No. 216 **6 March 2009**

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

Generic Manufacturing, Engineering & Technology

registered by Organising Field 06 – Manufacturing, Engineering & Technology, publishes the following Qualifications and Unit Standards for public comment.

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the Qualifications and Unit Standards. The full Qualifications 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 Qualifications and Unit Standards should reach SAQA at the address below and ***no later than 6 April 2009.*** All correspondence should be marked **Standards Setting – SGB for Generic Manufacturing, Engineering and Technology** and addressed to

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

D. MPHUTHING
ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:
National Certificate: Measurement, Control and Instrumentation

SAQA QUAL ID	*QUALIFICATION TITLE*		
65629	National Certificate: Measurement, Control and Instrumentation		
ORIGINATOR		*PROVIDER*	
SGB Generic Manufacturing, Engineering& Technology			
QUALIFICATION TYPE	*FIELD*	*SUBFIELD*	
National Certificate	6 - Manufacturing, Engineering and Technology	Engineering and Related Design	
ABET BAND	*MINIMUM CREDITS*	*NQF LEVEL*	*QUAL CLASS*
Undefined	133	Level 2	Regular-Unit Stds Based

This qualification replaces:

Qual ID	Qualification Title	NQF Level	Min Credits	Replacement Status
48695	National Certificate: Measurement, Control and Instrumentation	Level 2	137	Will occur as soon as 65629 is registered

PURPOSE AND RATIONALE OF THE QUALIFICATION
Purpose:

The purpose of this qualification is to provide learners with the necessary applied competence to function effectively in the Measurement, Control and Instrumentation field at an entry level.

Qualifying learners will gain competencies that will promote professionalism in this sub field of Measurement, Control and Instrumentation by demonstrating competence against the following exit level outcomes:

> Understand the fundamentals of field process instrumentation.
> Conduct basic maintenance and calibration of field instrumentation and equipment.
> Demonstrate knowledge of relevant organizational standards, policies and procedures. [Range: legislative health, safety, environmental and maintenance].

This qualification provides for instrumentation competence and specialization in analytical equipment by means of elective unit standards.

Rationale:

Measurement, Control and Instrumentation is complex and sophisticated and regarded as a critical and scarce skill. Its importance spans across industries of manufacturing, engineering and technology and competence is important since the implications of malfunctioning instrumentation could cause the loss of life, finances and infrastructure in industry.

Health, safety, risks and environmental knowledge forms an integral part of the learning covered in the unit standards associated with this qualification. Concepts and technology covered by this qualification are written in a generic manner in order to provide for the portability of skill across

generic manufacturing, engineering and technology industries. The qualification thus contributes to a national skills pool in a meaningful and proactive manner. The qualification provides for the pipelining of a scarce skill for the sustainable growth of the industries it supports.

Typical entrants:

This qualification is aimed at learners (employed and unemployed) who wish to enter this field of economic activity as well as learners who are already in this field and have gained experience in this sub field and wish to receive formal recognition of experience. This qualification serves as an entry level for learners who wish to articulate through this career path and forms the basis for further development by advancing from this NQF Level 2 certificate to the NQF Level 3 and NQF Level 4 qualifications and eventual summative assessment through a nationally centralized trade test for red seal certification.

Hence, the range of typical learners at entry level could be:

> Assistants to qualified artisans with exposure resulting in unstructured experience, and who now seek to formalize their learning experience.
> School leavers who have not yet had any experience or vocational learning but have the potential to achieve this qualification.
> People working in other industry fields, but who now choose this field of work and have the potential to complete this qualification successfully.

Through its design this qualification will provide enhanced opportunity for employment within the Measurement, Control and Instrumentation industry.

Qualifying learners:

After qualifying with this certificate learners will be able to provide meaningful foundational skills to a range of industries and will contribute to the maintenance function of instrumentation by delivering skills and knowledge commensurate with the exit level outcomes of this certificate.

RECOGNIZE PREVIOUS LEARNING?
Y

LEARNING ASSUMED IN PLACE
It is assumed that learners are already competent in:

> Communication and Mathematical Literacy at NQF Level 1.

Recognition of Prior Learning:

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

Access to the Qualification:

Access to this qualification is open. However, it is preferred that learners have completed a National Certificate at NQF Level 1 in a trade-related sub-field or an equivalent qualification.

