media, employer's policies and procedures, cultural ethics, business ethics, work environment, professional conduct, test instrumentation, tools, human resources, customer, material, equipment, quality standards, SABS standards, and anti-static procedures are applicable.

Level (for level 4)

A learning programme leading to the award of this unit standard should develop learners who demonstrate:

(a)   An understanding of the discipline/field's fundamental rules, concepts and principles

(b)   Familiarity with the essential procedures, operations and techniques of this field

(c)   An ability to use a range of procedures to solve routine problems

(d)   An ability to communicate and present information clearly and reliably following prescribed formats and conventions

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific outcome 1:

Science used in transmission of light in fiber

Assessment criteria:

1.1 Understand the spectrum of electromagnetic waves used and described mathematically using standard formulae for Optic Fiber communication in telecommunications.

1.2 Understand the science with regard to reflection and refraction and do mathematics using standard formulae

1.3 Able to point out the basic advantages and disadvantages of fiber in the field

1.4 Able to describe the principle of Optic Fiber

1.5 Able to explain and do mathematics using standard formulae with regard to Propagation Velocity of Light

1.6 Able to explain and do mathematics using standard formulae with regard to propagation velocity

1.7 Able to explain and do mathematics using standard formulae with regard to refraction index

1.8 Understand the science behind reflection that occurs in Fiber

Specific outcome 2:

Physical basics of Optic fiber

Assessment criteria:

2.1 Understand the process taken to manufacture fiber.

2.2 Understand the different types of materials Fiber is made off

2.3 Able to point out the different types of fiber

2.4 Understand and be able to point out the different types of fiber with regard to Single mode and multi mode fibers

1.1 Be able to describe the basics and makeup of cables used in a company specifications

Specific outcome 3:

The preparation and splicing of Fibers

Assessment criteria:

3.1 Able to read and compute specification of cables used in the fiber technologies

3.2 Understand and do cutting of fibers

3.3 Understand and do cleaving of fibers

3.4 Understand and do cleaning of fibers

3.5 Understand and do preparation of fibers

3.6 Understand and do fusion splicing of fibers

3.7 Understand and do mechanical splicing of fibers

Specific outcome 4:

Testing of Optic fiber

Assessment criteria:

4.1 Understand the different dispersions founded in Optic fiber

4.2 Understand the working of a OTDR meter

4.3 Be able to do actual measurements on Fibre with a OTDR meter

4.4 Able to read measurements taken on a OTDR meter and to analyse data

4.5 Able to read and compute technical specifications on the different fibers used

4.6 Understand the method how to do and be able to do measurements with a power source and power meter

Specific outcome 5:

Understand equipment limitations and inspections

Assessment criteria:

5.1 Able to read limitations on equipment and to react

5.2 Able to do a safety check on equipment

5.3 Have a background knowledge of work- and storage lifetime of equipment

5.4 Able to check own rope access equipment.

ACCREDITATION AND MODERATION OPTIONS:

1. Anyone assessing a learner against this unit standard, must be registered as an assessor with the relevant ETQA

2. Any institution offering learning that will enable achievement of this unit standard must be accredited as a provider through the relevant SETA/ETQA

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

NOTES:

1. CRITICAL CROSS-FIELD OUTCOMES:

The following critical cross-field outcomes are addressed in this unit standard:

1.1 Able to design specific controllers with added hardware.

1.2 Organise oneself and one's activities so that all requirements are met in achieving competence in the programming and compiling of instruction sets.

1.3 Identify and solve problems related to the 8 bit controllers and bring up solutions that will increase efficiency.

1.4 Work effectively with others as a member of a team.

1.5 Being culturally sensitive across a range of social contexts when consulting engineers and customers.

2. ESSENTIAL EMBEDDED KNOWLEDGE:

- Telecommunications Technology systems related to this learners Core Specialization
- Safety aspects
- Use of installation tools
- Teamwork
- Scheduling of activities
- Time management
- Procurement procedures
- Organizational policies and procedures regarding installation of elements
- Related regulations regarding installation of elements
- Principles of electricity

SUPPLEMENTARY INFORMATION:

1. Glossary of terms:

OTDR – Optical Time Domain Reflectometer

Optic fiber – Technology used to transmit data with light from Transmit side to the Receiver

2. Assessment methods:

Integrated assessment methods and tools will allow the candidate to demonstrate that she/ he has acquired knowledge of and can safely and effectively apply competence identified in this unit standard.

These tools may include the following:

- In-situ (on-the-job) observations
- Role-play simulations
- Structured group discussions
- Written reports (e.g. tests, exams, case studies, projects, registers, logbooks, workbooks)
- Verbal report backs (presentations)
- Portfolios of evidence
- Projects
- Experiential learning

- Working in teams
- Scenario sketching

These methods must be carefully selected based on the purpose of the assessment (For example, the written method of assessing knowledge or on-job demonstration of practical competence). The assessment must integrate a number of different methods in order to give the assessor reliable and valid proof of competence and evidence of required attitudes.

3. Notes to Assessors

Assessors should keep the following general principles in mind when designing and conducting assessments against this unit standard:

- Focus the assessment activities on gathering evidence in terms of the main outcome expressed in the title to ensure assessment is integrated rather than fragmented. Remember we want to declare the person competent in terms of the title. Where assessment at title level is unmanageable, then focus assessment around each specific outcome, or groups of specific outcomes.

- Make sure evidence is gathered across the entire range, wherever it applies. Assessment activities should be as close to the real performance as possible, and where simulations or role-plays are used, there should be supporting evidence to show the candidate is able to perform in the real situation.

- Do not focus the assessment activities on each assessment criterion. Ensure that the assessment activities focus on outcomes and are sufficient to enable evidence to be gathered around all the assessment criteria.

- The assessment criteria provide the specifications against which assessment judgements should be made. In most cases, knowledge can be inferred from the quality of the performances, but in other cases, knowledge and understanding will have to be tested through questioning techniques. Where this is required, there will be assessment criteria to specify the standard required.

- The task of the assessor is to gather sufficient evidence, of the prescribed type and quality, as specified in this unit standard, that the candidate can achieve the outcomes again and again and again. This means assessors will have to judge how many repeat performances are required before they believe the performance is reproducible.

- All assessments should be conducted in line with the following well documented principles of assessment: appropriateness, fairness, manageability, integration into work or learning, validity, direct, authentic, sufficient, systematic, open and consistent

TITLE: **Maintain and Repair Feeder Cables**

UNIT STANDARD ID:

FIELD: Manufacturing, Engineering and Technology

SUB-FIELD: Engineering and related design

LEVEL: 4

CREDITS: 10

ISSUE DATE

REVIEW DATE

PURPOSE OF THE UNIT STANDARD:

Learners credited with this Unit Standard are able to perform the maintenance and repair of feeder cables within the Telecommunications Industry.

A person credited with this unit standard will be able to:

- Prepare for the maintenance of feeder cables

- Maintain feeder cables

- Repair feeder cables

- Conclude the maintenance of feeder cables

This unit standard will contribute to the full development of any learner within the Telecommunications Industry and more specifically in the feeder cables discipline by providing recognition, further mobility and transportability within the field.   The knowledge, skills and understanding demonstrated in this unit standard are essential for social and economic transformation and upliftment within the Telecommunications environment.

LEARNING ASSUMED TO BE IN PLACE:

The following knowledge, skills, attitude and/or equivalent on level 3:

- Communication and language.

- Applied mathematics.

- Principles of electronics and electricity.

- Recognition and use of general hand and power tools.

- Operation of test equipment.

RANGE STATEMENTS:

- The typical scope of this unit standard includes but is not limited to:
  - Preventative and corrective maintenance

  - Waveguides

  - Heavy duty coaxial feeder cables

  - Flexible and rigid

  - Indoor and outdoor

- The context of this unit standard is performed within structures where stationery, transportation, support structure, communication media, employer's policies and procedures, cultural ethics, business ethics, work environment, professional conduct, test instrumentation, tools, human resources, customer, material, equipment, quality standards, SABS standards, and anti-static procedures are applicable.

Level (for level 4)

A learning programme leading to the award of this unit standard should develop learners who demonstrate:

(a)   A wide range of technical skills

(b)   An ability to use relevant test instruments and procedures

(c)   A broad knowledge that incorporates theoretical concepts

(d)   An ability to critically analyse test results

(e)   An ability to make judgements to new problems

(f)   An ability to work on their own with full responsibility

(g)   An ability to communicate and present information clearly and reliably following prescribed formats and conventions

(h)   An ability to maintain and repair feeder cables

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific outcome 1:

Prepare for the maintenance of feeder cables

Assessment criteria:

1.1 Work order and maintenance documentation is obtained in accordance with employer's policies and procedures.

1.2. Work order is explained and interpreted correctly.

1.3 All role players are consulted and all logistic arrangements are made.

1.4 Relevant material, equipment and tools are identified and obtained in accordance with work order.

1.5 Health and safety requirements are considered in accordance with statutory requirements and employer's policies and procedures.

1.6 Site inspection is conducted

1.7 Work effectively with the customer in order to ensure accurate and professional service delivery.

Specific outcome 2:

Maintain feeder cables

Assessment criteria:

2.1 A safe work area is established.

2.2 The transmission medium is removed from service where necessary.

2.3 Transmission medium is cleaned / cleared appropriately.

2.4 The purpose of preventative maintenance is explained

2.5 All relevant tests are completed according to manufacturer's specification and company policies and procedures.

2.6 Procedures to achieve specification are explained.

2.7 Equipment is adjusted according to manufacturer/employer's specification.

2.8 Health and safety requirements are applied in accordance with statutory requirements and employer's policies and procedures.

Specific outcome 3:

Repair feeder cables

Assessment criteria:

3.1 Test results are diagnosed and failures identified.

3.2 Fault finding techniques are explained.

3.3 Typical fault conditions are described.

3.4 Fault is located using the relevant test equipment.

3.5 Fault is repaired to manufacturer's specification and/or company policies and procedures.

3.6 Health and safety requirements are applied in accordance with statutory requirements and employer's policies and procedures.

Specific outcome 4:

Conclude the maintenance of feeder cables

Assessment criteria:

4.1 Quality inspection / final test of work is carried out.

4.2 Transmission medium is returned to service correctly.

4.3 Relevant documentation is completed according to employer's policies and procedures.

4.4 The site is restored to an acceptable condition.

4.5 The blueprint is updated to include any changes.

ACCREDITATION AND MODERATION OPTIONS:

1. Anyone assessing a learner against this unit standard, must be registered as an assessor with the relevant ETQA

2. Any institution offering learning that will enable achievement of this unit standard must be accredited as a provider through the relevant SETA/ETQA

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

NOTES:

1. CRITICAL CROSS-FIELD OUTCOMES:

The following critical cross-field outcomes are addressed in this unit standard:

1.1 Collect, evaluate, organize and critically evaluate information related to the maintenance of feeder cables so that these are accurately interpreted into application performance standards.

1.2 Understand the world as a set of related systems in that the maintenance of feeder cables is interrelated with the overall telecommunications.

1.3 Organise oneself and one's activities so that all requirements are met in achieving competence in the maintenance of feeder cables.

1.4 Identify and solve problems related to the achievement of the maintenance of feeder cables relevant competencies.

1.5 Work effectively with others as a member of a team when maintaining feeder cables.

1.6 Communicate effectively when maintaining feeder cables.

1.7 Being culturally sensitive across a range of social contexts when consulting customers.

2. ESSENTIAL EMBEDDED KNOWLEDGE:

2.1 Names, functions, locations of physical things, process, concepts

- Location of typical faults
- Tools and equipment related to the maintenance of feeder cables
- Maintenance procedures

2.2 Sensory cues provided by environment

- Visual indications for faults (smell, sound, hear, feel)

2.3 Process, events, causes and effects, implications

- Incorrect handling of faults conditions
- Implications of poorly aligned and malfunctioning test equipment and feeder cables
- Problem solving and analytical thinking techniques

2.4 Procedures and techniques

- Alignment of test equipment
- Maintenance techniques
- Fault finding techniques

2.5 Regulations, legislation, agreements and policies and procedures

- Health and safety
- Company polices and procedures

2.6 Theory – rules, agreements and principles

- Types of faults
- Adjustment procedures

SUPPLEMENTARY INFORMATION:

1. Glossary of terms:

"As built" refers to the final product, which may differ from working drawing.

"Blueprint" refers to the master working drawing.

"Work order" refers to the verbal or written instruction given to initiate the work to be done.

"Fire block" refers to the intervention required to restrict the spread of fire.

2. Assessment methods:

Integrated assessment methods and tools will allow the candidate to demonstrate that she/ he has acquired knowledge of and can safely and effectively apply competence identified in this unit standard.

These tools may include the following:

- In-situ (on-the-job) observations
- Role-play simulations
- Structured group discussions
- Written reports (e.g. tests, exams, case studies, projects, registers, logbooks, workbooks)
- Verbal report backs (presentations)
- Portfolios of evidence
- Projects
- Experiential learning
- Working in teams
- Scenario sketching

These methods must be carefully selected based on the purpose of the assessment (For example, the written method of assessing knowledge or on-job demonstration of practical competence). The assessment must integrate a number of different methods in order to give the assessor reliable and valid proof of competence and evidence of required attitudes.

3. Notes to Assessors

Assessors should keep the following general principles in mind when designing and conducting assessments against this unit standard:

- Focus the assessment activities on gathering evidence in terms of the main outcome expressed in the title to ensure assessment is integrated rather than fragmented. Remember we want to declare the person competent in terms of the title. Where assessment at title level is unmanageable, then focus assessment around each specific outcome, or groups of specific outcomes.

- Make sure evidence is gathered across the entire range, wherever it applies. Assessment activities should be as close to the real performance as possible, and where simulations or role-plays are used, there should be supporting evidence to show the candidate is able to perform in the real situation.

- Do not focus the assessment activities on each assessment criterion. Ensure that the assessment activities focus on outcomes and are sufficient to enable evidence to be gathered around all the assessment criteria.

- The assessment criteria provide the specifications against which assessment judgments should be made. In most cases, knowledge can be inferred from the quality of the performances, but in other cases, knowledge and understanding will have to be tested through questioning techniques. Where this is required, there will be assessment criteria to specify the standard required.

- The task of the assessor is to gather sufficient evidence, of the prescribed type and quality, as specified in this unit standard, that the candidate can achieve the outcomes again and again and again. This means assessors will have to judge how many repeat performances are required before they believe the performance is reproducible.

- All assessments should be conducted in line with the following well documented principles of assessment: appropriateness, fairness, manageability, integration into work or learning, validity, direct, authentic, sufficient, systematic, open and consistent

TITLE: **Maintain and Repair Radio Frequency Antennae**

UNIT STANDARD ID:

FIELD: Manufacturing, Engineering and Technology

SUB-FIELD: Engineering and related design

LEVEL: 4

CREDITS: 3

ISSUE DATE

REVIEW DATE

PURPOSE OF THE UNIT STANDARD:

Learners credited with this Unit Standard are able to perform the maintenance and repair

of radio frequency antennae within the Telecommunications Industry.

A person credited with this unit standard will be able to:

- Prepare for the maintenance of radio frequency antennae

- Maintain radio frequency antennae

- Repair radio frequency antennae

- Conclude the maintenance of radio frequency antennae

This unit standard will contribute to the full development of any learner within the

Telecommunications Industry and more specifically in the radio frequency antennae

discipline by providing recognition, further mobility and transportability within the field.

The knowledge, skills and understanding demonstrated in this unit standard are

essential for social and economic transformation and upliftment within the

Telecommunications environment.

LEARNING ASSUMED TO BE IN PLACE:

The following knowledge, skills, attitude and/or equivalent on level 3:

- Communication and language.

- Applied mathematics.

- Principles of electronics and electricity.

- Recognition and use of general hand and power tools.

- Operation of test equipment.

RANGE STATEMENTS:

- The typical scope of this unit standard includes but is not limited to:

  - Preventative and corrective maintenance

  - Radio frequency antennae including parabolic dishes

- The context of this unit standard is performed within structures where stationery, transportation, support structure, communication media, employer's policies and procedures, cultural ethics, business ethics, work environment, professional conduct, test instrumentation, tools, human resources, customer, material, equipment, quality standards, SABS standards, and anti-static procedures are applicable.

Level (for level 4)

A learning programme leading to the award of this unit standard should develop learners who demonstrate:

(a)   A wide range of technical skills

(b)   An ability to use relevant test instruments and procedures

(c)   A broad knowledge that incorporates theoretical concepts

(d)   An ability to critically analyse test results

(e)   An ability to make judgements to new problems

(f)   An ability to work on their own with full responsibility

(g)   An ability to communicate and present information clearly and reliably following prescribed formats and conventions

(h)   An ability to maintain and repair radio frequency antennae

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific outcome 1:

Prepare for the maintenance of radio frequency antennae

Assessment criteria:

1.1 Work order and maintenance documentation is obtained in accordance with employer's policies and procedures.

1.2. Work order is explained and interpreted correctly.

1.3 All role players are consulted and all logistic arrangements are made.

1.4 Relevant material, equipment and tools are identified and obtained in accordance with work order.

1.5 Health and safety requirements are considered in accordance with statutory requirements and employer's policies and procedures.

1.6 Site inspection is conducted

1.7 Work effectively with the customer in order to ensure accurate and professional service delivery.

1.8 The reasons for selecting specific tools and equipment are explained and described.

Specific outcome 2:

Maintain radio frequency antennae

Assessment criteria:

2.1 A safe work area is established.

2.2 The transmission medium is removed from service where necessary.

2.3 Transmission medium is cleaned / cleared appropriately.

2.4 The purpose of preventative maintenance is explained

2.5 All relevant tests are completed according to manufacturer's specification and

company policies and procedures.

2.6 Procedures to achieve specification are explained

2.7 Equipment is adjusted according to manufacturer/employer's specification.

2.8 Health and safety requirements are applied in accordance with statutory

requirements and employer's policies and procedures.

Specific outcome 3:

Repair radio frequency antennae

Assessment criteria:

3.1 Test results are diagnosed and failures identified.

3.2 Fault finding techniques are explained.

3.3 Typical fault conditions are described.

3.4 Faults are located using the relevant test equipment.

3.5 Fault is repaired to manufacturer's specification and/or company policies and

procedures.

3.6 Health and safety requirements are applied in accordance with statutory

requirements and employer's policies and procedures.

Specific outcome 4:

Conclude the maintenance of radio frequency antennae

Assessment criteria:

4.1 Quality inspection / final test of work is carried out.

4.2 Transmission medium is returned to service correctly.

4.3 Relevant documentation is completed according to employer's policies and

procedures.

4.4 The site is restored to an acceptable condition.

4.5 The blueprint is updated to include any changes.

ACCREDITATION AND MODERATION OPTIONS:

1. Anyone assessing a learner against this unit standard, must be registered as an

assessor with the relevant ETQA

2. Any institution offering learning that will enable achievement of this unit standard must

be accredited as a provider through the relevant SETA/ETQA

3. Moderation of assessment will be overseen by the relevant ETQA according to the

moderation guidelines in the relevant qualification and the agreed ETQA procedures

NOTES:

1. CRITICAL CROSS-FIELD OUTCOMES:

The following critical cross-field outcomes are addressed in this unit standard:

1.1 Collect, evaluate, organise and critically evaluate information related to the

maintenance of radio frequency antennae so that these are accurately interpreted into

application performance standards.

1.2 Understand the world as a set of related systems in that the maintenance of radio frequency antennae is interrelated with the overall telecommunications.

1.3 Organize oneself and one's activities so that all requirements are met in achieving competence in the maintenance of radio frequency antennae.

1.4 Identify and solve problems related to the achievement of the maintenance of radio frequency antennae relevant competencies.

1.5 Work effectively with others as a member of a team when maintaining radio frequency antennae.

1.6 Communicate effectively when maintaining radio frequency antennae.

1.7 Being culturally sensitive across a range of social contexts when consulting customers.

2. ESSENTIAL EMBEDDED KNOWLEDGE:

2.1 Names, functions, locations of physical things, process, concepts

- Location of typical faults

- Tools and equipment related to the maintenance of radio frequency antennae

- Maintenance procedures

2.2 Sensory cues provided by environment

- Sensory indications for faults (sight, smell, sound, touch)

2.3 Process, events, causes and effects, implications

- Incorrect handling of faults conditions

- Implications of poorly aligned and malfunctioning test equipment and radio frequency antennae

- Problem solving and analytical thinking techniques

2.4 Procedures and techniques

- Alignment of test equipment

- Maintenance techniques

- Fault finding techniques

2.5 Regulations, legislation, agreements and policies and procedures

- Health and safety

- Company polices and procedures

2.6 Theory – rules, agreements and principles

- Types of faults

- Adjustment procedures

SUPPLEMENTARY INFORMATION:

1. Glossary of terms:

"As built" refers to the final product, which may differ from working drawing.

"Blueprint" refers to the master working drawing.

"Work order" refers to the verbal or written instruction given to initiate the work to be done.

"Fire block" refers to the intervention required to restrict the spread of fire.

2. Assessment methods:

Integrated assessment methods and tools will allow the candidate to demonstrate that she/ he has acquired knowledge of and can safely and effectively apply competence identified in this unit standard.

These tools may include the following:

- In-situ (on-the-job) observations

- Role-play simulations

- Structured group discussions

- Written reports (e.g. tests, exams, case studies, projects, registers, logbooks, workbooks)

- Verbal report backs (presentations)

- Portfolios of evidence

- Projects

- Experiential learning

- Working in teams

- Scenario sketching

These methods must be carefully selected based on the purpose of the assessment (For example, the written method of assessing knowledge or on-job demonstration of practical competence). The assessment must integrate a number of different methods in order to give the assessor reliable and valid proof of competence and evidence of required attitudes.

3. Notes to Assessors

Assessors should keep the following general principles in mind when designing and conducting assessments against this unit standard:

- Focus the assessment activities on gathering evidence in terms of the main outcome expressed in the title to ensure assessment is integrated rather than fragmented. Remember we want to declare the person competent in terms of the title. Where assessment at title level is unmanageable, then focus assessment around each specific outcome, or groups of specific outcomes.

- Make sure evidence is gathered across the entire range, wherever it applies. Assessment activities should be as close to the real performance as possible, and where simulations or role-plays are used, there should be supporting evidence to show the candidate is able to perform in the real situation.

- Do not focus the assessment activities on each assessment criterion. Ensure that the assessment activities focus on outcomes and are sufficient to enable evidence to be gathered around all the assessment criteria.

- The assessment criteria provide the specifications against which assessment judgements should be made. In most cases, knowledge can be inferred from the quality of the performances, but in other cases, knowledge and understanding will have to be tested through questioning techniques. Where this is required, there will be assessment criteria to specify the standard required.

- The task of the assessor is to gather sufficient evidence, of the prescribed type and quality, as specified in this unit standard, that the candidate can achieve the outcomes again and again and again. This means assessors will have to judge how many repeat performances are required before they believe the performance is reproducible.

- All assessments should be conducted in line with the following well documented principles of assessment: appropriateness, fairness, manageability, integration into work or learning, validity, direct, authentic, sufficient, systematic, open and consistent

TITLE: Install Telecommunication Equipment

UNIT STANDARD ID:

FIELD: Manufacturing, Engineering and Technology

SUB-FIELD: Engineering and related design

LEVEL: 4

CREDITS: 7

ISSUE DATE:

PURPOSE:

This unit standard is for persons in the field of install telecommunications equipment.

A person credited with this unit standard is capable of:

- Receiving instruction and/or specification for installation of element
- Arranging and obtaining resources and equipment and prepare site for installation
- Installing and connecting equipment
- Handing over completed installation

This unit standard will contribute to the full development of any learner within the telecommunications environment and more specifically within telecommunications technology disciplines by providing recognition, further mobility and transportability within the field. The knowledge, skills and understanding demonstrated in this unit standard are essential for social and economic transformation and upliftment in the telecommunications environment

LEARNING ASSUMED TO BE IN PLACE

The following knowledge, skills, attitude and/or equivalent is assumed to be in place:

- Telecommunications Technology systems related to this learners Core Specialization
- Computer application
- Communication skills

RANGE

<u>Context</u>

This unit standard is applicable to learners in transmission technology

Level (for level 4)

A learning programme leading to the award of the credit for this unit standard should develop learners who demonstrate:

(a)   An ability to acquire a wide range of technical skills

(b)   An ability to discuss a considerable choice of procedures

(c)   A broad knowledge that incorporates theoretical concepts

(d)   An ability to critically analyse information

(e)   An ability to make judgements to unknown problems

(f)   An ability to work on its own with complete responsibility

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific outcome 1

Receive instruction and/or specification for installation of element

Assessment criteria

1.1 Installation instructions and or specifications are read and understood

1.2 Instructions are interpreted correctly

1.3 Installation instructions are described and explained

Specific outcome 2

Arrange and obtain resources and equipment and prepare site for installation

Assessment criteria

2.1 Necessary resources and equipment are obtained for the installation

2.2 Site is prepared for installation

2.3 Activities are scheduled according to priorities

2.4 Sufficient and necessary preparatory work is done

2.5 Acquisition/procurement procedures are explained

2.6 Scheduling of activities are explained

2.7 Related regulations regarding installation of elements are described and explained

2.8 Relevant safety aspects related to the preparation of the site are described and explained

Specific outcome 3

Install and connect equipment

Assessment criteria

3.1 Equipment is connected and installed

3.2 Installation conform to instructions, specifications and standards

3.3 Correct tools are used

3.4 Related regulations are identified and described

3.5 Safety aspects are described

3.6 Use of installation tools is explained

3.7 Organizational policies and procedures regarding installation of elements are described and explained

3.8 Principles of electricity are described and explained

Specific outcome 4

Hand over completed installation

Assessment criteria

4.1 Relevant documentation is completed

4.2 Installation handed over in agreed time frames

4.3 Documentation is completed according to policies and procedures

4.4 Installation conforms according to safety

4.5 Policies and procedures related to hand over of installation are described and explained

ACCREDITATION PROCESS (including moderation):

Anyone assessing a learner against this unit standard, must be registered as an assessor with the relevant ETQA

Any institution offering learning that will enable achievement of this unit standard must be accredited in terms of the criteria laid down by the relevant ETQA.

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

NOTES

1. CRITICAL CROSS FIELD OUTCOMES

1.1 Identify and solve problems in a critical and creative way when installing network elements

1.2 Work effectively with others as a member of a team in installing network elements

1.3 Organize and manage oneself and one's personal activities responsibly and effectively.

1.4 Collect, analyze, organize and critically evaluate information relevant to installing network elements

1.5 Communicate effectively when installing network elements

2. EMBEDDED KNOWLEDGE

- Telecommunications Technology systems related to this learners Core Specialization
- Safety aspects
- Use of installation tools
- Teamwork
- Scheduling of activities
- Time management
- Procurement procedures
- Organizational policies and procedures regarding installation of elements
- Related regulations regarding installation of elements
- Principles of electricity

SUPPLEMENTARY INFORMATION

The standard describes competent performance in installing network elements, and lays down the criteria by which competence should be judged, as well as the range of circumstances in which competence should be demonstrated.

Integrated assessment methods and tools will allow the candidate to demonstrate that she/ he has acquired knowledge of and can safely and effectively apply competence identified in this unit standard.

These tools include the following:
- In-situ (on-the-job) observations
- Role-play simulations

- Structured group discussions
- Written reports (e.g. tests, exams, case studies, projects, registers, logbooks, workbooks)
- Verbal report backs (presentations)
- Portfolios of evidence
- Projects (physical visits to Government Departments)
- Experiential learning
- Working in teams
- Scenario sketching

These methods must be carefully selected based on the purpose of the assessment (For example, the written method of assessing knowledge or on-job demonstration of practical competence). The assessment must integrate a number of different methods in order to give the assessor reliable and valid proof of competence and evidence of required attitudes.

Candidates are assessed against these assessment criteria. An assessor observes currently employed candidates carrying out their normal work duties. They may also be asked to carry out simulated tasks and to answer written and/or oral questions. Candidates studying towards a Unit Standard, and who are not currently employed, will also be assessed using variety of assessment tools.

TITLE: **Install indoor Radio Frequency Antennae (Microcells)**

UNIT STANDARD:

FIELD: Manufacturing, Engineering and Technology

SUB-FIELD: Engineering and related design

LEVEL: 4

CREDITS: 3

ISSUE DATE

REVIEW DATE

PURPOSE OF THE UNIT STANDARD:

Learners credited with this Unit Standard are able to perform the installation of domestic radio frequency antennae within the Telecommunications Industry.

A person credited with this unit standard will be able to:

- Prepare for the installation of domestic radio frequency antennae

- Install domestic radio frequency antennae

- Align domestic radio frequency antennae

- Conclude the installation of domestic radio frequency antennae

This unit standard will contribute to the full development of any learner within the Telecommunications Industry and more specifically in the transmission mediums discipline by providing recognition, further mobility and transportability within the field. The knowledge, skills and understanding demonstrated in this unit standard are essential for social and economic transformation and upliftment within the Telecommunications environment.

LEARNING ASSUMED TO BE IN PLACE:

The following knowledge, skills, attitude and/or equivalent on level 2:

- Communication and Language.

- Mathematics.

- Life Sciences.

- Recognition and use of general hand and power tools.

RANGE STATEMENTS:

- The typical scope of this unit standard includes but is not limited to:
  - Radio frequency antennae including parabolic dishes
- The context of this unit standard is performed within structures where stationery, transportation, support structure, communication media, employer's policies and procedures, cultural ethics, business ethics, work environment, professional conduct, test instrumentation, tools, human resources, customer, material, equipment, quality standards, SABS standards, and anti-static procedures are applicable.

Level (for level 4)

A learning programme leading to the award of this unit standard should develop learners who demonstrate:

(a)   A foundational knowledge of jointing techniques

(b)   An understanding of the discipline/field's fundamental rules, concepts and principles

(c)   Familiarity with the essential procedures, operations and techniques of this field

(d)   An ability to use a range of procedures to solve routine problems

(e)   An ability to communicate and present information clearly and reliably following prescribed formats and conventions

(f)   Has an understanding of jointing terms

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific outcome 1:

Prepare for the installation of domestic radio frequency antennae

Assessment criteria:

1.1 Work order and installation documentation is obtained in accordance with employer's policies and procedures.

1.2 Work order and site location is interpreted correctly.

1.3 All role players are consulted and all logistic arrangements are made.

1.4 Relevant material, equipment and tools are identified and obtained in accordance with work order.

1.5 Health and safety requirements are considered in accordance with statutory requirements and employer's policies and procedures.

1.6 Site inspection is conducted.

1.7 Work effectively with the customer in order to ensure accurate and professional service delivery.

1.8 The reasons for selecting specific tools and equipment are explained and described.

Specific outcome 2:

Install domestic radio frequency antennae

Assessment criteria:

2.1 A safe work area is established.

2.2 Equipment is positioned according to the work instruction, considering local conditions.

2.3 Installation problems are identified and strategies are developed to overcome them.

2.4 Integrity of the supporting structure is taken into consideration.

2.5 Equipment is fastened according to manufacturer / employer's specifications.

2.6 Health and safety requirements are applied in accordance with statutory requirements and employer's policies and procedures.

Specific outcome 3:

Align domestic radio frequency antennae

Assessment criteria:

3.1 Initial equipment alignment of Azimuth (panning) and elevation (tilting) is conducted correctly.

3.2 Equipment is electrically grounded in accordance with the existing national standard.

3.3 Equipment is weatherproofed according to manufacturer / employer's specifications.

3.4 Final equipment alignment of Azimuth and elevation is conducted.

3.5 Final tuning is conducted.

3.6 Health and safety requirements are applied in accordance with statutory requirements and employer's policies and procedures.

Specific outcome 4:

Conclude the installation of domestic radio frequency antennae

Assessment criteria:

4.1 Quality inspection of work is carried out.

4.2 The site is restored to an acceptable condition.

4.3 Documentation is completed

4.4 Installation, fastening and alignment methods are explained and described

ACCREDITATION AND MODERATION OPTIONS:

1. Anyone assessing a learner against this unit standard, must be registered as an assessor with the relevant ETQA

2. Any institution offering learning that will enable achievement of this unit standard must be accredited as a provider through the relevant SETA/ETQA

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

NOTES:

1. CRITICAL CROSS-FIELD OUTCOMES:

The following critical cross-field outcomes are addressed in this unit standard:

1.1 Collect, evaluate, organise and critically evaluate information related to the installation of domestic radio frequency antennae so that these are accurately interpreted into application performance standards.

1.2 Understand the world as a set of related systems in that the installation of domestic radio frequency antennae is interrelated with the overall telecommunication industry.

1.3 Organise oneself and one's activities so that all requirements are met in achieving competence in the installation of domestic radio frequency antennae.

1.4 Identify and solve problems related to the achievement of the installation of domestic radio frequency antennae relevant competencies.

1.5 Work effectively with others as a member of a team when installing of domestic radio frequency antennae.

1.6 Communicate effectively when installing of domestic radio frequency antennae.

1.7 Being culturally sensitive across a range of social contexts when consulting customers.

2. ESSENTIAL EMBEDDED KNOWLEDGE:

2.1 Names, functions, locations of physical things, process, concepts

- Demonstrate an understanding of product facilities and operations.
- Interpretation of work order and liaising with role-players

- Reach agreement with role-players through negotiation
- Installation, fastening and alignment methods

2.2 Process, events, causes and effects, implications

- Apply decision-making and problem solving skills before and during installations

2.3 Procedures and techniques

- Compile documentation when preparing and conducting installations
- Follow employer's policies and procedures
- Processing of engineering material during installations
- Demonstrate an understanding of the correct use of tools

2.4 Regulations, legislation, agreements and policies and procedures

- Organizational policies and procedures

2.5 Regulations, agreements, legislation

- Health and safety related to the installation of outdoor metallic cables

2.6 Theory – rules, agreements and principles

- Apply low current electrical principles during installations
- Apply decision-making procedures during installation

SUPPLEMENTARY INFORMATION:

1. Glossary of terms:

"As built" refers to the final product, which may differ from working drawing.

"Blueprint" refers to the master working drawing.

"Work order" refers to the verbal or written instruction given to initiate the work to be done.

"Fire block" refers to the intervention required to restrict the spread of fire.

2. Assessment methods:

Integrated assessment methods and tools will allow the candidate to demonstrate that she/ he has acquired knowledge of and can safely and effectively apply competence identified in this unit standard.

These tools may include the following:

- In-situ (on-the-job) observations
- Role-play simulations

- Structured group discussions
- Written reports (e.g. tests, exams, case studies, projects, registers, logbooks, workbooks)
- Verbal report backs (presentations)
- Portfolios of evidence
- Projects
- Experiential learning
- Working in teams
- Scenario sketching

These methods must be carefully selected based on the purpose of the assessment (For example, the written method of assessing knowledge or on-job demonstration of practical competence). The assessment must integrate a number of different methods in order to give the assessor reliable and valid proof of competence and evidence of required attitudes.

3. Notes to Assessors

Assessors should keep the following general principles in mind when designing and conducting assessments against this unit standard:

- Focus the assessment activities on gathering evidence in terms of the main outcome expressed in the title to ensure assessment is integrated rather than fragmented. Remember we want to declare the person competent in terms of the title. Where assessment at title level is unmanageable, then focus assessment around each specific outcome, or groups of specific outcomes.
- Make sure evidence is gathered across the entire range, wherever it applies. Assessment activities should be as close to the real performance as possible, and where simulations or role-plays are used, there should be supporting evidence to show the candidate is able to perform in the real situation.
- Do not focus the assessment activities on each assessment criterion. Ensure that the assessment activities focus on outcomes and are sufficient to enable evidence to be gathered around all the assessment criteria.
- The assessment criteria provide the specifications against which assessment judgements should be made. In most cases, knowledge can be inferred from the quality of the performances, but in other cases, knowledge and understanding will

have to be tested through questioning techniques. Where this is required, there will be assessment criteria to specify the standard required.

- The task of the assessor is to gather sufficient evidence, of the prescribed type and quality, as specified in this unit standard, that the candidate can achieve the outcomes again and again and again. This means assessors will have to judge how many repeat performances are required before they believe the performance is reproducible.

- All assessments should be conducted in line with the following well documented principles of assessment: appropriateness, fairness, manageability, integration into work or learning, validity, direct, authentic, sufficient, systematic, open and consistent

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

SOUTH
AFRICAN
QUALIFICATIONS
AUTHORITY

NATIONAL QUALIFICATIONS FRAMEWORK

Established in terms of Act 58 of 1995

National Diploma In Telecommunications Technology: NQF Level 5

1. Field: Manufacturing, Engineering and Technology

2. Sub-Field: Manufacturing and Assembly

3. Level: 5

4 Credit: 273

5. Issue date:

6. Review date:

7. RATIONALE FOR THE QUALIFICATION

This qualification reflects the workplace-based needs of the Telecommunications Industry as expressed by stakeholders. This qualification provides the learner with accessibility to be employed within the Telecommunications Industry. The qualification also provides the learner with flexibility to articulate in the Telecommunications environment with a wide variety of specialisation options and articulation within the Telecommunications Industry, Information Technology and Electronic Industry.

The level of flexibility within the range of electives will allow the individual to pursue a career as a specialist and maintainer of Telecommunications Equipment. The competencies achieved from the electives will serve as foundational knowledge and skills relevant to other disciplines.

The National Diploma in Telecommunications Technology: NQF Level 5 will provide recognition for prior learning. There are no registered qualifications for the Telecommunications industry on NQF level 4. Telecommunication equipment is installed, maintained and upgraded on a daily basis but training is currently not provided against nationally recognised qualifications.

The qualification will promote portability and accessibility within the Telecommunications, Electronic and Information Technology environment.

• Qualifying learners are capable of installing, maintaining and supporting telecommunications equipment. This will allow the learner to provide a more effective service that will improve customer service.

This qualification will contribute towards the transformation within telecommunications industry This will attract quality people and allows for the aspiration of people to be part of the industry. The recognition of prior learning policies will formalize informal and non-formal learning and learners will be able to obtain a national qualification. This will improve the level of participation of employees in the industry.

PURPOSE.

This qualification will allow a learner in the telecommunications industry to obtain a nationally recognized qualification in and for commissioning, upgrading, maintaining and supporting telecommunication equipment. It will also contribute to the upliftment of the telecommunications industry and will set a standard for professionalism in the industry. This will also assist in improving relationships between employer and employees. The obtainment of this qualification will also attract and retain quality learners and employees. This qualification will also provide for recognition of prior learning to allow for the recognition of existing and common knowledge and skills that will not only allow a learner to gain credits towards this qualification, but also to move across the different occupational areas.

A person acquiring this qualification will have skills, knowledge and experience to:

• Demonstrate familiarity with specific knowledge in the installation of telecommunication equipment

• Demonstrate familiarity with specific knowledge in the testing of telecommunication equipment

• Demonstrate familiarity with specific knowledge in commissioning of telecommunication equipment

• Demonstrate familiarity with specific knowledge in maintenance of telecommunication equipment

• Communicate with peers, customers and members of supervisory/management levels by demonstrating the ability to summarise information and express opinions on given information in verbal and/or written form

● Explore broader competencies required for planning, designing and/or supervising the construction and upgrading of telecommunication equipment

LEVEL, CREDITS AND LEARNING COMPONENTS ASSIGNED TO THE QUALIFICATION:

This qualification is made up of a planned combination of learning outcomes that have a defined purpose and will provide the qualifying learners with applied competence and a basis for further learning. It is a building block for the National Certificate in Telecommunications Technology: NQF Level 5. The qualification is made up of unit standards that are classified as Fundamental, Core and Electives for the purpose of this qualification.

A minimum of 136 credits is required to complete the qualification. In this qualification, credits are allocated as follows:

Fundamental	46 credits
Core	176 credits
Electives	51 credits
TOTAL	**273 Credits**

ACCESS TO THE QUALIFICATION.

There is access to this qualification to all learners except those who are blind, have physical disabilities, suffer from colour blindness and fear of heights or confined spaces.

LEARNING ASSUMED TO BE IN PLACE.

It is assumed that the learners entering this qualification have achieved the National Certificate in Telecommunications Technology: NQF Level 4.
 Or
Learners are assumed to be competent in communication and mathematical literacy at NQF Level 4. Such learners must have end user computing, tools handling, wiring and soldering techniques and customer service for the purpose of this qualification.

EXIT LEVEL OUTCOMES.

The outcomes are specified in terms of a combination of specific and critical cross-field outcomes as defined in the different unit standards. On achieving this qualification, a learner is able to:

Government Gazette

PART 3 OF 4

AIDS HELPLINE: 0800-0123-22 Prevention is the cure

ELO 1: Apply knowledge of mathematics and basic sciences from first principles to solve problems related to the commissioning, maintaining, supporting and upgrading of telecommunications equipment/systems.

ASSESSMENT CRITERIA:

- *Components/products/processes/systems are tested and measured in a laboratory/workplace according to prescribed methodology and properties and specifications are recorded.*

- *Components, products, systems and processes are analysed in a telecommunications environment*

- *Basic science, mathematical, engineering and telecommunications concepts, techniques and principles to solve practical problems during commissioning, supporting and upgrading of telecommunications equipment are applied*

- *Commissioning, maintaining, support and upgrading of resources, processes are described and performed*

ELO 2: Apply engineering principles to systematically diagnose and solve well defined engineering problems when encountered during commissioning, maintaining, supporting and upgrading Telecommunications equipment/systems.

Associated Assessment Criteria

- A well-defined telecommunications problem is identified and measured with clear description.

- Information relating to the telecommunication problem is gathered using appropriate data collection methods

- Relevant information is presented in a methodical and logical format comprehensible to peers/co-workers and team leaders.

- Sound engineering judgement in the synthesis of potential solutions to the engineering problem is applied

- The potential solutions for technical, economic and operational feasibility are tested and the preferred solution in a logical and methodical manner is articulated

ELO 3: Communicate technical, supervisory information effectively, both orally and in writing, using appropriate language structure, style and graphical support.

Associated Assessment Criteria

- Appropriate data and information is generated and assembled using available resources

- Technical data and categories to organise information pertaining to the documents are created and selected

- Graphical tools within selected software packages are used to produce a graphical presentation of the data.

- A computer to process, produce and present a technical report using Word Processing and Presentation software is used.

ELO 4: Commission, maintain, support and upgrade Telecommunications equipment/systems.

- Commissioning of telecommunications equipment is planned according to employer's policies and procedures, job requirements, equipment specifications and the site process.

  - Resources are identified and obtained, validated and controlled according to job requirements and employer's policies and procedures.

- Operation of complex test equipment is planned and prepared according to job requirements, to employer's policies and procedures, manufacturer specifications and job specifications.

- Quality testing and inspection is planned and prepared according to job, site and equipment specifications and employer's policies and procedures.

- Hand over is planned and prepared, executed and concluded according to employer's policies and procedures, customer and job requirements and job instruction.

- Maintenance of telecommunication equipment is planned and prepared, conducted and concluded according to employer's policies and procedures, customer needs and requirements and health & safety regulations.

- PC based programme installation and upgrade is planned and prepared according to employer's policies and procedures, work instructions, manufacturer and equipment specifications, job, customer and software requirements.

International Comparability

The following facets were the focus of international (and national) benchmarking, which occurred continually throughout the Project:

- The standards writing approach

- Contents of the standards themselves

- Appropriateness of the chosen standard format

- The type of unit standards developed by the Telecommunications Industry within countries like Australia and New Zealand. The unit standard titles are similar but the content of the standard is different because of the business culture in the South African Telecommunications Industry.

Standards and qualifications that have been used for benchmarking thus far:

- Australia and New Zealand's qualifications and standards.

- German Qualifications

    o Telecommunications Technician (Tack 2)

    o Degree in Telecommunications (Tack 3)

Integrated Assessment

The practical, applied, foundational and reflective competencies demonstrated for the group of unit standards in this qualification must proof that the whole competence is more than the sum of the parts of the competencies.

Oral or written questioning regarding the reflective competencies within the qualification is essential. If the identifying and solving of problems, team work, organising one-self, the using of applied science, the implication of actions and reactions in the world as a set of related systems are not clear from the observation through a method of oral or written questioning, a case study can also be used to determine the person's development and integration of applied knowledge and skills.

The preparation, planning, conducting and concluding telecommunications related installations, maintenance, planning & design, and quality assurance can be assessed in one application.

Applicable assessments tool(s) must be used by establish the foundational, reflective and embedded knowledge to problem solving and application of the world as a set of related systems within the Telecommunications environment.

A detailed portfolio of evidence is required to proof the practical, applied and foundational competencies of the learner.

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

Unit standards in the qualification must be used to assess specific and critical cross-field outcomes. During integrated assessments the assessor should make use of formative and summative assessment methods and should assess combinations of practical, applied, foundational and reflective competencies.

Recognition of prior learning

This qualification may be achieved in part of whole through the recognition of prior learning which includes formal, informal and non-formal learning and work

experience. RPL will be conducted according to the guidelines and policies as stipulated by SAQA and the relevant ETQA.

Articulation possibilities

The qualification allows for both horizontal (persons with the qualification at the same or higher level can pursue this qualification for career orientation) and vertical (persons completing this qualification can proceed to a relevant NQF 6 Telecommunications qualifications) articulation.

- Degree in telecommunications Technology (NQF 6, under construction)

Moderation Options

Moderation must include internal and external moderation of assessments. Internal and external moderation systems must ensure that all assessors produce assessments that are credible, fair, reliable and practicable.

Internal and external moderation systems must provide learning opportunities that are transparent, affordable and enhancing development in the field and sub-field of the Framework.

The accredited provider with the relevant ETQA must be able to provide internal moderation.

External moderation will be done by the relevant ETQA according to the particular ETQA's policies and guidelines (now in process to be developed and finalised at the different ETQA's) for assessment and moderation.

Criteria for registration of assessors

The assessor must have completed:

- A similar qualification, which is one level above the qualification or
- A similar qualification at the level with a minimum of 12 months field experience after he/she has completed the qualification
- The subject matter expertise of the assessor can be established by recognition of prior learning

Assessors need to be registered with the relevant ETQA.

Notes to Assessors:

Assessors should keep the following general principles in mind when designing and conducting assessments against unit standards:

- Assessment activities should focus on gathering evidence in terms of the main outcome expressed in the title to ensure assessment is integrated rather than fragmented. Remember we want to declare the person competent in terms of the title. Where assessment at title level is unmanageable, then assessment should be focused around each specific outcome, or groups of specific outcomes.

- Ensure evidence is gathered across the entire range, wherever it applies. Assessment activities should be as close to the real performance as possible, and where simulations or role-plays are used, there should be supporting evidence to show the candidate is able to perform in the real situation.

- Do not focus the assessment activities on each assessment criterion. Ensure that the assessment activities focus on outcomes and are sufficient to enable evidence to be gathered around all the assessment criteria.

- The assessment criteria provide the specifications against which assessment judgements should be made. In most cases, knowledge can be inferred from the quality of the performances, but in other cases, knowledge and understanding will have to be tested through questioning techniques. Where this is required, there will be assessment criteria to specify the standard required.

- The task of the assessor is to gather sufficient evidence, of the prescribed type of quality, as specified in this unit standard, in order for the candidate to achieve the outcomes again and again and again. This means assessors will have to judge how many repeat performances are required before they are confident that the performance is reproducible.

- Assessment should be conducted in line with the following well documented principles of assessment appropriateness, fairness, manageability, integration into work or learning, validity, direct, authentic, sufficient, systematic, open and consistent.

CONSISTENCY OF EXIT LEVEL OUTCOMES WITH CRITICAL CROSSFIELD OUTCOMES

SAQA Critical Cross-Field Outcomes	Equivalent Exit Level Outcome
Identifying and solving problems in which responses display that responsible decisions using critical thinking have been made.	ELO 2
Working effectively with others as a member of a team, group, organization and community.	ELO 3
Organising and managing oneself and one's activities responsibly and effectively	ELO 4
Collecting, analysing, organizing and critically evaluating information.	ELO 1
Communicating effectively using visual, mathematical and/or language skills	ELO 1
Using science and technology effectively and critically, showing responsibility toward the environment and health of others	ELO 2
Demonstrating an understanding of the world as a set of related systems by recognizing that problem contexts do not exist in isolation	ELO 4
Contributing to the full personal development of each learner and the social and economic development of society at large, by making it an underlying intention	

of the programme of learning to make an individual aware of:	
• reflecting on and exploring a variety of strategies to learn more effectively	ELO 3
• participating as responsible citizens in the life of local, national and global communities	ELO 4
• being culturally and aesthetically sensitive across a range of contexts	ELO 2,3
• exploring education and career opportunities	ELO 4
• Developing entrepreneurial opportunities	ELO 4

Rules of combination

● All fundamental unit standards are compulsory (45 Credits)

● All Core unit standards are compulsory (156 Credits)

● The given selection of Elective unit standards (40 Credits) must be completed within a specific telecommunications domain. A choice can be made between the following domains:

● Mobile communications

● Fixed networks

● Intelligent networks

● Data networks

● Customer premises equipment

● Transmission equipment (Radio and Fibre)

● Broadcast communications

The level assigned to this qualification is appropriate, as the process requires:

● A basic knowledge of some main areas of a discipline/field

● A basic understanding of a discipline/field's key terms, rules, concepts, principles and theories

● Familiarity with some of the essential methods, procedures and techniques of the discipline/field

● An ability to use the above to solve routine problems within given frameworks

● Basic information gathering, analysis and presentation skills

- An ability to communicate information reliably and accurately in the required medium of instruction.

This qualification will enable the qualifying learner to articulate to other Telecommunication domains at NQF level 5 and will allow progress to the Bachelor Degree in Telecommunications (NQF6).

The qualification consists of fundamental, core and elective components

Fundamental

A learner must achieve or demonstrate his/her competence in the field of Communication Studies and Language (10 credits), Science & Mathematics (30 credits), and computer literacy (5 credits).

Core & Elective

The unit standards reflect the skills and competencies needed in order to be transportable in the Telecommunication environment.

The following embedded knowledge is applicable to this qualification:

- Apply oral and written communication when liaison with the industry.

- Complete documentation when preparing and conducting work within the industry.

- Apply decision-making and problem solving skills before and during work performed within the industry.

- Demonstrate understanding of product facilities and operations within the industry.

- Follow the industry's employer's policies and procedures.

- Reach agreement with the industry through negotiation.

- Facilitate co-operation between industry role-players.

- Apply light current electrical principles when work is performed within the industry.

- Apply faultfinding procedures when work is performed within the industry.

- Utilise test equipment when work is performed within the industry.

- Demonstrate understanding of the correct use of tools when work is performed within the industry.

- Demonstrate computer literacy when work is performed within the industry.

- Apply project management skills

- Demonstrate understanding of the correct use of complex test equipment

- Demonstrate the understanding of complex Telecommunication Equipment

- Demonstrate the understanding of complex software

In the core component of the qualification a learner must achieve or demonstrate his/her competence in the156 credits within the core group of unit standards.

The elective component of the qualification enables the person to pursue a learning path with interests of his/her own that can contribute to other learning pathways, such as the Bachelor Degree in Telecommunications.

An average learner currently takes 2400 notional hours in order to achieve the learning outcomes as described within the core and elective group of the unit standard.

National Diploma in Telecommunications Technology: NQF Level 5

Classification		Level	Credits	Total
Fundamental	Communication & Language Skills	5	10	
	Mathematics	5	20	
	Engineering Science	5	10	
	Sub Total			40
Core	Electrical Principles	5	10	
	Electronic Fundamentals	5	20	
	Radio/ Communication Fundamentals	5	30	
	Digital Electronic Fundamentals	5	30	
	Software Programming	5	20	
	Data Networking Principles	5	5	
	Use and care of hand tools	3	3	
	Use and care of power tools	3	3	
	Soldering Techniques	3	5	
	Wiring Techniques	3	5	
	Apply Fault Finding Techniques	4	3	
	Operate a personal computer system	3	6	
	Demonstrate the ability to use the world wide web	3	3	
	Demonstrate the ability to use electronic mail software to send and receive mail	3	3	
	Demonstrate knowledge of and produce computer spreadsheets using basic functions	3	3	
	Demonstrate knowledge of and produce word processing documents	3	3	
	Demonstrate an Understanding of Hardware Components for Personal Computers or Hand-held Computers	4	7	
	Repair a Personal Computer or Hand-held Computer to module level	4	12	
	Install system software and applications software for a Personal Computer or Hand-held Computer	4	5	
	Ensure customer satisfaction and competitive practice	3	2	
	Manage Time and the network process in a business environment	3	4	
	Subtotal			**182**

Elective			
Perform Functional test on Telecommunications Equipment	5	3	
Configure and Administer a Data Base	5	6	
Commission electronic telecommunications products and services	5	7	
Perform Software and Hardware Upgrades	5	4	
Perform Maintenance on Telecommunications Equipment	5	6	
Analyse Complex Network Failures and Performances	5	12	
Inspect, Repair and Restore Faulty Hardware & Software Failures	5	6	
Perform an Acceptance test on new equipment and sign off	5	3	
Handover of Telecommunications Equipment	3	2	
Organise Resources	5	2	
Subtotal			**51**

Rules of Combination
- All fundamental unit standards are compulsory
- All core unit standards are compulsory
- A selection of Elective unit standards

Note: The unit standards in **bold**, are Technikon unit standards, they will be generated as soon as the Technikons have completed their mergers.

TITLE: **Apply analytical fault finding techniques**

UNIT STANDARD ID:

LEVEL: 4

CREDITS: 3

FIELD: Manufacturing, Engineering and Technology

SUB-FIELD: Engineering and related design

ISSUE DATE

REVIEW DATE

PURPOSE OF THE UNIT STANDARD:

Learners credited with this Unit Standard are able to understand the basics concepts how to analyse faults

A person credited with this unit standard will be able to:

* Able to identify faults in a generic environment
* Able to describe faults
* Able to analyze faults
* Able to find solutions to a problem so that they do not recur.

This unit standard will contribute to the full development of any learner within the Telecommunications Industry and more specifically in the Installation medium discipline by providing recognition, further mobility and transportability within the field.

LEARNING ASSUMED TO BE IN PLACE:

The following knowledge, skills, attitude and/or equivalent on level 2:

* Communication and Language.
* Be able to work in groups and have a questioning skills

RANGE STATEMENTS:

* The typical scope of this unit standard includes but is not limited to:
    * Case studies
    * Practical assignments
    * Electronic and Electrical problem solving

- The context of this unit standard is performed within structures where stationery, support structure, electronics media, employer's policies and procedures, cultural ethics, business ethics, work environment, professional conduct, test instrumentation, tools, human resources, customer, material, equipment, quality standards, SABS standards, and anti-static procedures are applicable.

Level (for level 4)

A learning programme leading to the award of this unit standard should develop learners who demonstrate:

(a)   An understanding of the discipline/field's fundamental rules, concepts and principles

(b)   Familiarity with the essential procedures, operations and techniques of this field

(c)   An ability to use a range of procedures to solve routine problems

(d)   An ability to communicate and present information clearly and reliably following prescribed formats and conventions

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific outcome 1:

Objective of trouble shooting

Assessment criteria:

1.1 Analyze a complex situation

1.2 List the problems

1.3 Separate the problems

1.4 Prioritize the problems

1.5 Define an action plan

Specific outcome 2:

Able to priorities generic faults from least importance to high priority

Assessment criteria:

2.1 Define the problems/faults that needs to be repaired first

2.2 Use of documentation

2.3. Define the cause of the problem

2.4. Repair the problem/fault

Specific outcome 3:

Able find a solution to prevent future faults from reoccurring

Assessment criteria:

3.1 Effective use of equipment

3.2. Ensure that the problem/fault will not reoccur

3.3. Ensure proper completion of work carried out

ACCREDITATION AND MODERATION OPTIONS:

1. Anyone assessing a learner against this unit standard, must be registered as an assessor with the relevant ETQA

2. Any institution offering learning that will enable achievement of this unit standard must be accredited as a provider through the relevant SETA/ETQA

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

NOTES:

1. CRITICAL CROSS-FIELD OUTCOMES:

The following critical cross-field outcomes are addressed in this unit standard:

1.1 Understand the basic concepts used in different manufacturers in electronic .

1.2 Able to design specific controllers with added hardware.

1.3 Organize oneself and one's activities so that all requirements are met in achieving competence in the workplace.

1.4 Identify and solve problems related to the scenario at hand

1.5 Work effectively with others as a member of a team.

1.6 Communicate effectively and using the correct jargon in the repairs environment

1.7 Being culturally sensitive across a range of social contexts when consulting engineers and customers.

2. ESSENTIAL EMBEDDED KNOWLEDGE:

2.1 Names, functions, locations of physical things, process, concepts

- Understanding of subject matter
- Use of tools
- Use of equipment
- Use of manuals

SUPPLEMENTARY INFORMATION:

1. Assessment methods:

Integrated assessment methods and tools will allow the candidate to demonstrate that she/ he has acquired knowledge of and can safely and effectively apply competence identified in this unit standard.

These tools may include the following:

- In-situ (on-the-job) observations
- Role-play simulations
- Structured group discussions
- Written reports (e.g. tests, exams, case studies, projects, registers, logbooks, workbooks)
- Verbal report backs (presentations)
- Portfolios of evidence
- Projects
- Experiential learning
- Working in teams
- Scenario sketching

These methods must be carefully selected based on the purpose of the assessment (For example, the written method of assessing knowledge or on-job demonstration of practical competence). The assessment must integrate a number of different methods in order to give the assessor reliable and valid proof of competence and evidence of required attitudes.

3. Notes to Assessors

Assessors should keep the following general principles in mind when designing and conducting assessments against this unit standard:

- Focus the assessment activities on gathering evidence in terms of the main outcome expressed in the title to ensure assessment is integrated rather than fragmented. Remember we want to declare the person competent in terms of the title. Where assessment at title level is unmanageable, then focus assessment around each specific outcome, or groups of specific outcomes.
- Make sure evidence is gathered across the entire range, wherever it applies. Assessment activities should be as close to the real performance as possible, and

where simulations or role-plays are used, there should be supporting evidence to show the candidate is able to perform in the real situation.

- Do not focus the assessment activities on each assessment criterion. Ensure that the assessment activities focus on outcomes and are sufficient to enable evidence to be gathered around all the assessment criteria.

- The assessment criteria provide the specifications against which assessment judgements should be made. In most cases, knowledge can be inferred from the quality of the performances, but in other cases, knowledge and understanding will have to be tested through questioning techniques. Where this is required, there will be assessment criteria to specify the standard required.

- The task of the assessor is to gather sufficient evidence, of the prescribed type and quality, as specified in this unit standard, that the candidate can achieve the outcomes again and again and again. This means assessors will have to judge how many repeat performances are required before they believe the performance is reproducible.

- All assessments should be conducted in line with the following well documented principles of assessment: appropriateness, fairness, manageability, integration into work or learning, validity, direct, authentic, sufficient, systematic, open and consistent

TITLE: **Soldering Techniques**

UNIT STANDARD ID:

LEVEL: 3

CREDITS: 5

Field: Manufacturing, Engineering and Technology

SUB-FIELD: Engineering and related design

ISSUE DATE:

REVIEW DATE

PURPOSE OF THE UNIT STANDARD:

Learners credited with this Unit Standard are able to solder & de-solder conventional components and surface mount devices on vero board and printed circuit boards.

A learner credited with this unit standard will be able to:

- Prepare for soldering of electronic components (conventional and SMD)

- Identify & maintain soldering equipment & components

- Be able to de-solder using different techniques

- Evaluate solder joints

- Conclude soldering tasks

This unit standard will partially contribute to the full development of any learner within the Telecommunications & Electronic Industry and more specifically in the manufacturing environment.

LEARNING ASSUMED TO BE IN PLACE:

The following knowledge, skills, attitude and/or equivalent on level 2:

- Identify electronic components.

- Life Sciences.

- Recognition and use of general hand tools.

RANGE STATEMENTS:

- The typical scope of this unit standard includes but is not limited to:

  - Electronic components

  - Standard soldering equipment

  - Printed circuit boards and vero boards

• Work bench soldering & de-soldering

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific outcome 1:

Select equipment material and method for task at hand

Assessment criteria:

1.1 Appropriate method is selected for task

1.2 Solder tip is correctly selected

1.3 Type/thickness of solder wire.

1.4 Correct hand tools are selected.

1.5 Select correct cleaning materials and fluids

1.6 Correct antistatic measures taken

Specific outcome 2:

Apply solder techniques

Assessment criteria:

2.1 Interpret component placement diagram

2.2 Pre-forming of conventional components

2.3 Check for the correct placement and orientation of components

2.4 Evaluate solder joint according to applicable quality standard

2.5 Ensure joints are electrically and mechanically secured

Specific outcome 3:

Apply de-soldering techniques

Assessment criteria:

3.1 Interpret component placement diagram

3.2 Correct de-soldering method for the task at hand.

3.3 Correct tools and equipment in conjunction with method selected.

3.4 Cleaning and preparation of soldering joint.

Specific outcome 4:

Quality and Completion of task

Assessment criteria:

4.1 Quality check as per customer specifications

4.2 Cleaning of work bench.

4.3 Correct storing of equipment, cleaning fluids and materials.

ACCREDITATION AND MODERATION OPTIONS:

1. Anyone assessing a learner against this unit standard, must be registered as an assessor with the relevant ETQA

2. Any institution offering learning that will enable achievement of this unit standard must be accredited as a provider through the relevant SETA/ETQA

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

NOTES:

1. CRITICAL CROSS-FIELD OUTCOMES:

The following critical cross-field outcomes are addressed in this unit standard:

1.1 Collect, evaluate, organise and critically evaluate information related to the termination of telecommunication cables so that these are accurately interpreted into application performance standards.

1.2 Understand the world as a set of related systems in that the termination of telecommunication cables does not exist in isolation.

1.3 Organize oneself and one's activities so that all requirements are met in achieving competence in the termination of telecommunication cables.

1.4 Identify and solve problems related to the achievement of the termination of telecommunication cables relevant competencies.

1.5 Work effectively with others as a member of a team when terminating of telecommunication cables.

1.6 Communicate effectively when terminating of telecommunication cables.

1.7 Being culturally sensitive across a range of social contexts when consulting customers.

2. ESSENTIAL EMBEDDED KNOWLEDGE:

- Language skills
- Able to work with mechanical equipment
- Able to read basic electronic schematics
- Health and safety

SUPPLEMENTARY INFORMATION:

1. Glossary of terms:

"Schematics" refers to the master working drawing.

"Work bench" refers to the work area were equipment and task is completed.

"Joint" refer to the actual mechanical and electrical connection point between component and printed circuit board.

2. Assessment methods:

Integrated assessment methods and tools will allow the candidate to demonstrate that she/ he has acquired knowledge of and can safely and effectively apply competence identified in this unit standard.

These tools may include the following:

Soldering Station, Cooling stand and Solder tips

Heatgun

De-soldering station

Solder Wick

De-soldering pump

Soldering Wire

Hand Tools (Cutting and Bending pliers)

Printed Circuit Board Clamp

Magnifying Class

Cleaning Fluids

Hot-air jet

These methods must be carefully selected based on the purpose of the assessment (For example, the written method of assessing knowledge or on-job demonstration of practical competence). The assessment must integrate a number of different methods in order to give the assessor reliable and valid proof of competence and evidence of required attitudes.

3. Notes to Assessors

Assessors should keep the following general principles in mind when designing and conducting assessments against this unit standard:

- Focus the assessment activities on gathering evidence in terms of the main outcome expressed in the title to ensure assessment is integrated rather than fragmented. Remember we want to declare the person competent in terms of the title. Where assessment at title level is unmanageable, then focus assessment around each specific outcome, or groups of specific outcomes.

- Make sure evidence is gathered across the entire range, wherever it applies. Assessment activities should be as close to the real performance as possible, and where simulations or role-plays are used, there should be supporting evidence to show the candidate is able to perform in the real situation.

- Do not focus the assessment activities on each assessment criterion. Ensure that the assessment activities focus on outcomes and are sufficient to enable evidence to be gathered around all the assessment criteria.

- The assessment criteria provide the specifications against which assessment judgements should be made. In most cases, knowledge can be inferred from the quality of the performances, but in other cases, knowledge and understanding will have to be tested through questioning techniques. Where this is required, there will be assessment criteria to specify the standard required.

- The task of the assessor is to gather sufficient evidence, of the prescribed type and quality, as specified in this unit standard, that the candidate can achieve the outcomes again and again and again. This means assessors will have to judge how many repeat performances are required before they believe the performance is reproducible.

- All assessments should be conducted in line with the following well documented principles of assessment: appropriateness, fairness, manageability, integration into work or learning, validity, direct, authentic, sufficient, systematic, open and consistent

TITLE: **Use and care of hand tools**

UNIT STANDARD ID:

LEVEL: 3

CREDITS: 3

Field: Manufacturing, Engineering and Technology

SUB-FIELD: Engineering and related design

ISSUE DATE

REVIEW DATE

PURPOSE OF THE UNIT STANDARD:

Learners credited with this Unit Standard are able to use and understand how to use and care for hand tools

A learner credited with this unit standard will be able to:

- Know the different names of hand tools in use
- Able to work with the different hand tools
- Able to clean his hand tools
- Able to store hand tools correctly to company specifics

This unit standard will partially contribute to the full development of any learner within the Telecommunications & Electronic Industry and more specifically in the manufacturing environment.

LEARNING ASSUMED TO BE IN PLACE:

The following knowledge, skills, attitude and/or equivalent on level 2:

- Life Sciences.
- Languages

RANGE STATEMENTS:

- The typical scope of this unit standard includes but is not limited to:
  - Tool box
  - How to select hand tools

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific outcome 1:

Demonstrate knowledge of hand tools and equipment.

Assessment criteria:

1.1 Purposes of hand tools and equipment are identified.

1.2 Able to name different tools in use in a company

1.3 Principles of how hand tools and equipment operate are identified

Specific outcome 2:

Usage and care of hand tools

Assessment criteria:

2.1 Tools are identified and used to enable the job to be carried out according specifications and company policy

2.2 Able to distinguish between sizes of tools to be used for a task assigned

2.3 Techniques when using hand tools and equipment are identified and carried out according to manufacturer's specifications and company policy.

2.3 Safe working practices are carried out throughout the task with regard to personal safety, safety to other people, environmental safety; tool equipment, and machine safety

2.3 Understand the different cleaning materials used for cleaning hand tools

2.4 Able to clean hand tools to company specifics

ACCREDITATION AND MODERATION OPTIONS:

1. Anyone assessing a learner against this unit standard, must be registered as an assessor with the relevant ETQA

2. Any institution offering learning that will enable achievement of this unit standard must be accredited as a provider through the relevant SETA/ETQA

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

NOTES:

1. CRITICAL CROSS-FIELD OUTCOMES:

The following critical cross-field outcomes are addressed in this unit standard:

1.1 Collect, evaluate, organise and critically evaluate information related to the termination of telecommunication cables so that these are accurately interpreted into application performance standards.

1.2 Understand the world as a set of related systems in that the termination of telecommunication cables does not exist in isolation.

1.3 Organize oneself and one's activities so that all requirements are met in achieving competence in the termination of telecommunication cables.

1.4 Identify and solve problems related to the achievement of the termination of telecommunication cables relevant competencies.

1.5 Work effectively with others as a member of a team when terminating of telecommunication cables.

1.6 Communicate effectively when terminating of telecommunication cables.

1.7 Being culturally sensitive across a range of social contexts when consulting customers.

2. ESSENTIAL EMBEDDED KNOWLEDGE:

- Able to speak English
- Health and safety

SUPPLEMENTARY INFORMATION:

2. Assessment methods:

Integrated assessment methods and tools will allow the candidate to demonstrate that she/ he has acquired knowledge of and can safely and effectively apply competence identified in this unit standard.

These tools may include the following:

Stanley knife

Chisel

Hacksaw

Wood saw

Hole saw

File

Screwdriver

Phillips screw driver

Combination Pliers

Long nose pliers

Side Cutter (diagonal cutter)

Vice grips

Allan keys

Wrenches

Tape measure

Spanners

Crimp tool

Hammer

Tool box

These methods must be carefully selected based on the purpose of the assessment (For example, the written method of assessing knowledge or on-job demonstration of practical competence). The assessment must integrate a number of different methods in order to give the assessor reliable and valid proof of competence and evidence of required attitudes.

3. Notes to Assessors

Assessors should keep the following general principles in mind when designing and conducting assessments against this unit standard:

- Focus the assessment activities on gathering evidence in terms of the main outcome expressed in the title to ensure assessment is integrated rather than fragmented. Remember we want to declare the person competent in terms of the title. Where assessment at title level is unmanageable, then focus assessment around each specific outcome, or groups of specific outcomes.

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- Do not focus the assessment activities on each assessment criterion. Ensure that the assessment activities focus on outcomes and are sufficient to enable evidence to be gathered around all the assessment criteria.

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- The task of the assessor is to gather sufficient evidence, of the prescribed type and quality, as specified in this unit standard, that the candidate can achieve the outcomes again and again and again. This means assessors will have to judge how many repeat performances are required before they believe the performance is reproducible.

- All assessments should be conducted in line with the following well documented principles of assessment: appropriateness, fairness, manageability, integration into work or learning, validity, direct, authentic, sufficient, systematic, open and consistent

TITLE: **Organise Resources**

UNIT STANDARDS ID:
FIELD: Manufacturing, Engineering and Technologies
SUB FIELD: Manufacturing and Assembly
NQF LEVEL: 5
CREDITS: 2
ISSUE DATE:
REVIEW DATE:

PURPOSE

This unit standard focuses on the field of Telecommunications Equipment.

A learner credited with this unit standard is capable of:

*   Identify the resources

*   Obtain the resources

*   Validate the resources

*   Control the resources

This unit standard will contribute to the full development of any learner within the

Telecommunications environment. The knowledge, skills and understanding demonstrated in this

unit standard are essential for upliftment, social and economic transformation in the

Telecommunications environment.

Range

*   The typical scope of this unit standard includes resources but not limited to:

*   All Telecommunications resources.

*   The context of this unit standard is performed within structures where stationery, recording
    device, support structure, communication media, employer's policies and procedures, cultural
    ethics, business ethics, finance availability, and work environment are applicable.

*   The level assigned to this unit standard is appropriate because the learner:

*   Possesses a well-developed range skill.

*   Apply relevant knowledge with underpinning comprehension in a number of areas.

*   Demonstrate ability to make comparisons and interpret available information.

- Operate in a number of contexts, some of which may be non-routine.

- Make significant choice from a wide range of procedures and co-ordinate with others.

- Has a significant responsibility for quantity and quality of one's own output under general supervision and quality checking.

- Possibility of being responsible for the output of others.

Learning Assumed To Be In Place

The learning assumed to be in place should be on the same level of this unit standard or higher.

- Communication & Language
- Mathematics & Numeracy, Life Sciences.
- General management principles.

Specific Outcome 1 Identify the required resources

Assessment Criteria For SO1

- Role-players are listed and equipment is identified according to job requirements.
- Contact details of role-players are listed in terms of Names, Addresses and Telephone Numbers.
- The storage facility is identified according to employer's policies and procedures.

Specific Outcome 2 Obtain the required resources
Assessment Criteria For SO2

- Documentation is completed, equipment, tools and material are collected, storage facility is made available and role-players are consulted according to employer's policies and procedures.
- Inventory checklist is compiled according to job requirements.

Specific Outcome 3 Validate the required resources

Assessment Criteria For SO3

- Work order is confirmed, equipment, material & tools conform, workforce is identified for the task and documentation corresponds according to job requirements.

Specific Outcome 4 Control the required resources

Assessment Criteria For SO4

- Storage facility is managed, inventory checklist is maintained and resources are made available according to employer's policies and procedures.
- Workforce is scheduled according to job requirements.

Accreditation Option

1. Anyone assessing a learner against this unit standard must be registered as an Assessor with the relevant ETQA.

2. Any institution offering learning that will enable achievement of this unit standard must be accredited as a provider through the relevant ETQA by SAQA.

Moderation Option

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

Notes

Notes to Assessors

Assessors should keep the following general principles in mind when designing and conducting assessments against this unit standard:

- Focus the assessment activities on gathering evidence in terms of the main outcome expressed in the title to ensure assessment is integrated rather than fragmented. Remember we want to declare the person competent in terms of the title. Where assessment at title level is unmanageable, then focus assessment around each specific outcome, or groups of specific outcomes.

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- The assessment criteria provide the specifications against which assessment judgements should be made. In most cases, knowledge can be inferred from the quality of the performances, but in other cases, knowledge and understanding will have to be tested through questioning techniques. Where this is required, there will be assessment criteria to specify the standard required.

- The task of the Assessor is to gather sufficient evidence, of the prescribed type and quality, as specified in this unit standard, that the candidate can achieve the outcomes again and again and again. This means Assessors will have to judge how many repeat performances are required before they believe the performance is reproducible.

- All assessments should be conducted in line with the following well documented principles of assessment: appropriateness, fairness, manageability, integration into work or learning, validity, direct, authentic, sufficient, systematic, open and consistent.

- Requirements for a portfolio are that it should be valid, reliable and authentic evidence (presented as a portfolio of evidence) from past achievements and experience, which serves to supplement the assessment of applied competence. The portfolio may include:

  - Written statements from persons (e.g. current and/or previous employer, colleague, peer, manager, external customers) confirming competence of the learner
  - Relevant certificates or awards
  - Previous assessment records
  - Journals/logbook

TITLE: **Perform an acceptance Test on New Equipment and Sign off**

UNIT STANDARD ID:

FIELD: Manufacturing, Engineering and Technologies

SUB FIELD: Manufacturing and Assembly

NQF LEVEL: 5

CREDITS: 3

ISSUE DATE:

REVIEW DATE:

PURPOSE

This unit standard focuses on the field of Telecommunications Equipment .

A learner credited with this unit standard is capable of:

- Planning the acceptance test on new equipment
- Preparing for the acceptance test on new equipment
- Conducting the acceptance test on new equipment
- Concluding the acceptance test on new equipment

This unit standard will contribute to the full development of any learner within the
Telecommunications environment, more specifically within Telecommunications environment by
providing recognition, further mobility and transportability within the field. The knowledge, skills
and understanding demonstrated in this unit standard are essential for upliftment, social and
economic transformation in the Telecommunications environment.

Range

- The typical scope of this unit standard includes but not limited to:
- Telecommunications Equipment.

- The context of this unit standard is performed within structures where stationery, transportation,
  support structure, communication media, employer's policies and procedures, cultural ethics,
  business ethics, work environment, professional conduct, test equipment, tools, human
  resources, customer, equipment, quality standards, and anti-static procedures are applicable.

- The level assigned to this unit standard is appropriate because the learner has: a basic knowledge of some main areas of a discipline/ field

- a basic understanding of a discipline/ field's key terms, rules, concepts, principles and theories

- familiarity with some of the essential methods, procedures and techniques of the discipline/ field

- an ability to use the above to solve routine problems within given frameworks

- basic information gathering, analysis and presentation skills

- an ability to communicate information reliably and accurately in the required medium of instruction

- a capacity to operate within clearly defined contexts, with limited scope for personal decision-making and responsibility

- a capacity to learn within a well-structured and managed environment

- a capacity to evaluate own performance against given criteria

Learning Assumed To Be In Place

The learning assumed to be in place should be on the same level of this unit standard or higher.

- Communication and Language Studies.
- Computer literacy.
- Maths and Science.
- Principles of electricity.
- Knowledge of Customer Premises Equipment.

Specific Outcome 1 Plan for an acceptance test on new equipment

Assessment Criteria For SO1

- The schedule is obtained according to job specifications and the information is analysed accurately and the site is identified according to job specifications and/or employer's policies and procedures.

- Operational test records of equipment are obtained according to customer needs and manufacturer's specifications.
- Equipment to be tested is identified according to job and/or site specifications.
- Schedule with role players is agreed upon according to competencies and availability.
- Type of test equipment is identified according to the equipment specifications.
- Acceptance testing documentation is obtained according to employer's policies and procedures.

Specific Outcome 2 Prepare for an acceptance test on new equipment

Assessment Criteria For SO2

- Operational test records are analysed accurately.
- Role players are consulted and type of equipment is obtained according to employer's policies and procedures.

Specific Outcome 3 Conduct an acceptance test on new equipment

Assessment Criteria For SO3

- Customer is consulted, testing equipment is prepared and test results are recorded and according to employer's policies and procedures.
- The equipment on site is located according to job order.
- User manuals are consulted for testing procedures.
- Acceptance test is conducted according to employer's policies and procedures and manufacturer's specifications.
- Type of test failure is identified according to customer needs and equipment specifications.

Specific Outcome 4 Conclude an acceptance test on new equipment and sign off

Assessment Criteria For SO4

- Site is restored, acceptance test on new equipment is signed-off, and documentation is completed accurately and distributed according to employer's policies and procedures.

Accreditation Option

1. Anyone assessing a learner against this unit standard must be registered as an Assessor with the relevant ETQA.

2. Any institution offering learning that will enable achievement of this unit standard must be accredited as a provider through the relevant ETQA by SAQA.

Moderation Option

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

Notes

Notes to Assessors

Assessors should keep the following general principles in mind when designing and conducting assessments against this unit standard:

*   Focus the assessment activities on gathering evidence in terms of the main outcome expressed in the title to ensure assessment is integrated rather than fragmented. Remember we want to declare the person competent in terms of the title. Where assessment at title level is unmanageable, then focus assessment around each specific outcome, or groups of specific outcomes.

*   Make sure evidence is gathered across the entire range, wherever it applies. Assessment activities should be as close to the real performance as possible, and where simulations or role-plays are used, there should be supporting evidence to show the candidate is able to perform in the real situation.

*   Do not focus the assessment activities on each assessment criterion. Ensure that the assessment activities focus on outcomes and are sufficient to enable evidence to be gathered around all the assessment criteria.

*   The assessment criteria provide the specifications against which assessment judgements should be made. In most cases, knowledge can be inferred from the quality of the

performances, but in other cases, knowledge and understanding will have to be tested through questioning techniques. Where this is required, there will be assessment criteria to specify the standard required.

- The task of the Assessor is to gather sufficient evidence, of the prescribed type and quality, as specified in this unit standard, that the candidate can achieve the outcomes again and again and again. This means Assessors will have to judge how many repeat performances are required before they believe the performance is reproducible.

- All assessments should be conducted in line with the following well documented principles of assessment: appropriateness, fairness, manageability, integration into work or learning, validity, direct, authentic, sufficient, systematic, open and consistent.

- Requirements for a portfolio are that it should be valid, reliable and authentic evidence (presented as a portfolio of evidence) from past achievements and experience, which serves to supplement the assessment of applied competence. The portfolio may include:

  - Written statements from persons (e.g. current and/or previous employer, colleague, peer, manager, external customers) confirming competence of the learner
  - Relevant certificates or awards
  - Previous assessment records
  - Journals/logbook

Critical Cross-Field Outcomes

- Identify barriers pertaining to the acceptance test on new equipment and developed strategies to overcome them.
- Work effectively with role players in order to ensure that acceptance test plan is agreed upon and that customer's requirements are met.
- Manage activities in terms of planning, preparation, conducting and concluding an acceptance test on new equipment effectively to ensure an accurate and professional service delivery.
- Demonstrate the functionality of the tested equipment.
- Conduct testing to ensure effective integration on the network.
- Be culturally sensitive across a range of social contexts when consulting role players.

Embedded Knowledge

Skills, Knowledge and Understanding

- Apply oral and written communication when liasing with role players.

- Compile documentation when preparing and conducting acceptance testing.

- Apply decision-making and problem solving skills before and during acceptance testing.

- Demonstrate understanding of product facilities and operations.

- Follow employer's policies and procedures.

- Reach agreement with the role players through negotiation.

- Facilitate co-operation between role players.

- Apply light current electrical principles during acceptance testing.

- Apply faultfinding procedures during acceptance testing.

- Utilise test equipment during testing procedures.

- Demonstrate understanding of the correct use of test equipment.

- Demonstrate intermediate computer literacy.

Legal Requirements

Compliance to the following legal requirements and standards are mandatory:

- Employer's Policies and Procedures.
- Environmental Management System.
- Independent Communications Authority of South Africa.
- Occupational Health and Safety Act.

TITLE: Perform Functional Test on Telecommunications Equipment
UNIT STANDARD ID:
FIELD: Manufacturing, Engineering and Technologies
SUB FIELD: Manufacturing and Assembly
NQF LEVEL 5
CREDITS: 3
ISSUE DATE:
REVIEW DATE:

PURPOSE
This unit standard focuses on the field of Telecommunications Equipment.

A learner credited with this unit standard is capable of:
• Planning the functional test on basic equipment
• Preparing for the functional test on basic equipment
• Conducting the functional test on basic equipment
• Concluding the functional test on basic equipment

This unit standard will contribute to the full development of any learner within the Telecommunications environment, further mobility and transportability within the field. The knowledge, skills and understanding demonstrated in this unit standard are essential for upliftment, social and economic transformation in the Telecommunications environment.

Range

• The typical scope of this unit standard includes but is not limited to equipment like:
  • Telecommunications Equipment

• The context of this unit standard is performed within structures where stationery, transportation, support structure, communication media, employer's policies and procedures, cultural ethics, business ethics, finance availability, work environment, professional conduct, test equipment, tools, human resources, customer, equipment are applicable.

• The level assigned to this unit standard is appropriate because the learner:
• Demonstrates basic comprehension and employ a narrow range of skills

• Applies known solutions to familiar problems.

- Demonstrates basic processing of readily available information.

- Shows basic competence in a limited range of established and familiar contexts under general supervision and quality control.

- Follows established and familiar procedures.

- Co-operates with others.

- Some limited/restricted responsibility for quantity and quality of one's own output.

- Responsible for guiding others.

Learning Assumed To Be In Place

The learning assumed to be in place should be on the **same level of this unit standard** or higher.

- Communication & Language.
- Computer literacy.

Specific Outcome 1 Plan the functional test on basic equipment

Assessment Criteria For SO1

- Role-players are identified according to job requirements and consulted according to customer's needs and employer's policies and procedures.
- Tools and test equipment are identified according to job requirements.

Specific Outcome 2 Prepare for the functional test on basic equipment

Assessment Criteria For SO2

- The functionality of the equipment is determined according to the job requirements.
- Test equipment is obtained according to job requirements and equipment specifications.
- Tools are obtained according to job requirements.
- Pre-test is conducted according to equipment specifications and manufacturer's specifications.

Specific Outcome 3 Conduct the functional test on basic equipment

Assessment Criteria For SO3

- Safety standards are adhered to according to equipment specifications and employer's policies and procedures.
- Equipment test procedures are adhered to and equipment test is conducted according to equipment specification.

Specific Outcome 4 Conclude the functional test on basic equipment

Assessment Criteria For SO4

- Post-test is conducted according to equipment - and manufacturer's specifications.
- Site is cleared and documentation is completed according to job specifications.
- Role-players are consulted according to employer's policies and procedures.

Accreditation Option

1. Anyone assessing a learner against this unit standard must be registered as an Assessor with the relevant ETQA.

2. Any institution offering learning that will enable achievement of this unit standard must be accredited as a provider through the relevant ETQA by SAQA.

Moderation Option

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

Notes

Notes to Assessors

Assessors should keep the following general principles in mind when designing and conducting assessments against this unit standard:

- Focus the assessment activities on gathering evidence in terms of the main outcome expressed in the title to ensure assessment is integrated rather than fragmented. Remember we want to declare the person competent in terms of the title. Where assessment at title level is unmanageable, then focus assessment around each specific outcome, or groups of specific outcomes.

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- Do not focus the assessment activities on each assessment criterion. Rather make sure the assessment activities focus on outcomes and are sufficient to enable evidence to be gathered around all the assessment criteria.

- The assessment criteria provide the specifications against which assessment judgements should be made. In most cases, knowledge can be inferred from the quality of the performances, but in other cases, knowledge and understanding will have to be tested through questioning techniques. Where this is required, there will be assessment criteria to specify the standard required.

- The task of the Assessor is to gather sufficient evidence, of the prescribed type and quality, as specified in this unit standard, that the candidate can achieve the outcomes again and again and again. This means Assessors will have to judge how many repeat performances are required before they believe the performance is reproducible.

- All assessments should be conducted in line with the following well documented principles of assessment: appropriateness, fairness, manageability, integration into work or learning, validity, direct, authentic, sufficient, systematic, open and consistent.

- Requirements for a portfolio are that it should be valid, reliable and authentic evidence (presented as a portfolio of evidence) from past achievements and experience, which serves to supplement the assessment of applied competence. The portfolio may include:

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

- Relevant certificates or awards

- Previous assessment records

- Journals/logbook

Critical Cross-Field Outcomes

- Identify barriers pertaining to performing a functional test on basic equipment and developed strategies to overcome them.
- Work effectively with internal and / or external role-players when conducting a functional test on basic equipment.
- Manage activities in terms of planning, preparing, conducting and concluding a functional test on basic equipment effectively to ensure an accurate and professional service delivery.
- Understand the functionality of equipment to be tested.
- Be culturally sensitive across a range of social contexts when consulting customers.

Embedded Knowledge
Skills, Knowledge and Understanding

- Use oral and written communication when liasing with role-players.

- Compile documentation when conducting equipment testing.

- Apply decision-making and problem solving skills before and during equipment testing.

- Demonstrate competency and understanding of test equipment and equipment to be tested.

- Follow employer's policies and procedures.

- Reach agreement with the role-players through negotiation.

- Apply electric and electronic principles during equipment testing.

- Apply equipment-testing procedures.

- Utilise test instrumentation during testing procedures.

- Demonstrate understanding of the correct use of tools and test equipment.

- Demonstrate basic computer literacy.

Legal Requirements

Compliance to the following legal requirements and standards are mandatory:

- Adhere to employer's policies and procedures.

- Occupational Health and Safety Act.

- Independent Communications Authority of South Africa.

- South African Bureau of Standards.

