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

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GOVERNMENT NOTICES

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

No. 685 **15 July 2005**

In order to proceed with the recognition of Standards Generating Bodies in terms of Government Regulations 19(1)(c) and 22(2) of 28 March 1998, Organising Field 02, Culture and Arts, invites public comment with respect to *the acceptability of the nominees and the representativeness of the key education and training stakeholder interest groups* listed as SGB applicants below.

In addition, the coordinator invites submissions from interested parties wishing to serve on such an SGB. Interested parties should take note of the section on SGB Information below.

All nominations/ applications should be accompanied by curricula vitae.

More information regarding this application may be obtained on the SAQA website or from the SAQA offices.

Comment should reach the Directorate at the address below by not later than **15 Aug 2005.** All correspondence should be marked **SGB for Equine Management and Equestrian Instruction and** be addressed to:

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

SGB INFORMATION

As a necessary step in the development and implementation of the National Qualifications Framework, The Directorate of Standards Setting and Development is briefed [regulation 19(1)(c) of 28 March 1998] to recognise or establish Standards Generating Bodies (SGBs).

SGBs shall:

a. generate standards and qualifications in accordance with the Authority requirements in identified sub-fields and levels;
b. update and review standards;
c. recommend standards and qualifications to Directorate;

d. recommend criteria for the registration of assessors and moderators or moderating bodies; and
e. perform such other functions as may from time-to-time be delegated by the Directorate of Standards Setting and Development.

Any bodies wishing to nominate representatives, make application to serve on, or make any other submission with regard to the above SGB should note the following information.

SGBs should be composed of organisations, which shall be key education and training stakeholder interest groups and experts in the sub-field. The Directorate, when making its final decisions will have due regard for, among other things, *'the need for representativeness and equity, redress and relevant expertise in terms of the work of the SGBs.'*

Organisations proposing to nominate persons to SGBs should be sensitive to the need for ***equity*** and ***redress***, and shall nominate persons who-

(a) will be able to consider issues of productivity, fairness, public interest and international comparability as related to education and training in the sub-field;
(b) enjoy credibility in the sub-field in question, who enjoy respect; have the necessary expertise and experience in the sub-field and have the support or backing of the nominating body;
(c) are able to advocate and mediate the needs and interests of all levels within the sub-field covered by the Standards Generating Body;
(d) are able to exercise critical judgement at a high level; and
(e) are committed to a communication process between the Standards Generating Body, the Directorate for Standards Setting and Development and the Constituency.

PUBLIC NOTICE BY THE DIRECTORATE FOR STANDARDS SETTING AND DEVELOPMENT OF ITS INTENTION TO ESTABLISH AND REGISTER A STANDARDS GENERATING BODY (SGB) FOR EQUINE MANAGEMENT AND EQUESTRIAN INSTRUCTION IN ORGANISING FIELD 02, CULTURE AND ARTS

The Directorate for Standards Setting and Development has received an application to register a Standards Generation Body (SGB) for Equine Management and Equestrian Instruction in Organising Field 02, Culture and Arts, in order to generate and review standards and qualifications in the Equine and Equestrian fields from NQF Levels 1-8, from 1 August 2005 to 30th July 2008.

PROPOSED BRIEF OF THE SGB

1. Develop learning pathways for potential qualifications and unit standards in the area of Equine and Equestrian studies level 1 through to level 8 [Regulation 24 (1) (e)].

2. Generate appropriate Qualifications and Unit Standards across the Equine and Equestrian fields in accordance with Authority requirements, as below;

   - FETC Certificates (NQF Level 1)
   - National Certificates (NQF Level 2-5)
   - National Diplomas (NQF Levels 5& 6)
   - Bachelor's Degrees (NQF Level 6)
   - Honours Degrees (NQF 7)
   - Masters and Doctoral Level Degrees (NQF 8 +)

3. Recommend the Unit Standards and Qualifications generated in 2 above to SAQA [Regulation 24 (1)(c)].

4. Recommend criteria for the registration of assessors and moderators or moderating bodies for Equine Management and Equestrian Instruction [Regulation 24 (1)(d)].

5. Review already registered Qualifications and Unit Standards that have reached the end of their registration period and make recommendations on their re-registration [regulation 24 (1)(b)].

6. Maintain liaison during the process of developing standards and qualifications with other Standards Generating Bodies in the Field [Regulation 24 (e)(1)].

7. Accept and perform other related functions as requested by Organising Field 02 [regulation 24 (1)(e)].

PROPOSED COMPOSITION OF THE SGB

Name of Nominee	Workplace	Nominating Body	Qualifications/ Experience
Pieterse, Diane Mrs.	South African National Equestrian Federation (SANEF)	South African National Equestrian Federation (SANEF)	**Qualifications and Courses attained;** • Certificate PRISA Public Relations **Has the following experience;** • Life member PHASA AND IPHA; • Coenraad Vermaak award; • Equestarian; • has Conducted Research, Education and Training in Equestrian Sport; • Publications, Communication audits; • Judge, Co-ordinator; • Has written SANEF Qualifications • Has attended international seminars and lectures; • Is the regional representative, executive committee member, Director and National Chairman SANEF; • has conducted Equine and Equestrian studies and sport; • Holds Executive Committee seat and press officer, International Group for Equestrian Qualifications
Meiring, Noeleen Mrs.	South African National Equestrian Federation (SANEF)-Instructor's Plan.	South African National Equestrian Federation (SANEF)-Instructor's Plan.	**Qualifications and Courses attained;** • National Certificate in Police Administration; • National Higher Certificate in Police Administration; • Has attended various Horseback basic equestrian courses **Has the following Experience;** • Strong horse background; • South African Defence Force Platoon Sergeant and Equestrian rider; • South African Police Services trainer, served equestrian rider, instructor, evaluator and National Commander; • Manager • Instructor in Crime prevention on horseback; • has made Publications in South African Police Services and writtenSecurity Services equestrian training manuals

