No. 127 **11 February 2009**

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

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

Air-conditioning, Refrigeration and Ventilation

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

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

Comment on the Qualifications and Unit Standards should reach SAQA at the addr and ***no later than 11 March 2009.*** All correspondence should be marked **Standards SGB for Air-conditiong, Refrigeration and Ventilation** and addressed to

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ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:
National Certificate: Air-conditioning, Refrigeration and Ventilation

SAQA QUAL ID	*QUALIFICATION TITLE*		
65449	National Certificate: Air-conditioning, Refrigeration and Ventilation		
ORIGINATOR		*PROVIDER*	
SGB Air-conditioning Refrigeration and Ventilation			
QUALIFICATION TYPE	*FIELD*	*SUBFIELD*	
National Certificate	6 - Manufacturing, Engineering and Technology	Manufacturing and Assembly	
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
48959	National Certificate: Air-conditioning, Refrigeration and Ventilation	Level 2	147	Will occur as soon as 65449 is registered

PURPOSE AND RATIONALE OF THE QUALIFICATION
Purpose:

The air conditioning, refrigeration and ventilation industry provides a service to many sectors of the country`s economy such as food processing and warehousing, food transportation, distribution and retailing, deep level mining and industrial process, high rise and retail property, specialized medical care, automotive and mass transport, tourism and hospitality.

This qualification enables a competent learner at NQF Level 2, under supervision, to demonstrate a basic ability to install, service, repair and operate mechanical equipment that is used in the air conditioning, refrigeration and ventilation industry.

The current rate of urban development, the advance in technology and development of tourism creates an ever-increasing demand for air conditioning, refrigeration and ventilation equipment and systems and therefore a corresponding demand for technicians to repair, maintain, install and manufacture such equipment and systems.

The technical skills required for this purpose are scarce and there is a growing demand for technicians skilled in the mechanical, electrical and thermal sciences. These qualifications are ideally suited to school-leavers (male and female) who have an interest in the engineering sciences and have practical skills. This series of qualifications also equips the learner with entrepreneurial skills which would lead to self employment in the SMME field (Most businesses in the field of air conditioning, refrigeration, and ventilation are in fact SMME`s).

South African trained technicians are the obvious choice for work in this field, in many African countries. We also see an untapped potential for work and learning in this field, in many parts of Africa.

This qualification specifically suits learners who have an interest in science and mathematics as well as manual dexterity (ability to use tools) and a consciousness of personal and environmental safety.

Learners credited with this Qualification will be able to:

> Identify and handle refrigerants.
> Identify and use basic tools.
> Identify and work with component parts for air-conditioning, refrigeration and ventilation equipment.
> Understand the basic operation of air-conditioning, refrigeration and ventilation systems.
> Work safely and responsibly in the plant environment.

Rationale:

Air conditioning, refrigeration and ventilation are subfields of specialized engineering which account for the design, manufacture, installation, maintenance, and repair of systems which provide artificial cooling for the environment and the processing and preservation of foodstuffs. The development of the urban lifestyle with its concentration of population into centralized areas, the food chain from producer to consumer as well as the working environment and medical care would not be possible without these specialized engineering services.

This is the first qualification in a series of qualifications which will lead to a learner acquiring all the skills required to work in the industry in the repair, maintenance, installation, manufacture and ultimately design of the mechanical/electrical systems which provide temperature control for environmental or process needs. By qualifying at this level, a learner will achieve the status of an Assistant Mechanic. The broader framework of qualifications (2008) is demonstrated by the following hierarchy of qualifications:

> Assistant Mechanic - Level 2 (Technical competence - Has a basic understanding of equipment and is able to carry out technical work under supervision).
> Mechanic - Level 3, - (Technical competence - Has a knowledge of equipment and systems and is able to carry out technical work without supervision).
> Artisan - Level 4, - (Technical competence - Has an advanced knowledge of systems and equipment and is able to work without supervision and to supervise a team).
> Technician/Project Leader - Level 5, - (Has knowledge of system design, selection and engineering and has management skills).

The learner will be required to reach competence in the advanced skills of the servicing, repair and commissioning of systems and the selection of components and to understand and operate supervisory control systems. He will be required to supervise work teams and communicate at all levels in the workplace and with customers.

There are many applications of air conditioning, refrigeration and ventilation which relate directly to the tourism and hospitality industry:

> Air conditioning of hotels, restaurants and recreation areas.
> Air conditioning of luxury buses, automobiles and other transport modes.
> Refrigeration related to the food chain (producers, processors, warehouses, transport, and retailing).

Relevant future socio-economic developments, for example, the increase in level of tourism will create further demand for the services of trained technicians to install, service and repair cooling equipment at all skills levels.

RECOGNIZE PREVIOUS LEARNING?

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LEARNING ASSUMED IN PLACE
This qualification assumes that the candidate has already achieved a General Education and Training Certificate at NQF Level 1 or ABET Level 4 or Grade 9 school level.

Recognition of Prior Learning:

This qualification may be achieved in part (or whole) through the recognition of relevant prior knowledge and/or experience. The learner must be able to demonstrate competence in the knowledge, skills, values and attitudes implicit in this qualification. As part of the provision of recognition of prior learning providers are required to develop a structured means for the assessment of individual learners against the Unit Standards of the Qualification on a case-by-case basis. A range of assessment tools and techniques during formative and summative assessment procedures should be used which have been jointly decided upon by the learner and the assessor. Such procedures, and the assessment of individual cases, are subject to moderation by independent assessors. The same principles that apply to assessment of this qualification also apply to recognition of prior learning.

Learners may provide evidence of prior learning for which they may receive credit towards the Unit Standards and/or the qualification by means of portfolios or other forms of appropriate evidence as agreed to between the relevant provider and relevant ETQA or ETQA that has a Memorandum of Understanding in place with the relevant ETQA.

RPL is particularly important, as there are people in the metal production sector with a variety of skills and competencies of differing quality and scope. It is important that an RPL process be available to assist in making sense of existing competencies and skills, and helping to standardise these competencies and skills towards a common standard.

QUALIFICATION RULES
> Fundamental component: 36 credits.

> Core component: 78 credits.

> A minimum total of 19 credits is required in the elective component. A learner may select any combination of credits adding up to a minimum of 19 credits.

EXIT LEVEL OUTCOMES
1. Identify and handle refrigerants.

2. Identify and use basic tools.

3. Identify and work with component parts for air-conditioning, refrigeration and ventilation equipment.

4. Understand the basic operation of air-conditioning, refrigeration and ventilation systems.

5. Work safely and responsibly in the plant environment.

Critical Cross-field outcomes:

This Qualification addresses the following Critical-Cross Field Outcomes:

Identifying and solving problems in which responses display that responsible decisions using thinking have been made when:

> Identifying, using and handling equipment in the air conditioning, refrigeration and ventilation industry.

Working effectively with others as a member of a team, group, organization and community when:
> Maintaining safety standards in handling air conditioning and refrigeration equipment.

Organising and managing oneself and one's activities responsibly and effectively when:
> Identifying tools, equipments and instruments.
> Sequencing installation of parts and components.

Communicate effectively using visual, mathematical and/or language in the modes of oral and/or written persuasion when:
> Explaining basic tools.
> Explaining sequence of installing component parts.
> Explaining the functions of components.
> Explaining refrigeration, air conditioning and ventilation systems.

Use science and technology effectively and critically, showing responsibility towards the environment and health of others when:
> How the various components are aligned and integrated into the bigger whole.

Demonstrate understanding of the world as a set of related systems by recognizing the complex and dynamic nature of the various systems, system components and the inter-relationships that exist between systems when:
> Interpreting air conditioning, refrigeration and ventilation plant layout and component and systems.
> Handling refrigerants responsibly.

ASSOCIATED ASSESSMENT CRITERIA
Associated Assessment Criteria for Exit Level Outcome 1:

> Types of refrigerants are identified as required.
> Procedures for the handling of refrigerants are demonstrated in line with specifications.
> Procedures for the handling of refrigerants are demonstrated in line with occupational safety norms and standards.

Associated Assessment Criteria for Exit Level Outcome 2:

> Types of basic tools are identified.
> Procedures and sequences for the use of basic tools are followed and demonstrated in line with manufacturer's specifications.
> Basic tools are handled in line with occupational safety norms and standards.

Associated Assessment Criteria for Exit Level Outcome 3:

> Component parts for air-conditioning, refrigeration and ventilation equipment are identified.
> Component parts for air-conditioning, refrigeration and ventilation equipment are used as required and in line with manufacturer's specifications.
> Component parts for air-conditioning, refrigeration and ventilation equipment are handled in line with occupational safety norms and standards.
> Consequences of defective assembly are explained in terms of safety, legal and contractual considerations.
> Standards for control of quality are explained and their application is discussed.