TITLE: **Analyze Complex Network Failures and Performance**

UNIT STANDARD ID:

FIELD: Manufacturing, Engineering and Technology

SUB FIELD: Engineering and related design

LEVEL: 5

CREDITS: 12

ISSUE DATE:

REVIEW DATE:

Purpose:

This unit standard is for persons in the field of operating and maintaining telecommunications technology.

A person credited with this unit standard is capable of:

- Observing traffic flow/ performance/ faults/ alarms/ anomalies of elements
- Acquiring and collating relevant data and information on element performance/faults/ alarms/ anomalies
- Analyzing results of observations and collated information on element performance/faults/ alarms/ anomalies
- Taking corrective and pro-active actions regarding element performance/faults/ alarms/ anomalies and dispatch to relevant parties
- Evaluating correction and generating reports

This unit standard will contribute to the full development of any learner within the telecommunications environment and more specifically within telecommunications technology disciplines by providing recognition, further mobility and transportability within the field. The knowledge, skills and understanding demonstrated in this unit standard are essential for social and economic transformation and upliftment in the telecommunications environment

LEARNING ASSUMED TO BE IN PLACE

The following knowledge, skills, attitude and/or equivalent is assumed to be in place:

- Protocols
- Concepts and principles
- Operations of Telecommunications Technology systems related to this learners Core Specialization
- Mathematical manipulation

• Surveillance of telecommunication elements

• Typing skills

• Analytical skills

RANGE

Context

• Observations include responses and non-responses

• According to organizational policies and procedures

Level (for level 6)

A learning programme leading to the award of this unit standard should develop learners who demonstrate:

(a) A wide range of specialised skills

(b) An ability to discuss and choose between a wide range of standard and non-standard procedures

(c) Specialised knowledge with depth in more than one area

(d) The ability to reformat and evaluate a wide range of information

(e) The ability to formulate appropriate responses to concrete and abstract problems

(f) An ability to manage processes

(g) An ability to accept full responsibility for own performance

(h) An ability to discuss and choose between a range of routine (non-complex) and complex faults

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific outcome 1

Observe traffic flow/ performance/ faults/ alarms/ anomalies of elements

Assessment criteria

1.1 Performance/faults/ alarms/ anomalies are identified

1.2 System performs correctly according to system specifications

1.3 Condition of elements is identified and described

Specific outcome 2

Acquire and collate relevant data and information on element performance/faults/ alarms/ anomalies

Assessment criteria

2.1 Information and data are gathered for analytical purposes

2.2 Raw data is collected according to relevant policies and procedures

2.3 The gathering of information and data for analytical purposes is described and explained

2.4 Information and data are identified and explained

Specific outcome 3

Analyze results of observations and collated information on element performance/faults/ alarms/ anomalies

Assessment criteria

3.1 Information and data are prioritised and sorted

3.2 Data are quantitatively analysed and represented in a structured format

3.3 Data are interpreted and problem is identified

3.4 All relevant information and data are sort and filtered

3.5 The prioritising of information is explained

3.6 The analysis of data is described

3.7 Statistical procedures are explained

3.8 Organisational procedures and policies on the analysis of data are explained

3.9 Cause(s) of problem is/are described

3.10 Problem is described

Specific outcome 4

Take corrective and pro-active actions regarding element performance/faults/ alarms/ anomalies and dispatch to relevant parties

Assessment criteria

4.1 Optimum corrective/pro-active actions are identified

4.2 Fault corrective/pro-active implementation plan is developed

4.3 Feedback reports are compiled

4.4 Internal client/ customer/ vendor requirements are identified

4.5 Support is provided to internal client/ customer/ vendor

4.6 Corrective/pro-active action is implemented

4.7 Various corrective/pro-active actions are listed

4.8 Faults are dealt with according to best practice

4.9 Outage time/mean time to repair is according to service level agreements

4.10 System performs according to specifications

4.11 Corrective/pro-active actions are described

4.12 Service level agreements are described

4.13 Outage time/mean time to repair is explained

4.14 Scheduling activities is explained

Specific outcome 5

Evaluate correction and generate reports

Assessment criteria

5.1 Corrective/pro-active action is assessed

5.2 Relevant documentation is completed and processed

5.3 Information is stored and kept according to policies and procedures

5.4 Post processing procedures are identified and described

ACCREDITATION AND MODERATION

Anyone assessing a learner against this unit standard, must be registered as an assessor with the relevant ETQA

Any institution offering learning that will enable achievement of this unit standard must be accredited in terms of the criteria laid down by the relevant ETQA.

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

NOTES
1. CRITICAL CROSS FIELD OUTCOMES

1.1 Identify and solve problems in a critical and creative way when analyzing failures and network performance

1.2 Work effectively with others as a member of a team in analyzing failures and network performance

1.3 Organize and manage oneself and one's personal activities responsibly and effectively.

1.4 Collect, analyze, organize and critically evaluate information relevant to analyzing failures and network performance

1.5 Communicate effectively when analyzing failures and network performance

EMBEDDED KNOWLEDGE

- Organizational policies and procedures on the monitoring and analysis of network elements performance/faults/ alarms/ anomalies
- Condition and characteristics of elements in Telecommunications Technology networks
- Network performance parameters
- Reporting procedures and administration
- Prioritizing principles
- Scheduling of daily activities
- Statistical procedures for analyzing and interpreting information

SUPPLEMENTARY INFORMATION

The standard describes competent performance in analyzing failures and network performance, and lays down the criteria by which competence should be judged, as well as the range of circumstances in which competence should be demonstrated.

Integrated assessment methods and tools will allow the candidate to demonstrate that she/ he has acquired knowledge of and can safely and effectively apply competence identified in this unit standard.

These tools include the following:
- In-situ (on-the-job) observations
- Role-play simulations
- Structured group discussions
- Written reports (e.g. tests, exams, case studies, projects, registers, logbooks, workbooks)
- Verbal report backs (presentations)
- Portfolios of evidence

- Projects (physical visits to Government Departments)
- Experiential learning
- Working in teams
- Scenario sketching

These methods must be carefully selected based on the purpose of the assessment (For example, the written method of assessing knowledge or on-job demonstration of practical competence). The assessment must integrate a number of different methods in order to give the assessor reliable and valid proof of competence and evidence of required attitudes.

Candidates are assessed against these assessment criteria. An assessor observes currently employed candidates carrying out their normal work duties. They may also be asked to carry out simulated tasks and to answer written and/or oral questions. Candidates studying towards a Unit Standard, and who are not currently employed, will also be assessed using variety of assessment tools.

TITLE: **CONFIGURE AND ADMINISTER A DATABASE**

UNIT STANDARD ID:

FIELD: Manufacturing, Engineering and Technology

SUB-FIELD: Engineering and related design

LEVEL: 5

CREDITS: 6

ISSUE DATE:

REVIEW DATE:

PURPOSE:

This unit standard is for persons in the field of operating and maintaining telecommunications technology.

A person credited with this unit standard is capable of:

- Receiving and interpreting specification of network elements
- Executing required configuration/ data base change
- Documenting and recording configuration change

This unit standard will contribute to the full development of any learner within the telecommunications environment and more specifically within telecommunications technology disciplines by providing recognition, further mobility and transportability within the field. The knowledge, skills and understanding demonstrated in this unit standard are essential for social and economic transformation and upliftment in the telecommunications environment

LEARNING ASSUMED TO BE IN PLACE

The following knowledge, skills, attitude and/or equivalent is assumed to be in place:

- Typing skills
- Operations of Telecommunications Technology systems related to this learners Core Specialization
- Analytical skills

RANGE

Context

- Elementary to complex
- Assessment on Telecommunications Technology vendor specific elements/systems related to this learners Core Specialization
- Applicable to learners in Telecommunications Technology
- Administration could be manually or electronically
- Telecommunications Technology systems related to this learners Core Specialization
- From hardware to software

Level (for level 5)

A learning programme leading to the award of the credit for this unit standard should develop learners who demonstrate:

(a)   An ability to acquire a wide range of technical skills

(b)   An ability to discuss a considerable choice of procedures

(c)   A broad knowledge that incorporates theoretical concepts

(d)   An ability to critically analyse information

(e)   An ability to make judgements to unknown problems

(f)   An ability to work on its own with complete responsibility

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific outcome 1

Receive and interpret specification of network elements

Assessment criteria

1.1 Instructions and or specifications are read and understood

1.2 Database changes are planned and scheduled

1.3 Internal client/customer/ vendor requirements are identified

1.4 Database changes are explained

1.5 Different instructions and specifications are explained

Specific outcome 2

Execute required configuration/ data base change

Assessment criteria

2.1 Database changes are executed

2.2 Database irregularities are processed

2.3 Database integrity is ensured

2.4 Database changes are executed according to policies and procedures

2.5 Configuration/data base change conforms to instructions, specifications and standards

2.6 System perform according to standard

2.7 Database security is according to policies and procedures

2.8 Policies and procedures on database changes are explained

2.9 The securing of a database is described and explained

Specific outcome 3

Document and record configuration change

Assessment criteria

3.1 Database change records are kept and maintained

3.2 Relevant documentation is completed and processed according to policies and procedures

3.3 The keeping of records are described and explained

ACCREDITATION PROCESS AND MODERATION

Anyone assessing a learner against this unit standard, must be registered as an assessor with the relevant ETQA

Any institution offering learning that will enable achievement of this unit standard must be accredited in terms of the criteria laid down by the relevant ETQA.

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

NOTES

1. CRITICAL CROSS FIELD OUTCOMES

1.1 Identify and solve problems in a critical and creative way when configuring and administering a database

1.2 Work effectively with others as a member of a team in configuring and administering a database

1.3 Organise and manage oneself and one's personal activities responsibly and effectively.

1.4 Collect, analyse, organise and critically evaluate information relevant to configuring and administering a database

1.5 Communicate effectively when configuring and administering a database

2. EMBEDDED KNOWLEDGE

- Time management
- Condition of elements
- Equipment performance parameters
- Telecommunications Technology systems database administration related to this learners Core Specialization
- Reporting procedures and administration
- Prioritising principles
- Scheduling of daily activities

SUPPLEMENTARY INFORMATION

The standard describes competent performance in configuring and administering a database, and lays down the criteria by which competence should be judged, as well as the range of circumstances in which competence should be demonstrated.

Integrated assessment methods and tools will allow the candidate to demonstrate that she/ he has acquired knowledge of and can safely and effectively apply competence identified in this unit standard.

These tools include the following:

- In-situ (on-the-job) observations
- Role-play simulations
- Structured group discussions
- Written reports (e.g. tests, exams, case studies, projects, registers, logbooks, workbooks)
- Verbal report backs (presentations)
- Portfolios of evidence
- Projects (physical visits to Government Departments)

- Experiential learning
- Working in teams
- Scenario sketching

These methods must be carefully selected based on the purpose of the assessment (For example, the written method of assessing knowledge or on-job demonstration of practical competence). The assessment must integrate a number of different methods in order to give the assessor reliable and valid proof of competence and evidence of required attitudes.

Candidates are assessed against these assessment criteria. An assessor observes currently employed candidates carrying out their normal work duties. They may also be asked to carry out simulated tasks and to answer written and/or oral questions. Candidates studying towards a Unit Standard, and who are not currently employed, will also be assessed using variety of assessment tools.

TITLE: **Perform Software/Hardware Upgrade**

UNIT STANDARD ID:

FIELD: Manufacturing, Engineering and Technology

SUBFIELD: Manufacturing and Assembly

NQF LEVEL: 5

CREDITS: 4

ISSUE DATE:

REVIEW DATE:

PURPOSE

This unit standard focuses on the field of Telecommunication Equipment.

A learner credited with this unit standard is capable of:

- Planning the software / hardware upgrade
- Preparing for the software / hardware upgrade
- Conducting the software / hardware upgrade
- Concluding the software / hardware upgrade

This unit standard will contribute to the full development of any learner within the Telecommunications environment. The knowledge, skills and understanding demonstrated in this unit standard are essential for upliftment, social and economic transformation in the Telecommunications environment.

Range

The typical scope of this unit standard includes but is not limited to:

- Hardware

- Software

- The context of this unit standard is performed within structures where stationery, transportation, support structure, communication media, employer's policies and procedures, manufacturer's specifications / requirements, cultural ethics, business ethics, work environment, professional conduct, test instrumentation, tools, human resources, role-players, material, equipment, quality standards, and anti-static procedures are applicable.

- The level assigned to this unit standard is appropriate because the learner: Possesses a wide-range of scholastic or technical skills.

- Possess a broad knowledge base incorporating some basic theoretical concepts.

- Demonstrate the ability to access, analyse and evaluate information independently.

- Employ a range of responses to well-defined but often unfamiliar or unpredictable problems.

- Operate in a variety of familiar and unfamiliar contexts under broad guidance and evaluation.

- Select from a considerable choice of procedures.

- Give presentations to an audience. Has complete responsibility for quantity and quality of the output.

- Is possibly responsible for the quantity and quality of output of others.

Learning Assumed To Be In Place

The learning assumed to be in place should be on the **same level of this unit standard** or higher.

- Competent with installation of Telecommunication Equipment, Operate test equipment and Maintenance of telecommunication Equipment.
- Principles of electricity.
- Testing procedures.
- Experience in Telecommunication Network.
- Computer literate.
- Communication and Language.
- Mathematics and Science.

Specific Outcome 1 Plan software / hardware upgrade

Assessment Criteria For SO1

- Job order is obtained and customer is consulted according to employer's policies and procedures.
- Upgrade requirements / specifications are determined and software / hardware to be upgraded is identified according to manufacturer's specifications, customer specifications and employer's policies and procedures.
- Tools / test equipment is identified according to manufacturer's specifications and employers policies and procedures.

Specific Outcome 2 Prepare software / hardware upgrade

Assessment Criteria For SO2

- Software / hardware to be upgraded is obtained and tools / test equipment is obtained according to employer's policies and procedures and manufacturer's specifications.
- Customer is consulted according to employer's policies and procedures.

Specific Outcome 3 Conduct software / hardware upgrade

Assessment Criteria For SO3

- Software / hardware upgrade is conducted and tested according to manufacturer's specifications, customer requirements and employer's policies and procedures.

Specific Outcome 4 Conclude software / hardware upgrade

Assessment Criteria For SO4

- Functionality / operations / facilities of upgrade is demonstrated and documentation is completed according to employer's policies and procedures and manufacturer's specifications.

Accreditation Option

1. Anyone assessing a learner against this unit standard must be registered as an Assessor with the relevant ETQA.

2. Any institution offering learning that will enable achievement of this unit standard must be accredited as a provider through the relevant ETQA by SAQA.

Moderation Option

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

Notes

Notes to Assessors

- Assessors should keep the following general principles in mind when designing and conducting assessments against this unit standard:

- Focus the assessment activities on gathering evidence in terms of the main outcome expressed in the title to ensure assessment is integrated rather than fragmented. Remember we want to declare the person competent in terms of the title. Where assessment at title level is unmanageable, then focus assessment around each specific outcome, or groups of specific outcomes.

- Make sure evidence is gathered across the entire range, wherever it applies. Assessment activities should be as close to the real performance as possible, and where simulations or role-plays are used, there should be supporting evidence to show the candidate is able to perform in the real situation.

- Do not focus the assessment activities on each assessment criterion. Ensure that the assessment activities focus on outcomes and are sufficient to enable evidence to be gathered around all the assessment criteria.

- The assessment criteria provide the specifications against which assessment judgements should be made. In most cases, knowledge can be inferred from the quality of the performances, but in other cases, knowledge and understanding will have to be tested through questioning techniques. Where this is required, there will be assessment criteria to specify the standard required.

- The task of the Assessor is to gather sufficient evidence, of the prescribed type and quality, as specified in this unit standard, that the candidate can achieve the outcomes again and again and again. This means Assessors will have to judge how many repeat performances are required before they believe the performance is reproducible.

- All assessments should be conducted in line with the following well documented principles of assessment: appropriateness, fairness, manageability, integration into work or learning, validity, direct, authentic, sufficient, systematic, open and consistent.

- Requirements for a portfolio are that it should be valid, reliable and authentic evidence (presented as a portfolio of evidence) from past achievements and experience, which serves to supplement the assessment of applied competence. The portfolio may include:

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

- Relevant certificates or awards

- Previous assessment records

- Journals/logbook

Critical Cross-Field Outcomes

- Identify barriers pertaining to the software / hardware upgrade and developed strategies to overcome them.

- Work effectively with role-players in order to ensure that upgrade is agreed upon and those requirements are met.

- Manage activities in terms of preparation, planning, conducting and concluding software / hardware upgrade effectively to ensure an accurate and professional service delivery.

- Demonstrate the functionality / operation / facility of the upgrade.

- Conduct an effective integration of the upgrade.

- Be culturally sensitive across a range of social contexts when consulting customers.

Embedded Knowledge

Skills, Knowledge and Understanding

- Use oral and written communication when liasing with role-players.

- Compile / complete documentation.

- Apply decision making and problem solving skills before and during upgrade.

- Demonstrate understanding of product facilities, operations and functionality.

- Follow employer's policies and procedures.

- Follow manufacturer's specifications / requirements.

- Reach agreement with role-players through negotiation.

- Facilitate co-operation between role-players.

- Apply electrical principles during upgrade.

- Apply faultfinding procedures during upgrade.

- Utilise test instrumentation during testing procedures.

- Demonstrate understanding of the correct use of tools and test instrumentation.

- Demonstrate computer literacy.

Legal Requirements

Compliance to the following legal requirements and standards are mandatory:

- Environmental Management System.
- Independent Communication Authority of South Africa.
- Occupational Health and Safety Act.