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
In the compulsory Fundamental Component of the qualification, learners must demonstrate their competence in the 20 credits in the field of Communication at NQF Level 2 and 16 credits in the field of Mathematical Literacy NQF Level 2.

The unit standards in the compulsory Core Component of this qualification reflect the generic competencies required in the Measurement, Control and Instrumentation discipline for the applicable industrial environments. The learner must demonstrate competence in the Core Component for the total of 84 credits.

Learners have to complete a minimum of 13 credits in the Elective Component. A minimum of 133 credits is required for certification purposes.

This qualification provides for a specialization in analytical equipment through the selection of the following elective unit standards:

> ID 244062: Demonstrate an understanding of elementary chemical principles and their application in process industries, 8 credits.
> ID 244071: Apply sampling theory and practice, 5 credits.

The above specializations apply to the following process industries in South Africa:

> Pulp and Paper.
> Metals Manufacturing and related process industries.
> Chemicals including Petrochemical.
> Mining and Minerals.
> All industries dealing with lifting machinery.
> Food and Beverages.
> Power Plant.

EXIT LEVEL OUTCOMES
1. Understand the fundamentals of field process instrumentation.

2. Conduct basic maintenance and calibration of field instrumentation and equipment.

3. Demonstrate knowledge of organizational standards, policies and procedures.
> Range: legislative health, safety, environmental and maintenance.

4. Solve problems and communicate with peers, supervisors and others.
> Range: Communication includes verbal and written form.

Critical Cross Field Outcomes:

> The learner is capable of identifying deviations related to equipment and procedures and creatively finding solutions through clearly defined methods and techniques.
> Work effectively with others as a member of a team on a daily basis to effectively provide maintenance and related services to process plants.
> Organise and manage oneself and one's activities responsibly and effectively by proactively handling and maintaining instrumentation equipment and tools.
> Communicate effectively using appropriate verbal and nonverbal skills to ensure a smooth shift take-over and hand-over and reporting all work related issues.
> Demonstrate an understanding of the world, as a set of related systems by recognising that problem solving in the context of Instrumentation and Analytical equipment does not happen in isolation.

> Use science and technology to show responsibility towards the environment and health of the broader community by complying with health, safety and environmental policies and procedures as dictated by legislation.

ASSOCIATED ASSESSMENT CRITERIA

Associated Assessment Criteria for Exit Level Outcome 1:

1.1 Basic Measurement, Control and Instrumentation drawings, sketches and material lists are identified and described in terms of their function.
1.2 The purpose of field instruments and equipment is explained in terms of a control loop within a process.
1.3 The fundamentals of electricity are described in accordance with accepted theoretical principles.
1.4 The methods and reasons for sampling instrumentation are given in accordance with organizational policy and procedure.
1.5 Methods and reasons for calibrating instrumentation are described using appropriate terminology and meet organizational standards.

Associated Assessment Criteria for Exit Level Outcome 2:

2.1 Maintenance of field instruments and equipment is planned for in accordance with sound Measurement, Control and Instrumentation principles and organisational requirements.
2.2 All appropriate engineering tools are used and maintained according to standard operating procedures.
2.3 Safe working conditions are applied when working with field instruments and equipment.
2.4 Field instruments and equipment are installed and removed in accordance with industry accepted procedures.
2.5 Basic Measurement, Control and Instrumentation drawings, sketches and material lists are used according to their purpose.
2.6 Instruments are calibrated as per specifications and associated ranges.

Associated Assessment Criteria for Exit Level Outcome 3:

3.1 Field instruments and equipment are used in accordance with safe working practices and manufacturer specifications.
3.2 Quality, safety and environmental procedures are followed, with specific reference to regulatory and legislative requirements.
3.3 Safety requirements in an electrical environment are described in terms of meeting legislative and organisational specific standards.

Associated Assessment Criteria for Exit Level Outcome 4:

4.1 Communication is maintained and adapted as required to promote effective interaction in the work context.
4.2 Terminology used is appropriate to the situation and in accordance with normal workplace usage.
4.3 Information related to work tasks is accessed and interpreted from a range of written and oral sources that ensure work requirements are understood.
4.4 Communication is clear and unambiguous and at an appropriate level for designated target audiences.
4.5 Information communicated is accurate and conveyed in accordance with acceptable timeframes.
4.6 Communication is effective, regular and ongoing.

Integrated Assessment: