No. 988 **22 September 2008**

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

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

Electrical Engineering and Construction

registered by Organising Field 12, Physical Planning and Construction, publishes the following Qualification and Unit Standards for public comment.

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

Comment on the Qualification and Unit Standards should reach SAQA at the address below and ***no later 22 October 2008.*** All correspondence should be marked **Standards Setting – Electrical Engineering and Construction** addressed to

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

DR S BHIKHA
DIRECTOR: STANDARDS SETTING AND DEVELOPMENT

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:
Further Education and Training Certificate: Electrical Engineering

SAQA QUAL ID	*QUALIFICATION TITLE*		
63889	Further Education and Training Certificate: Electrical Engineering		
ORIGINATOR		*PROVIDER*	
SGB Electrical Engineering & Construction			
QUALIFICATION TYPE	*FIELD*	*SUBFIELD*	
Further Ed and Training Cert	12 - Physical Planning and Construction	Electrical Infrastructure Construction	
ABET BAND	*MINIMUM CREDITS*	*NQF LEVEL*	*QUAL CLASS*
Undefined	130	Level 4	Regular-Unit Stds Based

This qualification replaces:

Qual ID	Qualification Title	NQF Level	Min Credits	Replacement Status
48474	National Certificate: Electrical Engineering	Level 4	134	Will occur as soon as 63889 is registered

PURPOSE AND RATIONALE OF THE QUALIFICATION
Purpose:

The purpose of this qualification is to provide learners, education and training providers and employers with the standards and the range of learning required to work effectively within various industries, making use of electrical engineering knowledge and skills to meet the challenges of such an environment.

Qualifying learners will also be able to relate their learning to scientific and technological principles and concepts. They will also be able to maintain and support the various policies and procedures related to the safety, health, environment and quality systems that govern their workplace. This qualification will enable the learner to find employment as a skilled worker to perform Artisan duties in the electrical field.

Qualifying learners at NQF Level 4 will be able to:

> Understand electrical equipment and protection technology and interpret integrated system schematics.
> Install and commission electrical equipment on integrated electrical systems.
> Maintain and repair electrical equipment on integrated electrical systems.
> Evaluate and solve familiar problems pertaining to electrical equipment, integrated electrical systems and related processes.
> Accept responsibility for utilising and maintaining equipment without working under direct supervision.

The FETC Electrical Engineering (NQF Level 4) is the culmination of a learning path spanning three qualifications and is intended to produce a highly competent person who will be able to meet the challenges of a competitive and demanding environment.

Rationale:

This is the third of a three-level qualification series that reflect the workplace-based needs of the electrical field that is expressed by employers and employees, both now and for the future. This electrical engineering qualification provides the advanced competencies required to work on integrated electrical systems and installations. This qualification provides the learner with accessibility to be employed within the electrical engineering field and provides the flexibility to pursue different careers across various industry sectors and articulate within industries such as:

> Manufacturing and Engineering.
> Energy Sector.
> Mining.
> Chemical.
> Transport.
> Other related engineering industry sectors.

This qualification will enhance the status and productivity of the learner as well as contribute to improved quality, production rate and growth within the engineering sector. The range of typical learners at this level could include individuals preparing to qualify as an Electrician. Qualifying learners will obtain a Further Education Certificate in Electrical Engineering which places the learner in a position to investigate requirements for advancement to qualified artisan status or progress to a National Certificate or Diploma at NQF Level 5.

This qualification could assist with the achievement of national government and industrial development policies and strategies to grow a pool of scarce and other related skills in support of sustainable economic growth. People working in the electrical engineering fields require specialized technical skills and knowledge in order to meet the requirements of continually changing environment of the various industries. Through its design, this qualification will meet the needs of learners within the electrical engineering sectors who require technical expertise and essential knowledge needed to earn formal qualifications. This qualification facilitates access for previously disadvantaged groups and other learners to acquire the technical knowledge and skills that are required as well as provide access and mobility into higher-level more specialised occupations. This will allow the learner greater employability and support the development of small, medium enterprises (SME).

RECOGNIZE PREVIOUS LEARNING?
Y

LEARNING ASSUMED IN PLACE
This qualification assumes learners obtained a National Certificate in Electrical Engineering NQF Level 3 or an equivalent qualification. If the learner does not already have such a qualification, learning in preparation for this qualification would also have to include:

> Language and Maths at NQF Level 3.
> Advanced concepts of Science and Technology related to electrical engineering, materials and tools used in installation processes.
> An ability to install integrated electrical equipment and circuits.
> Occupational health, safety and environmental practices within the electrical environment.
> An understanding of procedures related to workplace relationships, roles and responsibilities.

Recognition of Prior Learning:

This qualification can be obtained wholly or in part through the recognition of prior learning (RPL) The learner should be thoroughly briefed on the process. Support and guidance should be provided. The process should not be so onerous as to prevent learners from taking up the RPL option in obtaining the qualification.

Access to the Qualification:

Access to this qualification is open. However learners must have completed a National Certificate at NQF Level 3 (in trade-related sub-field) or equivalent. The learner must be physically able to perform the outcomes as specified in the unit standards and be able to differentiate between various colours applicable to the industry.

QUALIFICATION RULES
Fundamental Component:

In the Fundamental Component of the qualification, learners must demonstrate their competence in:

> Languages and Communication: 40 credits, 20 of these credits must be at NQF Level 4 and 20 credits may be at NQF Level 3 in a second South African language.
> Mathematical Literacy: 16 credits.

Core Component:

The compulsory unit standards in the Core Component of this qualification reflect the generic competencies required in the field of Electrical Engineering for all industrial environments. The learner must demonstrate competence in the Core Component for the total of 54 credits.

Elective Component:

This component consists of several specialisations each with its own set of unit standards. Learners are to choose a specialisation area and complete a minimum of 20 credits from the unit standards listed under that specialisation area so as to attain a minimum of 130 credits required for certification purposes.

Specialisation Area 1:

Mining:

Unit Standard Title; Level; Credits:

> Carry out work on energized medium voltage networks; Level 4; 16 Credits.
> Inspect, record and report condition of Medium/High Voltage station apparatus and related equipment; Level 4; 6 Credits.
> Inspect, test and maintain high voltage isolators; Level 4; 12 Credits.
> Inspect, test and maintain Medium/High Voltage earthing systems; Level 4; 4 Credits.
> Inspect, test and maintain Medium/High Voltage transformers; Level 4; 6 Credits.
> Install/replace medium/high voltage equipment and hardware; Level 4; 6 Credits.
> Install and commission direct current (DC) machines; Level 4; 8 Credits.
> Install and terminate Medium Voltage cables; Level 4; 6 Credits.
> Joint Medium Voltage cables; Level 4; 8 Credits.
> Maintain Direct Current (DC) machines; Level 4; 5 Credits.
> Maintain low voltage switchgear; Level 4; 4 Credits.
> Operate on Medium Voltage networks; Level 4; 20 Credits.
> Troubleshoot on programmable logic controllers; Level 4; 5 Credits.
> Maintain unit protection devices on transformers; Level 4; 6 Credits.
> Advance or retreat electrical reticulation in an underground coal section; Level 3; 6 Credits.
> Control electrical networks from a control centre; Level 4; 14 Credits.
> Fault-find and repair a DC powered machine; Level 4; 6 Credits.
> Fault-find and repair the electrical system of winder installations; Level 4; 4 Credits.

> Fault find and repair the electrical system of a conveyor installation; Level 4; 5 Credits.
> Fault find and repair the electrical system of a surface mining production machine; Level 4; 4 Credits.
> Fault find a medium voltage reticulation system; Level 4; 4 Credits.
> Maintain and repair Medium Voltage Switchgear; Level 4; 7 Credits.
> Construct, maintain and dismantle HV overhead lines; Level 4; 20 Credits.

Specialisation Area 2:

Electrical Construction:

Unit Standard Title; Level; Credits:

> Complete certificate of compliance for a single phase domestic installation; Level 4; 5 Credits.
> Maintain low voltage switchgear; Level 4; 4 Credits.
> Troubleshoot on programmable logic controllers; Level 4; 5 Credits.
> Select a back-up generator for a stand-alone renewable energy system; Level 4; 4 Credits.
> Design a solar pump system; Level 4; 4 Credits.
> Apply the principles of energy efficiency; Level 4; 4 Credits.

Specialisation Area 3:

Chemical:

Unit Standard Title; Level; Credits:

> Complete certificate of compliance for a single phase domestic installation; Level 4; 5 Credits.
> Maintain Direct Current (DC) machines; Level 4; 5 Credits.
> Maintain low voltage switchgear; Level 4; 4 Credits.
> Maintain unit protection devices on transformers; Level 4; 6 Credits.
> Fault-find and repair a DC powered machine; Level 4; 6 Credits.
> Install electronic motor speed control units; Level 4; 5 Credits.

Specialisation Area 4:

Electrical Distribution:

Unit Standard Title; Level; Credits:

> Carry out work on energized medium voltage networks; Level 4; 16 Credits.
> Inspect, record and report condition of Medium/High Voltage station apparatus and related equipment; Level 4; 6 Credits.
> Inspect, test and maintain high voltage isolators; Level 4; 12 Credits.
> Inspect, test and maintain Medium/High Voltage earthing systems; Level 4; 4 Credits.
> Inspect, test and maintain Medium/High Voltage transformers; Level 4; 6 Credits.
> Install/replace medium/high voltage equipment and hardware; Level 4; 6 Credits.
> Install and terminate Medium Voltage cables; Level 4; 6 Credits.
> Joint Medium Voltage cables; Level 4; 8 Credits.
> Maintain unit protection devices on transformers; Level 4; 6 Credits.
> Operate on Medium Voltage networks; Level 4; 20 Credits.
> Spray-wash energized medium / high voltage networks; Level 4; 4 Credits.
> Fault find a medium voltage reticulation system; Level 4; 4 Credits.
> Maintain and repair Medium Voltage Switchgear; Level 4; 7 Credits.
> Apply the principles of energy efficiency; Level 4; 4 Credits.
> Construct, maintain and dismantle HV overhead lines; Level 4; 20 Credits.