TITLE: **Perform Maintenance on Telecommunications Equipment**

UNIT STANDARD ID:

FIELD: Manufacturing, Engineering and Technology

SUBFIELD: Manufacturing and Assembly

NQF LEVEL: 5

CREDITS: 6

ISSUE DATE:

REVIEW DATE:

Purpose

This unit standard focuses on the field of Telecommunications Equipment.

A learner credited with this unit standard is capable of:

* Planning the equipment maintenance
* Conducting the equipment maintenance
* Concluding the equipment maintenance

This unit standard will contribute to the full development of any learner within the Telecommunications environment, further mobility and transportability within the field. The knowledge, skills and understanding demonstrated in this unit standard are essential for upliftment, social and economic transformation in the Telecommunications environment.

Range

The typical scope of this unit standard includes but not limited to equipment like:

* Single Line installation and maintenance

* Transmission Equipment

* GSM Equipment

* Switching Equipment

* The context of this unit standard is performed within structures where stationery, support structure, communication media, employer's policies and procedures, cultural ethics, business ethics, work environment, professional conduct, test instrumentation, tools, human resources, customer, material, equipment, quality standards, SABS standards, anti-static procedures, training facilities, technology and transportation are applicable.

- The level assigned to this unit standard is appropriate because:
- Demonstrates basic comprehension and employ a narrow range of skills
- Applies known solutions to familiar problems.
- Demonstrates basic processing of readily available information.
- Shows basic competence in a limited range of established and familiar contexts under general supervision and quality control.
- Follows established and familiar procedures.
- Co-operates with others.
- Some limited/restricted responsibility for quantity and quality of one's own output.
- Responsible for guiding others.

Learning Assumed To Be In Place

The learning assumed to be in place should be on the same level of this unit standard or higher.

- Communication and Language
- Computer literacy
- Mathematics and Science
- Principles of electricity
- Testing procedures
- Competent in operating and installing Basic Telecommunication Equipment.

Specific Outcome 1 Plan customer equipment maintenance

Assessment Criteria For SO1

- Role-players are consulted according to employer's policies and procedures.
- Tools & equipment is verified and maintenance actions are planned according to job requirements.

Specific Outcome 2 Conduct customer equipment maintenance

Assessment Criteria For SO2

- Telecommunications Equipment is tested according to equipment specifications.
- Equipment is repaired / replaced / maintained according to equipment specifications and employer's policies and procedures.
- Safety standards are applied and customer requirements adhered to throughout the maintenance process.

Specific Outcome 3 Conclude Telecommunications Equipment maintenance

Assessment Criteria For SO3

- Post testing of Telecommunications Equipment is conducted according to equipment specifications.
- Site is cleared and customer is advised according to employer's policies and procedures.
- Role players are consulted according to job requirements.
- Documentation is completed according to employer's policies and procedures.

Accreditation Option

1. Anyone assessing a learner against this unit standard must be registered as an Assessor with the relevant ETQA.

2. Any institution offering learning that will enable achievement of this unit standard must be accredited as a provider through the relevant ETQA by SAQA.

Moderation Option

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

Notes

Notes to Assessors

- Assessors should keep the following general principles in mind when designing and conducting assessments against this unit standard:

- Focus the assessment activities on gathering evidence in terms of the main outcome expressed in the title to ensure assessment is integrated rather than fragmented. Remember we want to declare the person competent in terms of the title. Where assessment at title level is unmanageable, then focus assessment around each specific outcome, or groups of specific outcomes.

- Make sure evidence is gathered across the entire range, wherever it applies. Assessment activities should be as close to the real performance as possible, and where simulations or role-plays are used, there should be supporting evidence to show the candidate is able to perform in the real situation.

- Do not focus the assessment activities on each assessment criterion. Rather make sure the assessment activities focus on outcomes and are sufficient to enable evidence to be gathered around all the assessment criteria.

- The assessment criteria provide the specifications against which assessment judgements should be made. In most cases, knowledge can be inferred from the quality of the performances, but in other cases, knowledge and understanding will have to be tested through questioning techniques. Where this is required, there will be assessment criteria to specify the standard required.

- The task of the Assessor is to gather sufficient evidence, of the prescribed type and quality, as specified in this unit standard, that the candidate can achieve the outcomes again and again and again. This means Assessors will have to judge how many repeat performances are required before they believe the performance is reproducible.

- All assessments should be conducted in line with the following well documented principles of assessment: appropriateness, fairness, manageability, integration into work or learning, validity, direct, authentic, sufficient, systematic, open and consistent.

- Requirements for a portfolio are that it should be valid, reliable and authentic evidence (presented as a portfolio of evidence) from past achievements and experience, which serves to supplement the assessment of applied competence. The portfolio may include:

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

  - Relevant certificates or awards

  - Previous assessment records

  - Journals/logbook

Critical Cross-Field Outcomes

- Identify barriers pertaining to the equipment maintenance and developed strategies to overcome them.

- Work effectively with role players in order to ensure that equipment is maintained and that customer's requirements are met.

- Manage activities in terms of preparation, planning, conducting and concluding equipment maintenance effectively to ensure an accurate and professional service delivery.
- Maintenance is conducted in order to prevent and solve any problem effectively.

- Technology will assist in improving the entire maintenance process.

- Be culturally sensitive across a range of social contexts when consulting customers.

Embedded Knowledge

Skills, Knowledge and Understanding

- Use oral and written communication when liasing with customer.

- Complete documentation after conducting equipment maintenance.

- Apply decision-making and problem solving skills before and during equipment maintenance.

- Demonstrate understanding of product facilities and operations.

- Demonstrate understanding of the policies and procedures.

- Reach agreement with the customer through negotiation.

- Facilitate co-operation between role-players.

- Apply light current electrical principles during equipment maintenance.

- Apply faultfinding procedures before, during and after equipment maintenance.

- Utilise test instruments during testing process.

- Demonstrate understanding of the correct use of tools.

- Demonstrate computer literacy

Legal Requirements

The typical legal requirements for this unit standard includes but not limited to:

- Environmental Management System.
- Independent Communication Authority of South Africa.
- Occupational Health and Safety Act.

TITLE:　　　**Configure and Administer a Database**

UNIT STANDARD ID:

FIELD:　　　Manufacturing, Engineering and Technology

SUB-FIELD:　Engineering and related design

LEVEL:　　　5

CREDITS:　　6

ISSUE DATE:

REVIEW DATE:

PURPOSE:

This unit standard is for persons in the field of operating and maintaining telecommunications technology.

A person credited with this unit standard is capable of:

- Receiving and interpreting specification of network elements
- Executing required configuration/ data base change
- Documenting and recording configuration change

This unit standard will contribute to the full development of any learner within the telecommunications environment and more specifically within telecommunications technology disciplines by providing recognition, further mobility and transportability within the field. The knowledge, skills and understanding demonstrated in this unit standard are essential for social and economic transformation and upliftment in the telecommunications environment

LEARNING ASSUMED TO BE IN PLACE

The following knowledge, skills, attitude and/or equivalent is assumed to be in place:

- Typing skills
- Operations of Telecommunications Technology systems related to this learners Core Specialization
- Analytical skills

RANGE

Context

- Elementary to complex
- Assessment on Telecommunications Technology vendor specific elements/systems related to this learners Core Specialization
- Applicable to learners in Telecommunications Technology
- Administration could be manually or electronically
- Telecommunications Technology systems related to this learners Core Specialization
- From hardware to software

Level (for level 5)

A learning programme leading to the award of the credit for this unit standard should develop learners who demonstrate:

(a)   An ability to acquire a wide range of technical skills

(b)   An ability to discuss a considerable choice of procedures

(c)   A broad knowledge that incorporates theoretical concepts

(d)   An ability to critically analyse information

(e)   An ability to make judgements to unknown problems

(f)   An ability to work on its own with complete responsibility

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific outcome 1

Receive and interpret specification of network elements

Assessment criteria

1.1 Instructions and or specifications are read and understood

1.2 Database changes are planned and scheduled

1.3 Internal client/customer/ vendor requirements are identified

1.4 Database changes are explained

1.5 Different instructions and specifications are explained

Specific outcome 2

Execute required configuration/ data base change

Assessment criteria

2.1 Database changes are executed

2.2 Database irregularities are processed

2.3 Database integrity is ensured

2.4 Database changes are executed according to policies and procedures

2.5 Configuration/data base change conforms to instructions, specifications and standards

2.6 System perform according to standard

2.7 Database security is according to policies and procedures

2.8 Policies and procedures on database changes are explained

2.9 The securing of a database is described and explained

Specific outcome 3

Document and record configuration change

Assessment criteria

3.1 Database change records are kept and maintained

3.2 Relevant documentation is completed and processed according to policies and procedures

3.3 The keeping of records are described and explained

ACCREDITATION PROCESS AND MODERATION

Anyone assessing a learner against this unit standard, must be registered as an assessor with the relevant ETQA

Any institution offering learning that will enable achievement of this unit standard must be accredited in terms of the criteria laid down by the relevant ETQA.

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

NOTES

1. CRITICAL CROSS FIELD OUTCOMES

1.1 Identify and solve problems in a critical and creative way when configuring and administering a database

1.2 Work effectively with others as a member of a team in configuring and administering a database

1.3 Organise and manage oneself and one's personal activities responsibly and effectively.

1.4 Collect, analyse, organise and critically evaluate information relevant to configuring and administering a database

1.5 Communicate effectively when configuring and administering a database

2. EMBEDDED KNOWLEDGE

- Time management
- Condition of elements
- Equipment performance parameters
- Telecommunications Technology systems database administration related to this learners Core Specialization
- Reporting procedures and administration
- Prioritising principles
- Scheduling of daily activities

SUPPLEMENTARY INFORMATION

The standard describes competent performance in configuring and administering a database, and lays down the criteria by which competence should be judged, as well as the range of circumstances in which competence should be demonstrated.

Integrated assessment methods and tools will allow the candidate to demonstrate that she/ he has acquired knowledge of and can safely and effectively apply competence identified in this unit standard.

These tools include the following:

- In-situ (on-the-job) observations
- Role-play simulations
- Structured group discussions
- Written reports (e.g. tests, exams, case studies, projects, registers, logbooks, workbooks)
- Verbal report backs (presentations)
- Portfolios of evidence
- Projects (physical visits to Government Departments)

- Experiential learning
- Working in teams
- Scenario sketching

These methods must be carefully selected based on the purpose of the assessment (For example, the written method of assessing knowledge or on-job demonstration of practical competence). The assessment must integrate a number of different methods in order to give the assessor reliable and valid proof of competence and evidence of required attitudes.

Candidates are assessed against these assessment criteria. An assessor observes currently employed candidates carrying out their normal work duties. They may also be asked to carry out simulated tasks and to answer written and/or oral questions. Candidates studying towards a Unit Standard, and who are not currently employed, will also be assessed using variety of assessment tools.

TITLE: **Inspect, Repair and Restore Faulty Hardware/ Software**

UNIT STANDARD ID:

FIELD: Manufacturing, Engineering and Technology

SUB-FIELD: Engineering and related design

LEVEL: 5

CREDITS: 6

ISSUE DATE:

REVIEW DATE:

Purpose:

This unit standard is for persons in the field of operating and maintaining telecommunications technology.

A person credited with this unit standard is capable of:

- Developing schedule for inspection, repairing of software and hardware
- Inspecting and identifying faulty hardware and software
- Repairing and restoring faulty hardware and software
- Completing records and administration

This unit standard will contribute to the full development of any learner within the telecommunications environment and more specifically within telecommunications technology disciplines by providing recognition, further mobility and transportability within the field. The knowledge, skills and understanding demonstrated in this unit standard are essential for social and economic transformation and upliftment in the telecommunications environment

LEARNING ASSUMED TO BE IN PLACE

The following knowledge, skills, attitude and/or equivalent is assumed to be in place:

- Protocols
- Operations of Telecommunications Technology systems related to this learner's Core Specialization.
- Typing skills.
- Communication skills.

RANGE

Context

- Elementary to complex
- Assessment on Telecommunications Technology vendor specific elements/systems related to these learners Core Specialization.
- Applicable to learners in Telecommunications Technology.
- Administration could be manually or electronically
- Telecommunications Technology systems related to this learners Core Specialization
- From hardware to software

Level (for level 5)

A learning programme leading to the award of the credit for this unit standard should develop learners who demonstrate:

(a)   An ability to acquire a wide range of technical skills

(b)   An ability to discuss a considerable choice of procedures

(c)   A broad knowledge that incorporates theoretical concepts

(d)   An ability to critically analyse information

(e)   An ability to make judgements to unknown problems

(f)   An ability to work on its own with complete responsibility

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific outcome 1

Develop schedule for inspection, repairing of software and hardware

Assessment criteria

1.1 A schedule is developed and followed

1.2 Work is scheduled according to policies and procedures

1.3 The scheduling of activities is explained

1.4 Prioritising of activities is explained

Specific outcome 2

Inspect and identify faulty hardware and software

Assessment criteria

2.1 Faults/responses are inspected and identified

2.2 Faults/responses are dealt with according to policies, procedures and schedule

2.3 Condition of elements is described and explained

2.4 The causes and effects of the condition of elements are described

2.5 Faulty hardware/software is explained

Specific outcome 3

Repair and restore faulty hardware and software

Assessment criteria

3.1 Hardware and software is repaired and restored

3.2 Hardware and software is repaired and restored according to schedule and policies and procedures

3.3 The causes and effects of incorrect/correct actions are explained

3.4 The policies and procedures related to repairing and restoring faulty hardware/software are explained

Specific outcome 4

Complete records and administration

Assessment criteria

4.1 Necessary administration is completed

4.2 Administration is according to requirements

4.3 The reasons for the completion of administration are explained

ACCREDITATION PROCESS AND MODERATION

Anyone assessing a learner against this unit standard, must be registered as an assessor with the relevant ETQA

Any institution offering learning that will enable achievement of this unit standard must be accredited in terms of the criteria laid down by the relevant ETQA.

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

NOTES

1. CRITICAL CROSS FIELD OUTCOMES

1.1 Identify and solve problems in a critical and creative way when inspecting, repairing and restoring faulty hardware/software

1.2 Work effectively with others as a member of a team in inspecting, repairing and restoring faulty hardware/software

1.3 Organise and manage oneself and one's personal activities responsibly and effectively.

1.4 Collect, analyse, organise and critically evaluate information relevant to inspecting, repairing and restoring faulty hardware/software

1.5 Communicate effectively when inspecting, repairing and restoring faulty hardware/software

2. EMBEDDED KNOWLEDGE

- Operation of Telecommunications Technology systems related to this learners Core Specialization
- Condition of elements
- Causes and effects of condition of element
- Implications of wrong actions
- Scheduling of activities

SUPPLEMENTARY INFORMATION

The standard describes competent performance in inspecting, repairing and restoring faulty hardware/software, and lays down the criteria by which competence should be judged, as well as the range of circumstances in which competence should be demonstrated.

Integrated assessment methods and tools will allow the candidate to demonstrate that she/ he has acquired knowledge of and can safely and effectively apply competence identified in this unit standard.

These tools include the following:
- In-situ (on-the-job) observations

- Role-play simulations
- Structured group discussions
- Written reports (e.g. tests, exams, case studies, projects, registers, logbooks, workbooks)
- Verbal report backs (presentations)
- Portfolios of evidence
- Projects (physical visits to Government Departments)
- Experiential learning
- Working in teams
- Scenario sketching

These methods must be carefully selected based on the purpose of the assessment (For example, the written method of assessing knowledge or on-job demonstration of practical competence). The assessment must integrate a number of different methods in order to give the assessor reliable and valid proof of competence and evidence of required attitudes.

Candidates are assessed against these assessment criteria. An assessor observes currently employed candidates carrying out their normal work duties. They may also be asked to carry out simulated tasks and to answer written and/or oral questions. Candidates studying towards a Unit Standard, and who are not currently employed, will also be assessed using variety of assessment tools.

TITLE: **Perform Maintenance on telecommunications Equipment**

UNIT STANDARD ID:

FIELD: Manufacturing, Engineering and Technology

SUBFIELD: Manufacturing and Assembly

NQF LEVEL: 5

CREDITS: 6

ISSUE DATE:

REVIEW DATE:

PURPOSE

This unit standard focuses on the field of Telecommunications Equipment.

A learner credited with this unit standard is capable of:

* Planning the equipment maintenance

* Conducting the equipment maintenance

* Concluding the equipment maintenance

This unit standard will contribute to the full development of any learner within the Telecommunications environment, further mobility and transportability within the field. The knowledge, skills and understanding demonstrated in this unit standard are essential for upliftment, social and economic transformation in the Telecommunications environment.

Range

The typical scope of this unit standard includes but not limited to equipment like:

Single Line installation and maintenance

Transmission Equipment

GSM Equipment

Switching Equipment

* The context of this unit standard is performed within structures where stationery, support structure, communication media, employer's policies and procedures, cultural ethics, business ethics, work environment, professional conduct, test instrumentation, tools, human resources, customer, material, equipment, quality standards, SABS standards, anti-static procedures, training facilities, technology and transportation are applicable.

* The level assigned to this unit standard is appropriate because:

- Demonstrates basic comprehension and employ a narrow range of skills

- Applies known solutions to familiar problems.

- Demonstrates basic processing of readily available information.

- Shows basic competence in a limited range of established and familiar contexts under general supervision and quality control.

- Follows established and familiar procedures.

- Co-operates with others.

- Some limited/restricted responsibility for quantity and quality of one's own output.

- Responsible for guiding others.

Learning Assumed To Be In Place

The learning assumed to be in place should be on the same level of this unit standard or higher.

- Communication and Language
- Computer literacy
- Mathematics and Science
- Principles of electricity
- Testing procedures
- Competent in operating and installing Basic Telecommunication Equipment.

Specific Outcome 1 Plan customer equipment maintenance

Assessment Criteria For SO1

- Role-players are consulted according to employer's policies and procedures.
- Tools & equipment is verified and maintenance actions are planned according to job requirements.

Specific Outcome 2 Conduct customer equipment maintenance

Assessment Criteria For SO2

- Telecommunications Equipment is tested according to equipment specifications.
- Equipment is repaired / replaced / maintained according to equipment specifications and employer's policies and procedures.
- Safety standards are applied and customer requirements adhered to throughout the maintenance process.

Specific Outcome 3 Conclude Telecommunications Equipment maintenance

Assessment Criteria For SO3

- Post testing of Telecommunications Equipment is conducted according to equipment specifications.
- Site is cleared and customer is advised according to employer's policies and procedures.
- Role players are consulted according to job requirements.
- Documentation is completed according to employer's policies and procedures.

Accreditation Option

1. Anyone assessing a learner against this unit standard must be registered as an Assessor with the relevant ETQA.

2. Any institution offering learning that will enable achievement of this unit standard must be accredited as a provider through the relevant ETQA by SAQA.

Moderation Option

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

Notes

Notes to Assessors

- Assessors should keep the following general principles in mind when designing and conducting assessments against this unit standard:

- Focus the assessment activities on gathering evidence in terms of the main outcome expressed in the title to ensure assessment is integrated rather than fragmented. Remember we want to declare the person competent in terms of the title. Where assessment at title level is unmanageable, then focus assessment around each specific outcome, or groups of specific outcomes.

- Make sure evidence is gathered across the entire range, wherever it applies. Assessment activities should be as close to the real performance as possible, and where simulations or role-plays are used, there should be supporting evidence to show the candidate is able to perform in the real situation.

- Do not focus the assessment activities on each assessment criterion. Rather make sure the assessment activities focus on outcomes and are sufficient to enable evidence to be gathered around all the assessment criteria.

- The assessment criteria provide the specifications against which assessment judgements should be made. In most cases, knowledge can be inferred from the quality of the performances, but in other cases, knowledge and understanding will have to be tested through questioning techniques. Where this is required, there will be assessment criteria to specify the standard required.

- The task of the Assessor is to gather sufficient evidence, of the prescribed type and quality, as specified in this unit standard, that the candidate can achieve the outcomes again and again and again. This means Assessors will have to judge how many repeat performances are required before they believe the performance is reproducible.

- All assessments should be conducted in line with the following well documented principles of assessment: appropriateness, fairness, manageability, integration into work or learning, validity, direct, authentic, sufficient, systematic, open and consistent.

- Requirements for a portfolio are that it should be valid, reliable and authentic evidence (presented as a portfolio of evidence) from past achievements and experience, which serves to supplement the assessment of applied competence. The portfolio may include:

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

  - Relevant certificates or awards

  - Previous assessment records

  - Journals/logbook

Critical Cross-Field Outcomes

- Identify barriers pertaining to the equipment maintenance and developed strategies to overcome them.
- Work effectively with role players in order to ensure that equipment is maintained and that customer's requirements are met.
- Manage activities in terms of preparation, planning, conducting and concluding equipment maintenance effectively to ensure an accurate and professional service delivery.
- Maintenance is conducted in order to prevent and solve any problem effectively.
- Technology will assist in improving the entire maintenance process.
- Be culturally sensitive across a range of social contexts when consulting customers.

Embedded Knowledge

Skills, Knowledge and Understanding

- Use oral and written communication when liasing with customer.

- Complete documentation after conducting equipment maintenance.

- Apply decision-making and problem solving skills before and during equipment maintenance.

- Demonstrate understanding of product facilities and operations.

- Demonstrate understanding of the policies and procedures.

- Reach agreement with the customer through negotiation.

- Facilitate co-operation between role-players.

- Apply light current electrical principles during equipment maintenance.

- Apply faultfinding procedures before, during and after equipment maintenance.

- Utilise test instruments during testing process.

- Demonstrate understanding of the correct use of tools.

- Demonstrate computer literacy

Legal Requirements

The typical legal requirements for this unit standard includes but not limited to:

- Environmental Management System.
- Independent Communication Authority of South Africa.
- Occupational Health and Safety Act.

TITLE: **Maintain Telecommunication Equipment**

Field: Manufacturing, Engineering and Technology

Sub-field: Engineering and Related Design

Level: 5

Credits: 7

Issue date:

Review date:

Purpose:

This unit standard is for persons in the field of operating and maintaining Telecommunication equipment

A person credited with this unit standard is capable of:

- Planning the equipment maintenance
- Conducting the equipment maintenance
- Concluding the equipment maintenance
- Use systems documentation

This unit standard will contribute to the full development of any learner within the Telecommunications environment, more specifically within maintenance by providing recognition, further mobility and transportability within the field. The knowledge, skills and understanding demonstrated in this unit standard are essential for upliftment, social and economic transformation in the Telecommunications environment.

LEARNING ASSUMED TO BE IN PLACE

The following knowledge, skills, attitude and/or equivalent is assumed to be in place:

- Typing skills
- Analytical skills
- Communication and Language
- Computer literacy
- Mathematics and Science
- Principles of digital electronics
- Fault Finding Skills
- Testing procedures
- Telecomm. Related product course
- Competent in operating and installing Basic Telecommunication Equipment.

RANGE

<u>Context</u>

This unit standard is performed within structures where stationery, support structure, communication media, employer's policies and procedures, cultural ethics, business ethics, work environment, professional conduct, test instrumentation, tools, human resources, customer, material, equipment, quality standards, SABS standards, anti-static procedures, training facilities, technology and transportation are applicable.

The level assigned to this unit standard is appropriate because:

- Demonstrates comprehensive and employ a in depth range of skills in Telecommunication.

- Applies solutions to unknown problems.

- Demonstrates basic processing of readily available information.

- Shows basic competence in a limited range of established and familiar contexts under general supervision and quality control.

- Follows established and familiar procedures.

- Co-operates with others.

- Some limited/restricted responsibility for quantity and quality of one's own output.

- Responsible for guiding others.

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific outcome 1

Plan customer equipment maintenance

Assessment criteria

1.1 Role-players are consulted according to employer's policies and procedures.

1.2 Tools & equipment is verified and maintenance actions are planned according to job requirements.

1.3 Receiving of maintenance task according to company procedures is understood and be able to do.

Specific outcome 2

Conduct customer equipment maintenance

Assessment criteria

2.1 Customer equipment is tested according to equipment specifications.

2.2 Customer equipment is repaired / replaced / maintained according to equipment specifications and employer's policies and procedures.

2.3 Safety standards are applied and customer requirements adhered to throughout the maintenance process.

Specific outcome 3

Conclude customer equipment maintenance

Assessment criteria

3.1 Post testing of customer equipment is conducted according to equipment specifications.

3.2 Site is cleared and customer is advised according to employer's policies and procedures.

3.3 Role players are consulted according to job requirements.

3.4 Documentation is completed according to employer's policies and procedures.

ACCREDITATION PROCESS (including moderation):

Anyone assessing a learner against this unit standard, must be registered as an assessor with the relevant ETQA

Any institution offering learning that will enable achievement of this unit standard must be accredited in terms of the criteria laid down by the relevant ETQA.

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

NOTES

1. CRITICAL CROSS FIELD OUTCOMES

1.1 Organize and manage oneself and one's personal activities responsibly and effectively.

1.2 Identify barriers pertaining to the equipment maintenance and developed strategies to overcome them.

1.3 Work effectively with others as a member of a team in performing operational activities on Telecomm. Equipment.

1.4 Work effectively with role players in order to ensure that equipment is maintained and that customer's requirements are met.

1.5 Manage activities in terms of preparation, planning, conducting and concluding equipment maintenance effectively to ensure an accurate and professional service delivery.

1.6 Maintenance is conducted in order to prevent and solve any problem effectively.

1.7 Technology will assist in improving the entire maintenance process.

1.8 Be culturally sensitive across a range of social contexts when consulting customers.

1.1 Communicate effectively when performing maintenance activities.

EMBEDDED KNOWLEDGE

- Use and functions of systems documentation in Telecommunication equipment

- Use oral and written communication when liasing with customer.

- Complete documentation after conducting equipment maintenance.

- Apply decision-making and problem solving skills before and during equipment maintenance.

- Demonstrate understanding of product facilities and operations.

- Demonstrate understanding of the policies and procedures.

- Reach agreement with the customer through negotiation.

- Facilitate co-operation between role-players.

- Apply light current electrical principles during equipment maintenance.

- Apply faultfinding procedures before, during and after equipment maintenance.

- Utilise test instruments during testing process.

- Demonstrate understanding of the correct use of tools.

- Demonstrate computer literacy

SUPPLEMENTARY INFORMATION

The standard describes competent performance in performing maintenance activities Telecommunications Systems, and lay down the criteria by which competence should be judged, as well as the range of circumstances in which competence should be demonstrated.

Integrated assessment methods and tools will allow the candidate to demonstrate that she/ he has acquired knowledge of and can safely and effectively apply competence identified in this unit standard.

These tools include the following:
- In-situ (on-the-job) observations
- Role-play simulations
- Structured group discussions
- Written reports (e.g. tests, exams, case studies, projects, registers, logbooks, workbooks)
- Verbal report backs (presentations)
- Portfolios of evidence
- Projects (physical visits to Government Departments)
- Experiential learning
- Working in teams
- Scenario sketching

These methods must be carefully selected based on the purpose of the assessment (For example, the written method of assessing knowledge or on-job demonstration of practical competence). The assessment must integrate a number of different methods in order to give the assessor reliable and valid proof of competence and evidence of required attitudes.

Candidates are assessed against these assessment criteria. An assessor observes currently employed candidates carrying out their normal work duties. They may also be asked to carry out simulated tasks and to answer written and/or oral questions. Candidates studying towards a Unit Standard, and who are not currently employed, will also be assessed using variety of assessment tools.

TITLE: **Commission electronic telecommunications products and services**

FIELD: Manufacturing, Engineering and Technology

Sub-field: Engineering and Related Design

Level: 5

Credits: 7

Issue date:

Review date:

Purpose:

This unit standard is for persons who currently are, or will be, configuring and commissioning electronic telecommunications products and services.

A person credited with this unit standard is capable of:

- Able to ensure products and services are installed in the correct configuration
- Operate in the manner required by both the customer and the manufacturer/service provider
- Includes hand over of products and services to customers and basic operator training.

This unit standard will contribute to the full development of any learner within the Telecommunications environment, more specifically within maintenance by providing recognition, further mobility and transportability within the field. The knowledge, skills and understanding demonstrated in this unit standard are essential for upliftment, social and economic transformation in the Telecommunications environment.

LEARNING ASSUMED TO BE IN PLACE

The following knowledge, skills, attitude and/or equivalent is assumed to be in place:

- Analytical skills
- Communication and Language
- Computer literacy
- Mathematics and Science
- Principles of digital electronics
- Fault Finding Skills
- A sound understanding of test equipment used in Telecommunications
- Telecomm. Related product course

- Competent in operating and installing Basic Telecommunication Equipment.

RANGE

- Electronic telecommunications products and services: those electronic products and services relating to electronic telecommunications systems including transmission equipment, teletext, transmitters and receivers, customer premise equipment, operating support systems, data, voice, networks, links, test equipment, cryptographic systems, power supply, cabling, jamming, switches;
- Customers: internal, external, end-users, users of the product or system, managers, supervisors.
- A activities must comply with policies; procedure and requirements of the organizations involved; the ethical codes and standards of relevant professional bodies: and the relevant legislative and/or regulatory requirements.

Context

This unit standard is performed within structures where stationery, support structure, communication media, employer's policies and procedures, cultural ethics, business ethics, work environment, professional conduct, test instrumentation, tools, human resources, customer, material, equipment, quality standards, SABS standards, anti-static procedures, training facilities, technology and transportation are applicable.

The level assigned to this unit standard is appropriate because:

- Demonstrates comprehensive and employ a in depth range of skills in Telecommunication.

- Applies solutions to unknown problems.

- Demonstrates basic processing of readily available information.

- Shows basic competence in a limited range of established and familiar contexts under general supervision and quality control.

- Follows established and familiar procedures.

- Co-operates with others.

- Some limited/restricted responsibility for quantity and quality of one's own output.

- Responsible for guiding others.

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific outcome 1

Pre-commissioning and administration

Assessment criteria

1.1 Commissioning and cut over plans are implemented and installation meets customer satisfaction.

1.2 Internal client, customer and vendor requirements are identified

1.3 Planned configuration uses standard site configurations to implement commissioning plans

1.4 Configuration changes are made to the system and put into operation using site standard procedures. This includes explaining the changes to operators, obtaining all relevant permits, and following isolation and back-up procedures.

1.5 Electronic telecommunications products and services meet customer's operational configuration requirements.

1.6 Communication with identified customer contact personnel is maintained on a regular basis.

1.7 Calibration dates of test equipment is verified and correct

1.8 Correct procedure is followed when entering a customer site

1.9 Time management principles are described and explained

1.10 Prioritizing principles are explained

Specific outcome 2

Configure and commission electronic telecommunications products and services.

Assessment criteria

2.1 Installation is checked and verified to customer specifications

2.2 Software tools for off-line configuration are used in accordance with the configuration plan and manufacturer's instructions.

2.3 A test and commissioning procedure is developed in accordance with site procedures.

2.4 Commissioning typically includes - adjustment of constants, record of initial performance, alterations to initial design where necessary, consideration of consequences of commissioning on plant safety.

2.5 Commissioning tests are conducted in accordance with specifications, and equipment alignment and performance levels are correct.

2.6 Electronic products and services are commissioned within agreed timeframes and budgets.

2.7 Opportunities to improve commissioning of electronic products and services are identified and action is taken promptly.

Specific outcome 3

Post-commissioning and administration

Assessment criteria

3.1

3.2 Installation irregularities are identified and noted to customer specifications

3.3 Installation conforms to instructions, specifications and standards

3.4 Back-up copies of configuration software are made in accordance with site procedures.

3.5 Documentation for the commissioning of electronic telecommunications products and services is complete, and filed in the correct place by the agreed time.

3.6 Documentation is updated in accordance with site procedures.

ACCREDITATION PROCESS (including moderation):

Anyone assessing a learner against this unit standard, must be registered as an assessor with the relevant ETQA

Any institution offering learning that will enable achievement of this unit standard must be accredited in terms of the criteria laid down by the relevant ETQA.

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

NOTES

1. CRITICAL CROSS FIELD OUTCOMES

1.1 Organize and manage oneself and one's personal activities responsibly and effectively.

1.2 Identify barriers pertaining to the equipment maintenance and developed strategies to overcome them.

1.3 Work effectively with others as a member of a team in performing operational activities on Telecomm. Equipment.

1.4 Work effectively with role players in order to ensure that equipment is maintained and that customer's requirements are met.

1.5 Manage activities in terms of preparation, planning, conducting and concluding equipment maintenance effectively to ensure an accurate and professional service delivery.

1.6 Maintenance is conducted in order to prevent and solve any problem effectively.

1.7 Technology will assist in improving the entire maintenance process.

1.8 Be culturally sensitive across a range of social contexts when consulting customers.

1.1 Communicate effectively when performing maintenance activities.

EMBEDDED KNOWLEDGE

- Use and functions of systems documentation in Telecommunication equipment

- Use oral and written communication when liasing with customer.

- Complete documentation after conducting equipment maintenance.

- Apply decision-making and problem solving skills before and during equipment maintenance.

- Demonstrate understanding of product facilities and operations.

- Demonstrate understanding of the policies and procedures.

- Reach agreement with the customer through negotiation.

- Facilitate co-operation between role-players.

- Apply light current electrical principles during equipment maintenance.

- Apply faultfinding procedures before, during and after equipment maintenance.

- Utilise test instruments during testing process.

- Demonstrate understanding of the correct use of tools.

- Demonstrate computer literacy

SUPPLEMENTARY INFORMATION

The standard describes competent performance in performing maintenance activities Telecommunications Systems, and lay down the criteria by which competence should be judged, as well as the range of circumstances in which competence should be demonstrated.

Integrated assessment methods and tools will allow the candidate to demonstrate that she/ he has acquired knowledge of and can safely and effectively apply competence identified in this unit standard.

These tools include the following:
- In-situ (on-the-job) observations
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- Verbal report backs (presentations)
- Portfolios of evidence
- Projects (physical visits to Government Departments)
- Experiential learning
- Working in teams
- Scenario sketching

These methods must be carefully selected based on the purpose of the assessment (For example, the written method of assessing knowledge or on-job demonstration of practical competence). The assessment must integrate a number of different methods in order to give the assessor reliable and valid proof of competence and evidence of required attitudes.

Candidates are assessed against these assessment criteria. An assessor observes currently employed candidates carrying out their normal work duties. They may also be asked to carry out simulated tasks and to answer written and/or oral questions. Candidates studying towards a Unit Standard, and who are not currently employed, will also be assessed using variety of assessment tools.