Bartlett, Rosemarie Mrs.	Riverside Equestrian Center	Riverside Equestrian Center	**Qualifications and Courses attained;** • Diploma and Certificate Equestrian Studies and Instruction; **Has the following Experience;** • Manager various riding schools; • Lecturer; • Instructor; • Consultant Lecturer SANEF; • Equestrian Judge at National and Provincial levels; • National Examiner SANEF; • Member and chairperson various Equestrian Committees
Mnganga, Phumla Mrs.	Lehumo Investment Holdings	Gold Circle Racing and Gaming group	**Qualifications and Courses attained;** • BA; • Diploma Guidance; • B.Ed; • Has attended various Programmes Business Leadership, Strategic HR and change management; • Diploma Public Relations; • completing M Business Leadership **Has the following Experience;** • Board and committee member SA Jockey Academy, Gold Circle, Lehumo PTY (LTD)/ Member University Kwazulu Natal, Durban Westville councils and senate • Board and committee member various companies
Salvage, Patrick, Richard Mr.	The Racing and Equestrian Academy	The Racing and Equestrian Academy	**Qualifications and Courses attained;** • B. Soc. Sc • HED **Has the following Experience;** • Teacher and Lecturer in various Equestrian Schools and Institutions • Headmaster Equestrian Academy
Stoltz, Izak, Jacobus Mr.	South Africa Police Services	South Africa Police Services Mounted School	**Qualifications and Courses attained;** • B.Juris; • Numerous Courses in Policing and Equestrian, Management, Law, Facilitation and Instruction; **Has the following Experience;** • Inspector, Mounted school and others • Captain and Head Mounted school

Templer, Elizabeth	The South African Pony Club	The South African Pony Club	**Qualifications and Courses attained;** • Diplomas and courses in Special and other Education; • Teacher in various Equestrian schools; **Has the following Experience;** • Head, Manager, Director, Owner Equestrian schools • Chair Equestrian committees.
De Klerk, Andries, Johannes Mr.	Sinqobile Equestrian Security	Sinqobile Equestrian Security	**Qualifications and Courses attained;** • National Certificate Police Administration; • National Higher Certificate Police Administration; • National Diploma Police Administration; **Has the following Experience;** • Strong horse backgroud, • South African Police Services Platoon Sergeant; • Equestrian Rider, Instructor, Evaluator, and National Commander SAPS; • Horseback Crime prevention • Director Horse Stud farm; • Served various Equestrian Committees; • writer South African Police Services and Security Services Equestrian Training Manuals
Siderfin, Mande, Louise Ms.	Medical University of Southern Africa	The South African Pony Club	**Qualifications and Courses attained;** • National Diploma Equine Studies, Stud management, Sport and Recreation; • Qualifications A-D Efficiency, Pony Care and Riding tests; • various courses in Equine, • Information Technology, International Computer Driver's Licence; **Has the following Experience;** • Has written SANEF Instructor's plan; • Lecturer's Assistant in Equine and Farm Animals; • Various Equine awards and competitions; • Many Equine Publications

Boers, Nicola Mrs.	Beaulieu College	Beaulieu College	**Qualifications and Courses attained;** • Post Graduate Diploma in Education; • Bsc Agriculture, Animal Science and Breeding; • Msc Agriculture, Animal Science and Breeding/ **Has the following Experience;** • Teacher, Lecturer Equine, Animals sc and others; • Manager; • Techninal Assistant Animal breeding and Wildlife Sciences; • Committee member SA National Equestrian Federation/ SANEF; • Member and Representative various committees National and International; • Attended, participated national, international conferences
Bridel, Jackline, Anne Mrs.	The Racing and Equestrian Academy	The Racing and Equestrian Academy	**Qualifications and Courses attained;** • 'A' Panel Dressage Judge; • Red Cross Advanced Certificate • Kwazulu Natal Provincial Chair person-SANEF Instructor's Panel • Kwazulu Natal Provincial Colours for Eventing and Showing; • Attended numerous courses in Equestrian management and Instruction **Has the following Experience;** • SANEF Instructo; • British Horse Masters 1 and 11; • Equestrian Judge, Instructor, Manager; • Teacher Equestrian and racing disciplines
Smit, Barend, Jacobus Mr.	Tshwane Metro Police	Tshwane Metro, Equestrian Unit	**Qualifications and Courses attained;** • Diploma Traffic; • Various Equestrian, Traffic, management Courses; **Has the following Experience;** • Quality Controller Nissan SA; • Long Period to date Acting Superintendent Tshwane metro Equestrian
Gadsby, Paul, Micheal Mr.	The Racing and Equestrian Academy	The Racing and Equestrian Academy	**Qualifications and Courses attained;** • Achieved Long duration Jockey apprenticeship; **Has the following Experience;** • Professional Jockey various clubs; • Director Training Race Horses; • Riding Instructor, Head of Department, Apprenticeship at the Racing and Equestrian Academy

Mansfield, Dawn, Felicity Mrs	Tshwane University of Technology	Tshwane University of Technology	**Qualifications and Courses attained;** • B-Tech Equine Science; • Stages 1-3 Horse Care; • Riding and Grooms Certificate; • Preliminary Teachers' Certificate; • Level 2 Instructors Certificate • Equestrian Internship Student; **Has the following Experience;** • Stud Assistant and Groom in various companies; • Lecturer Equine Science
Kanz, Megan, Jane Mrs	Equi-works	Equi-works	**Qualifications and Courses attained;** • Honours Degree Advanced Equine Sc; • Qualified Equine body worker; • Qualified Advanced Equine body worker; • Attended various equine courses **Has the following Experience;** • Supervisor, Lordship Stud; • Manager, Feed and Tack Store; • Freelance and contract equine therapist; • SA Division Head and Chairperson International Equine Body Worker Association; • Advanced Equine Body Builder; • Clinical Instructor for Equinenergy Ltd and EquiworksSA cc; • Demonstrations and Guest lecture SA Jockey and Equestrian Academy
Voigt, Collet Mrs	Damelin Equestrian Academy	Cody Stud	**Qualifications and Courses attained;** • Certificate Equine Stud Management; • Certificate Artificial Insemination; • SA Quarter Horse Association Certificate; • T-Touch Certificate; • Diploma in Business Management • Completing MBA; **Has the following Experience;** • Chairperson, member various Equestrian Committees and Bodies; • International Director American Quarter Horse Association/ President and CEO SA Quarter Horse Association (SAQHA); • Registered Breeder; • Long experience horses, riding, breeding; • Show Secretary SAQHA; • Principal, Private Provider

No. 686 **15 July 2005**

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

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

Physical Planning and Construction

publishes the following 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 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, Hatfield Forum West, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the qualification and unit standards should reach SAQA at the address ***below and no later than 15 August 2005.*** All correspondence should be marked **Standards Setting – SGB Electrical Engineering and Construction** and addressed to

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

DUGMORE MPHUTHING
ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

General Education and Training Certificate: General Technical Practice

SAQA QUAL ID	*QUALIFICATION TITLE*		
49753	General Education and Training Certificate: General Technical Practice		
SGB NAME		*NSB 12*	*PROVIDER NAME*
SGB Electrical Engineering & Construction		Physical Planning and Construction	
QUAL TYPE		*FIELD*	*SUBFIELD*
National Certificate		Physical Planning and Construction	Electrical Infrastructure Construction
ABET BAND	*MINIMUM CREDITS*	*NQF LEVEL*	*QUALIFICATION CLASS*
Undefined	130	Level 1	Regular-Unit Stds Based

PURPOSE AND RATIONALE OF THE QUALIFICATION

Purpose

This entry- level qualification reflects the workplace-based needs of the Energy sector, expressed by employers and employees, for now and in the future. This qualification improves the employability of learners within the energy industries and provides flexibility to pursue different careers within the sector.

The qualification specifies the key skills, knowledge and values required to participate in learning processes within a formal work environment. While acquiring a strong core background to the world of work in a technical environment, the level of flexibility within the range of electives will allow the individual to pursue a career within any chosen field in the energy industry.

Rationale

The energy sector requires workers at a wide range of levels and this qualification will meet the needs of learners at entry levels as well as provide them with the knowledge and skills required for further learning.All of the NQF Level 2 technical and occupational qualifications in the energy sector assume some learning at NQF Level 1. This qualification formalises those assumptions. In doing so, it provides a range of qualifying learners with access to further learning at NQF Levels 2 and beyond in the fields or sub-disciplines of Energy Generation, Transmission and Distribution, Renewable energy, Electrical Construction and Engineering.

For those who have acquired experience in the workplace, the qualification represents part of the RPL process to acknowledge workplace skills acquired without the benefit of formal education or training.For the unemployed or first time workers it provides an introduction to the world of work and an opportunity to acquire vocational skills and values which will enhance the employability of the learner within the energy sector.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

It is assumed that learners are competent in the following:
> Mathematical Literacy at ABET Level 3
> Communication at ABET Level 3

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. The learner should be thoroughly briefed on the mechanisms to be used and provided with sufficient support and guidance to prepare for the assessment process.

Care should be taken that the mechanism used for RPL provides the learner with the opportunity to demonstrate competence and is not so onerous as to prevent learners from taking up the RPL option to gain this qualification. This qualification will also allow for the design of top-up courses, or additional experience based on gaps identified during an initial assessment process.

ACCESS TO THE QUALIFICATION

The ability to distinguish colour is crucial for a person entering an electrical sub-field. Entry is open to any learner bearing in mind the above-mentioned physical requirement and the learning assumed to be in place.

QUALIFICATION RULES

The rules of combination for this Qualification:

The Fundamental, Core and Elective learning components are broken down as follows:
Fundamental Unit Standards:
The "Communication " category contains 23 Credits. The "Mathematics Literacy 'category contains 20 credits and "Science and Technology" and "world of Work" categories together contain 11 Credits. This amounts to 54 Credits for the Fundamental component of the Qualification. All the fundamental Unit Standards are compulsory.

Core Unit Standards:
This amounts to 46 credits. All the Core Unit Standards are compulsory.

Elective Unit Standards:
A minimum of 30 Credits must be done from one of the following fields:

> Energy
> GenerationTransmission
> Distribution
> Renewable energy
> Electrical Construction and Engineering

A minimum of 130 Credits must be done to achieve a Certificate.

EXIT LEVEL OUTCOMES

1. Understand and adhere to safe working practices, select and use appropriate tools and equipment, follow instructions and use diagrammatic guides under supervision.

2. Work to acceptable standards, evaluate quality of own work and utilise efficient time management, study and self-management skills.

3 .Describe and explain general business principles and practices at a basic level, understand common workplace processes and apply basic problem solving techniques within a defined context.

4. Describe and explain, the procedures, legislation and policies that govern a specific working environment and explain understanding of technologies applied in the energy environment, alternative forms of energy, energy efficiency and terminology.

ASSOCIATED ASSESSMENT CRITERIA

1.
(Note: Assessment must be carried out in situ)
> The applicable knowledge and practical skills are described in terms of a range of key elements or processes in the fields or sub-disciplines of Energy Generation, Transmission and Distribution, Renewable Energy, Electrical Construction and Engineering and include; tools and equipment, materials, technical information, communication structures and/or the service provided or the final product.
> Understanding of the applicable key elements or processes in his/her field is demonstrated by providing explanations on site.
> Appropriate verbal and written communication skills, including sketches, drawings and diagrams, are selected and used to explain concepts and processes.

2.
> The learner is able to apply Quality control principles are applied to work, own life and study.
> The learner's goals and learning targets are identified.
> Concept of self- management and planning is applied in work and in personal life.

3.
> The roles and interdependence of markets, suppliers, customers, employers and shareholders are described with examples.
> Generic business concepts are described and explained with examples.
> Links between inappropriate behaviour in the workplace and its effect on productivity is drawn using practical examples.

4.
> The procedures and policies that impact on the learner's tasks in the workplace are identified and explained using examples from own world experiences.
> The purpose and the need for such policies and procedures is illustrated with examples.
> Clear links are drawn between the process/task and the scientific and technological concepts underpinning it, drawing on insights gained by the learner during his/her work experience.

Integrated assessment

Integrated assessment at the level of this qualification will evaluate the learner's capacity to integrate concepts, actions and ideas across a range of activities and knowledge domains.

The integrated assessment must specifically evaluate the learner's ability to:
> Implement and apply procedures with special reference to the relevant Codes of Practice and applicable regulations pertaining to specific tasks.
> Understand, use and care for basic tools, machinery and equipment.
> Explain and discuss issues, aspects and principles and relate them to the specific workplace context.

This will require assessment methodologies which will include demonstration and oral and written responses, both summative and formative, and evidence of these in the form of portfolios or projects.

Since this is a foundational qualification, the learner must show sufficient evidence to apply the fundamental learning skills both in the workplace and in other contexts.

This assessment should also ensure that learners are assessed for the critical outcomes.

INTERNATIONAL COMPARABILITY

The unit standards of this qualification were compared to international standards and Qualifications at a similar level in New Zealand, Wales and Ireland. A comparable outcomes-based occupational qualification could not be found. This qualification compares well in terms of addressing minimum levels of literacy and numeracy whilst promoting lifelong learning. It is also unique in that it combines an introduction to the world of work with occupational skills standards.

ARTICULATION OPTIONS

This qualification has been designed as a broad - based foundation for a wide range of occupational and workplace based qualifications. The learner will acquire general technical skills that will enable the individual to pursue different careers in the energy sector and also facilitate articulation within the engineering industries.

Horizontal articulation is possible with:
> GETC: Basic Technical Practice: Energy at NQF Level 1

Vertical articulation is possible with:
> NC: Electrical Engineering at NQF Level 2

MODERATION OPTIONS

> Anyone assessing a learner or moderating the assessment of a learner against this Qualification must be registered as an assessor with the relevant ETQA.

> 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 ETQA`s policies and guidelines for assessment and moderation; in terms of agreements reached around assessment and moderation between ETQA`s including professional bodies; and in terms of the moderation guideline detailed 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, 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.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

Anyone assessing a learner against this qualification must be registered as an assessor with the relevant ETQA.

Assessors must have a technical knowledge of an engineering or electrical occupation context. They should also have sufficient expertise to assess communication, numeracy, technology and business processes.

NOTES

N/A

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

	UNIT STANDARD ID AND TITLE	LEVEL	CREDITS	STATUS
Core	7461 Use maps to access and communicate information concerning routes, location and direction	Level 1	1	Reregistered
Core	12512 Practice environmental awareness	Level 1	4	Registered
Core	13165 Describe the properties of materials found in the workplace and describe their impact on the environment	Level 1	6	Registered
Core	13172 Understand the employer/employee relationship	Level 1	3	Registered
Core	13174 Identify and discuss inappropriate behaviours in the workplace	Level 1	2	Registered
Core	13995 Demonstrate an understanding of contracts and their sources	Level 1	2	Reregistered
Core	14569 Demonstrate an understanding of how to participate effectively in the workplace	Level 1	3	Registered
Core	110075 Apply basic fire fighting techniques	Level 1	3	Registered
Core	116511 Carry out basic first aid treatment in the workplace	Level 1	1	Registered
Core	119831 Mark off and cut out shapes using a template	Level 1	3	Draft - Prep for P Comment
Core	8420 Operate in a team	Level 2	4	Reregistered
Core	10252 Identify, inspect, use, maintain and care for engineering hand tools	Level 2	6	Reregistered
Core	10255 Select, use and care for power tools	Level 2	5	Reregistered
Core	113860 Demonstrate an understanding of the uses and safety aspect associated with flammable energy sources	Level 2	3	Registered
Elective	9839 Apply and maintain safety in an electrical environment	Level 1	5	Reregistered
Elective	13617 Select, use and maintain specialised tools for reticulation network construction	Level 1	2	Registered
Elective	14014 Read and interpret construction drawings and specifications	Level 1	3	Registered
Elective	14111 Demonstrate an understanding of how scientific skills and knowledge could contribute to sustainable use of resources	Level 1	2	Reregistered
Elective	119832 Construct and wire basic electrical circuits	Level 1	4	Draft - Prep for P Comment
Elective	119833 Install cables	Level 1	7	Draft - Prep for P Comment
Elective	119834 Install under-surface wireways and draw in conductors	Level 1	8	Draft - Prep for P Comment
Elective	119835 Install and maintain poles	Level 1	4	Draft - Prep for P Comment

Elective	10254	Maintain electrical distribution boards, panels and enclosures	Level 2	6	Reregistered
Elective	113861	Maintain servitudes, wayleaves and clearances	Level 2	5	Registered
Elective	113877	Understand fundamentals of electricity	Level 2	8	Registered
Fundamental	7447	Working with numbers in various contexts	Level 1	6	Reregistered
Fundamental	7448	Work with patterns in various contexts	Level 1	4	Reregistered
Fundamental	7450	Work with measurement in a variety of contexts	Level 1	2	Reregistered
Fundamental	7453	Use algebraic notation, conventions and terminology to solve problems	Level 1	3	Reregistered
Fundamental	7509	Apply basic concepts and principles in the natural sciences	Level 1	5	Reregistered
Fundamental	12462	Engage in a range of speaking and listening interactions for a variety of purposes	Level 1	6	Registered
Fundamental	12469	Read and respond to a range of text types	Level 1	6	Registered
Fundamental	12470	Write for a variety of different purposes	Level 1	6	Registered
Fundamental	12471	Explore and use a variety of strategies to learn (revised)	Level 1	5	Registered
Fundamental	12535	Understand the world of work	Level 1	5	Registered
Fundamental	14084	Demonstrate an understanding of and use the numbering system	Level 1	1	Registered
Fundamental	14098	Understand and use energy in technological product and systems	Level 1	1	Reregistered
Fundamental	110083	Process, analyse and communicate numerical data	Level 1	4	Registered

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 1

Mark off and cut out shapes using a template

SAQA US ID	*UNIT STANDARD TITLE*		
119831	Mark off and cut out shapes using a template		
SGB NAME		*NSB 12*	*PROVIDER NAME*
SGB Electrical Engineering & Construction		Physical Planning and Construction	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Physical Planning and Construction	Electrical Infrastructure Construction
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	3	Level 1	Regular

SPECIFIC OUTCOME 1

Plan and prepare materials and equipment for marking off.

SPECIFIC OUTCOME 2

Mark off surface using template.

SPECIFIC OUTCOME 3

Cut out and finish off shape.

SPECIFIC OUTCOME 4

Apply quality checks on completed work and store tools, equipment and templates.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 2

Construct and wire basic electrical circuits

SAQA US ID	*UNIT STANDARD TITLE*		
119832	Construct and wire basic electrical circuits		
SGB NAME		*NSB 12*	*PROVIDER NAME*
SGB Electrical Engineering & Construction		Physical Planning and Construction	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Physical Planning and Construction	Electrical Infrastructure Construction
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	4	Level 1	Regular

SPECIFIC OUTCOME 1

Plan and sketch a basic circuit diagram.

SPECIFIC OUTCOME 2

Understand and describe the functioning of the circuit.

SPECIFIC OUTCOME 3

Understand and operate a power supply.

SPECIFIC OUTCOME 4

Prepare to construct a basic electrical circuit.

SPECIFIC OUTCOME 5

Construct basic electrical circuits.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 3

Install cables

SAQA US ID	*UNIT STANDARD TITLE*		
119833	Install cables		
SGB NAME		*NSB 12*	*PROVIDER NAME*
SGB Electrical Engineering & Construction		Physical Planning and Construction	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Physical Planning and Construction	Electrical Infrastructure Construction
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	7	Level 1	Regular

SPECIFIC OUTCOME 1

Plan work task.

SPECIFIC OUTCOME 2

Install surface mounted cables.

SPECIFIC OUTCOME 3

Install under-surface cables.

SPECIFIC OUTCOME 4

Install cables in trenches.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 4

Install under-surface wireways and draw in conductors

SAQA US ID	*UNIT STANDARD TITLE*		
119834	Install under-surface wireways and draw in conductors		
SGB NAME		*NSB 12*	*PROVIDER NAME*
SGB Electrical Engineering & Construction		Physical Planning and Construction	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Physical Planning and Construction	Electrical Infrastructure Construction
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	8	Level 1	Regular

SPECIFIC OUTCOME 1

Plan work task.

SPECIFIC OUTCOME 2

Install under-surface wireways.

SPECIFIC OUTCOME 3

Complete task.

SPECIFIC OUTCOME 4

Draw in conductors in wireways.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 5

Install and maintain poles

SAQA US ID	*UNIT STANDARD TITLE*		
119835	Install and maintain poles		
SGB NAME		*NSB 12*	*PROVIDER NAME*
SGB Electrical Engineering & Construction		Physical Planning and Construction	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Physical Planning and Construction	Electrical Infrastructure Construction
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	4	Level 1	Regular

SPECIFIC OUTCOME 1

Excavate hole for erection of pole.

SPECIFIC OUTCOME 2

Handle and erect poles.

SPECIFIC OUTCOME 3

Backfill the excavation.

SPECIFIC OUTCOME 4

Assess condition of and maintain or remove damaged poles.

No. 687 **15 July 2005**

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

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

Physical, Mathematical, Computer and Life Sciences

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 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, Hatfield Forum West, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the qualification and unit standards should reach SAQA at the address ***below and no later than 15 August 2005.*** All correspondence should be marked **Standards Setting – SGB Environmental Science, Environmental Management and Waste Management** and addressed to

The Director: Standards Setting and Development
SAQA
Attention: Mr. Eddie Brown
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DUGMORE MPHUTHING
ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Environmental Practice

SAQA QUAL ID	*QUALIFICATION TITLE*		
49752	National Certificate: Environmental Practice		
SGB NAME		*NSB 10*	*PROVIDER NAME*
SGB Environmental Sc/ Mgt & Waste Mgt		Physical, Mathematical, Computer and Life Sciences	
QUAL TYPE		*FIELD*	*SUBFIELD*
National Certificate		Physical, Mathematical, Computer and Life Sciences	Environmental Sciences
ABET BAND	*MINIMUM CREDITS*	*NQF LEVEL*	*QUALIFICATION CLASS*
Undefined	122	Level 3	Regular-Unit Stds Based

PURPOSE AND RATIONALE OF THE QUALIFICATION

Purpose:

This qualification is the third in a series for practitioners in the field of environmental science, environmental management and waste management. This series of qualifications will equip practitioners with the skills, knowledge and values to contribute towards the wise and effective use and management of our natural resources and ecological systems.

The specific purpose of this qualification represents the skills, knowledge and understanding required by competent practitioners to:
> Operate and maintain complex machinery and equipment in an environmentally responsible manner
> Apply appropriate environmental principles to prevent, correct or remedy negative environmental impacts
> Lead a team and work together with others to promote sound environmental practices.

With this understanding, learners will be able to engage productively and responsibly in work or community-related activities in the field of environmental science, environmental management and waste management. This qualification will also serve as a basis for further learning, and will equip learners with the knowledge, skills and values to participate meaningfully in society and contribute towards developing sustainable communities.

This qualification is applicable to a range of contexts within the field of environmental science, environmental management and waste management, such as local government, public and private waste management enterprises, cultural or natural heritage sites, community projects, recycling and recovery of resources, controlling and eradication of invasive and alien species, rural development and site preparation or rehabilitation. It is also suitable for workers with environmental functions in a range of industries such as mining and chemical industry or manufacturing. The following are typical contexts in which this qualification can be assessed:
> Waste management related activities, eg
  > Materials recovery and buy-back centres
  > Waste reception
  > Landfill operations
> Water course cleaning, care and maintenance
> Care of public places, open areas, cultural and natural heritage sites
> Maintenance of parks and sports fields
> Community projects and job creation schemes relating to environmental practice
> General industrial and extraction, ie activities with an environmental care or improvement focus.

Rationale:

South Africa has a need to manage and protect its natural resources and ecological systems, while simultaneously using its resources in a sustainable manner to promote social, physical and economic development.

There is also a need for people as individuals, and as members of social or workplace communities, to become aware of their responsibilities towards the environment and to be empowered to make informed choices regarding their own activities and the impact that these activities have on the environment. There is also a need for people to develop practices which will ensure that their activities, individually and collectively, result in the sustainable use of resources and minimise impact on the environment.

Recent developments in environmental legislation have resulted in an increased demand for practitioners with the necessary skills, knowledge and values to fulfil these legislative requirements.

Such practitioners - as learners, as workers and as members of social communities - need to be equipped to engage with the complexities and challenges which arise from this need to ensure that use and development is socially, ecologically and economically sustainable.

This qualification will enable providers, assessors and learners to plan, implement and measure the outcomes of suitable learning programmes, or to recognize prior learning. It will recognise the skills, knowledge and values of learners who engage actively in activities relevant to the field of environmental science, environmental management and waste management. The qualification is suitable for learners who:

> Have attended environment related courses and then apply the knowledge gained to activities in a workplace or in a community, or
> Are already workers and have acquired the skills and knowledge without attending formal courses, or
> Are already active in the community and have acquired the skills and knowledge without attending formal courses, or
> Participate in skills programmes and the appropriate work experience or community work, or
> Are part of a learnership programme which integrates structured learning and work experience, or
> Acquire their learning through any combination of the above.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

It is assumed that the learner is competent in Communication and Mathematical Literacy at NQF level 2.

Recognition of prior learning:

This qualification may be obtained through the process of RPL. The learner should be thoroughly briefed prior to the assessment and support should be provided to assist the learner in the process of developing a portfolio. While this is primarily a context-based qualification, evidence from other areas of endeavour may be introduced if pertinent to any of the Exit Level Outcomes.

ACCESS TO THE QUALIFICATION

Access to this qualification is open.

However, it is preferable that learners first complete the National Certificate: Environmental Practice: Level 2 or equivalent before accessing this qualification. The learner will need access to suitable specialised vehicles and/or complex machinery and equipment.

QUALIFICATION RULES

All Fundamental (40) credits and Core (70) credits are compulsory. Then a learner has to chose 12 elective credits from the elective component to make up the minimum required credits of 122. If a learner selects First Aid as an elective all 3 first aid standards should be done.

EXIT LEVEL OUTCOMES

The Exit Level Outcomes for this qualification reflect a combination of Specific Outcomes and Critical Cross-Field Education and Training Outcomes. The way in which the Critical Cross-Field Outcomes have been advanced through the learning required for this qualification is embedded in the way in which the unit standards have been constructed. Critical Cross-Field Outcomes form the basis for acquiring skills, knowledge and values. The application of these in a specific context results in the achievement of Specific

Outcomes. The integration of Specific Outcomes from a variety of unit standards results in the ability to achieve the Exit Level Outcomes.

Exit level outcome 1
> Operate and maintain specialised vehicles and/or complex machinery and equipment.

> Range: Includes movable and static equipment for material treatment and processing functions which include consolidating, packaging (collection and handling), transferring and transporting materials, waste treatment and recycling, waste disposal, etc.

Exit level outcome 2
> Apply principles of environmental monitoring to identify anomalies and report on conditions and incidents related to the learner's area of responsibility, and implement appropriate action.

Exit level outcome 3
> Use and handle resources in a sustainable way within the framework of applicable standards

> Range: Resources include natural resources, materials, energy, waste, etc.Handle includes transporting, storing, disposing of, classifying, etc. This outcome also includes an awareness of primary or fundamental pollution control equipment for soil, air, water, noise and energy. Standards are levels of performance set by the organisation, by legislation or by regulations.

Exit level outcome 4
> Provide input for environmental management processes.

> Range: Environmental management processes refer to planning, trend analysis, monitoring, auditing and reporting in terms of statutory requirements, etc. Input refers to collected data such as measurements, maintenance records, samples, material usage, etc

Exit level outcome 5
> Interact with supervisor and lead a team within an operational context.

> Range: Lead includes coordinating, scheduling, planning, organising, and evaluating operational activities. The team is led to complete routine tasks.

Exit level outcome 6
> Communicate with supervisors, the public, customers and colleagues to pass on information and to resolve problems or complaints.

ASSOCIATED ASSESSMENT CRITERIA

Assessment criteria associated with Exit level outcome 1

> Operations related to the process are monitored and controlled in terms of safety, health and environmental considerations.
> Range: The process includes activities such as operating an incinerator; handling effluent; using truck-mounted materials handling and compacting equipment; operating forklifts; liquid bulk loading; baling, compacting and shredding waste; checking and testing samples; monitoring and checking the quality of materials; mixing and preparing ingredients and chemicals; monitoring the flow and quality of materials and ingredients; monitoring and controlling the use of consumables.

> Operational incidents, events and problems are identified and addressed appropriately.

> The process is monitored and adjustments are made to maintain operational standards.

> Procedures are followed and enforced correctly.

> The product produced or service delivered meets operational requirements specified.
> Range: Product refers to results of an action or process, eg compacted materials. Service refers to work done to prevent, correct or remedy environmental impacts, eg operating an incinerator. Operational requirements refer to those standards set at the site by the team, by the organisation and by legislation or regulation.

Assessment criteria associated with Exit level outcome 2

> Basic principles of environmental monitoring and inspection are demonstrated in practice.
> Range: Awareness of monitoring and measuring techniques for environmental parameters.

> Appropriate tools and protocols are used to measure conformance to quality standards and to identify deviations.
> Range: Conformance and deviations relate to components and interrelationships between components of the environment and include the impact of human activities on the components of the environment. (All references to the impact of human activities on the environment implicitly include the subsequent impact of the degraded environment on human health and well-being in accordance with accepted definitions of the environment.) Used: where applicable, includes selecting appropriate tools and protocols.

> Action plans to address the deviations are developed and implemented, and their outcomes evaluated.

> Deviations from set standards are prevented, corrected, or remedied
> Range: Prevented, corrected, or remedied includes early detection and appropriate solutions (ie within the learner's capacity and authority) Standards are levels of performance set by the organisation, by legislation or by regulations.

Assessment criteria associated with Exit level outcome 3

> Preventive measures are applied to control the impact of incorrectly used and handled resources on the environment.
> Range: Includes management of impacts.

> Safety, health, security and environmental safeguards are applied, monitored and controlled at all times.

> Use of resources is monitored and controlled on an on-going basis.
> Range: Includes application of relevant environmental management tools and protocol.

> Resources are used in a sustainable manner.
> Range: Includes identifying opportunities for, and optimising, wise use of resources.

Assessment criteria associated with Exit level outcome 4

> Data input equipment is selected, used and maintained.
> Range: Data input equipment can range from hand held data recording equipment to weighbridges, etc.

> Relevant, accurate data is collected, recorded and managed.
> Range: Includes sample collection, taking measurements, reporting, etc.

> The purpose of the environmental management processes and the relevance of the data is explained.
> Range: Includes basic knowledge and understanding of EMS audit principles and of the requirements of the information system as defined in relevant environmental standards.

Assessment criteria associated with Exit level outcome 5

> Tasks and resources are allocated, and productivity and quality of work is monitored and controlled on an on-going basis.
> Range: Includes knowledge of employment conditions, job descriptions, time sheets, etc.

> Interpersonal skills are demonstrated at all times.
> Range: Includes approachability, leadership skills, establishing and maintaining relationships, resolving conflict.

> Health, safety and environmental standards are ensured at all times.

> Team targets are met within quality standards.

Assessment criteria associated with Exit level outcome 6

> Appropriate responses are made to public and customer comments.
> Range: Public and customer includes the community.
Appropriate responses include recording, providing information, referring to supervisor, etc, and include knowledge of the type of communication which should be referred to a higher level of authority.

> Correct information is communicated to relevant parties.
> Range: Parties include supervisors, customers, team members, the public (eg hand out pamphlets, make announcements, answer queries).

> Participation in meetings is constructive and contributes to the overall purpose.

Integrated Assessment

In order to achieve the aims of integrated assessment it is recommended that the assessor assesses all components of the learning in an integrated way and that credits are awarded for the unit standards during this assessment.

It is recommended that learning components (ie fundamental and core) are combined into assignments and projects which are then included in the portfolio of evidence. This will form the basis for the bulk of the assessment. The assessor can then focus on specific areas for further probing and verification.

The assessment process should:

> Cover the explicit activities required for the qualification as well as the understanding of the concepts and principles which underpin the activities
> Establish how the Critical Cross-Field Outcomes have been advanced by the learning process.

The integrated assessment must be based on a summative assessment guide. The guide will spell out how the assessor will assess different aspects of the performance and will include:

> Looking at records and reports in the portfolio and reviewing previous assessments
> Asking questions and initiating short discussions to test understanding
> Observing the learner at work (in the primary activity as well as in other interactions).

The learner may choose in which language s/he wants to be assessed. This should be established as part of a process of preparing the learner for assessment and familiarising the learner with the approach being taken.

While this is primarily a context-based qualification, evidence from other areas of endeavour may be introduced if pertinent to any of the Exit Level Outcomes.

Assessors should also evaluate evidence that the learner has been performing consistently to standard over a period of time.

INTERNATIONAL COMPARABILITY

Qualifications which are directly comparable with this one in terms of level and scope have not been identified. The fact that this is a generic qualification that must serve the diverse needs of the broad field of environmental science, environmental management and waste management, puts it in a class of its own. Internationally, qualifications related to environmental science and environmental management fall into the sphere of higher education, apart from a few isolated examples at supervisory and first-tier management level. There are a limited number of qualifications which focus on waste management, such as the Scottish Vocational Qualifications and the National Vocational Qualifications of England, Wales and Northern Ireland. The approach taken in these qualifications aligns broadly with the approach taken here: qualifications are standards-based, learning is workplace-based, assessment is observation- and portfolio-based, and skills and knowledge are acquired, practiced and assessed within contexts relevant to the learner. However, this (ie the South African) qualification places a greater requirement on the learner to demonstrate successful integration of the knowledge and skills acquired. Another recent development has been the initiative by the International Solid Waste Association to develop qualifications and promote training internationally. Developments are also taking place in other parts of the world, notably South America.

ARTICULATION OPTIONS

This qualification articulates with the National Certificate in Environmental Practice: NQF 4.

This qualification has been designed and structured so that qualifying learners can move from one context to another. Employers or institutions should be able to evaluate the outcomes of this qualification against the needs of their context and structure top-up learning appropriately. Equally, holders of other qualifications

may be evaluated against this qualification for the purpose of RPL.

This qualification has been designed as a generic qualification which will serve the diverse needs of the field of environmental science, environmental management and waste management. While a certain amount of the learning is applicable across the field, the balance will be related to the learner's context. Each context will have a different focus and this will determine what qualifications, both horizontally and vertically, will articulate with this one.

MODERATION OPTIONS

> Anyone assessing a learner or moderating the assessment of a learner against this Qualification must be registered as an assessor or moderator with the relevant ETQA.
> 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.
> 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 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 for assessment by the relevant ETQA.
> To ensure that national standards are maintained, the final assessment should be conducted on the following basis, which will be under the control of the relevant ETQAs. National assessment of written papers and/or practical assignments needs to be undertaken, by the relevant ETQA. This must include the necessary assessment tools (e.g. marking schemes) to ensure consistent assessment. The ETQA itself or a nominated body or bodies can perform this function.
> Assessment can be institutional or workplace based and must be done by a registered assessor.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

The following criteria should be applied by the relevant ETQA:

> Appropriate qualification in a relevant field of environmental science, environmental management and waste management at NQF Level 4 with a minimum of 2 years' experience in a relevant context.
> Appropriate experience and understanding of assessment theory, processes and practices.
> Good interpersonal skills and ability to balance the conflicting requirements of:
  > Maintaining national standards
  > The interests of the learner
  > The need for transformation and redressing the legacies of the past
  > The cultural background and language of the learner.
> Registration as an assessor with a relevant ETQA.

NOTES

N/A

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

	UNIT STANDARD ID AND TITLE	*LEVEL*	*CREDITS*	*STATUS*
Core	13223 Apply safety, health and environmental protection procedures	Level 3	6	Reregistered
Core	13912 Apply knowledge of self and team in order to develop a plan to enhance team performance	Level 3	5	Registered
Core	14019 Plan team work functions and complete reports	Level 3	4	Registered
Core	14050 Care for customers in a community environment	Level 3	5	Registered
Core	115093 Control workplace hazardous substances	Level 3	4	Registered
Core	116257 Explain human resource policies and procedures	Level 3	3	Registered
Core	116275 Apply routine maintenance and servicing plans and procedures	Level 3	3	Registered
Core	119821 Implement lean work practices to ensure sound environmental management practices	Level 3	10	Draft - Prep for P Comment
Core	119822 Collect data for environmental management purposes	Level 3	8	Draft - Prep for P Comment

Core	119829	Use appropriate environmental management tools and protocols to detect and respond to specific impacts	Level 3	10	Draft - Prep for P Comment
Core	119830	Operate specialised vehicles and/or complex static or moving machinery and equipment	Level 3	12	Draft - Prep for P Comment
Elective	117924	Use a Graphical User Interface (GUI)-based word processor to format documents	Level 2	5	Registered
Elective	11498	Attend and give evidence in court	Level 3	6	Registered
Elective	14534	Apply knowledge of community issues in relation to development projects	Level 3	4	Registered
Elective	14578	Erect palisade fencing	Level 3	4	Registered
Elective	14581	Repair/replace minor structures	Level 3	10	Registered
Elective	113909	Coach a team member in order to enhance individual performance in work environment	Level 3	5	Registered
Elective	114952	Apply problem-solving techniques to make a decision or solve a problem in a real life context	Level 3	2	Registered
Elective	116496	Provide primary emergency care for bleeding and wounds	Level 3	1	Registered
Elective	116497	Provision of primary emergency care intervention for shock, unconsciousness and fainting in the working place	Level 3	1	Registered
Elective	116524	Measure environmental factors and take appropriate action	Level 3	15	Registered
Elective	116534	Carry out basic first aid treatment in the workplace	Level 3	2	Registered
Elective	116940	Use a Graphical User Interface (GUI)-based spreadsheet application to solve a given problem	Level 3	6	Registered
Elective	117085	Conduct basic forestry map reading	Level 3	2	Registered
Fundamental	7456	Use mathematics to investigate and monitor the financial aspects of personal, business and national issues	Level 3	5	Reregistered
Fundamental	8968	Accommodate audience and context needs in oral communication	Level 3	5	Reregistered
Fundamental	8969	Interpret and use information from texts	Level 3	5	Reregistered
Fundamental	8970	Write texts for a range of communicative contexts	Level 3	5	Reregistered
Fundamental	8973	Use language and communication in occupational learning programmes	Level 3	5	Reregistered
Fundamental	9010	Demonstrate an understanding of the use of different number bases and measurement units and an awareness of error in the context of relevant calculations	Level 3	2	Reregistered
Fundamental	9012	Investigate life and work related problems using data and probabilities	Level 3	5	Reregistered
Fundamental	9013	Describe, apply, analyse and calculate shape and motion in 2-and 3-dimensional space in different contexts	Level 3	4	Reregistered
Fundamental	114941	Apply knowledge of HIV/AIDS to a specific business sector and a workplace.	Level 3	4	Registered

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 1

Implement lean work practices to ensure sound environmental management practices

SAQA US ID	*UNIT STANDARD TITLE*		
119821	Implement lean work practices to ensure sound environmental management practices		
SGB NAME		*NSB 10*	*PROVIDER NAME*
SGB Environmental Sc/ Mgt & Waste Mgt		Physical, Mathematical, Computer and Life Sciences	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Physical, Mathematical, Computer and Life Sciences	Environmental Sciences
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	10	Level 3	Regular

SPECIFIC OUTCOME 1

Explain and describe concepts related to lean work practices.

SPECIFIC OUTCOME 2

Identify opportunities for introducing lean work practices.

SPECIFIC OUTCOME 3

Develop an action plan to implement new or modified practices.

SPECIFIC OUTCOME 4

Assess, evaluate and report the impact of new or modified practices.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 2

Collect data for environmental management purposes

SAQA US ID	*UNIT STANDARD TITLE*		
119822	Collect data for environmental management purposes		
SGB NAME		*NSB 10*	*PROVIDER NAME*
SGB Environmental Sc/ Mgt & Waste Mgt		Physical, Mathematical, Computer and Life Sciences	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Physical, Mathematical, Computer and Life Sciences	Environmental Sciences
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	8	Level 3	Regular

SPECIFIC OUTCOME 1

Demonstrate understanding of the data collection requirements and plan the sequence of actions required to collect the data.

SPECIFIC OUTCOME 2

Obtain and prepare equipment and documentation required for data collection.

SPECIFIC OUTCOME 3

Collect and record data.

SPECIFIC OUTCOME 4

Care for and store tools and equipment used.

SPECIFIC OUTCOME 5

Complete and process all applicable documentation.

SPECIFIC OUTCOME 6

Explain why the data is required.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 3

Use appropriate environmental management tools and protocols to detect and respond to specific impacts

SAQA US ID	*UNIT STANDARD TITLE*		
119829	Use appropriate environmental management tools and protocols to detect and respond to specific impacts		
SGB NAME		*NSB 10*	*PROVIDER NAME*
SGB Environmental Sc/ Mgt & Waste Mgt		Physical, Mathematical, Computer and Life Sciences	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Physical, Mathematical, Computer and Life Sciences	Environmental Sciences
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	10	Level 3	Regular

SPECIFIC OUTCOME 1

Monitor and evaluate activities and processes.

SPECIFIC OUTCOME 2

Use data from monitoring process to identify key activities and processes impacting on the environment.

SPECIFIC OUTCOME 3

Select and use appropriate tools and protocols to assess impact on the environment.

SPECIFIC OUTCOME 4

Develop and implement an appropriate plan to address the deviations and evaluate results.

SPECIFIC OUTCOME 5

Record and report interventions and results achieved.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 4

Operate specialised vehicles and/or complex static or moving machinery and equipment

SAQA US ID	*UNIT STANDARD TITLE*
119830	Operate specialised vehicles and/or complex static or moving machinery and equipment

SGB NAME	*NSB 10*	*PROVIDER NAME*
SGB Environmental Sc/ Mgt & Waste Mgt	Physical, Mathematical, Computer and Life Sciences	

UNIT STANDARD TYPE	*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular	Physical, Mathematical, Computer and Life Sciences	Environmental Sciences

ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	12	Level 3	Regular

SPECIFIC OUTCOME 1

Monitor condition and operation of vehicles, machinery or equipment and resolve problems.

SPECIFIC OUTCOME 2

Operate vehicles, machinery or equipment according to workplace standards and with regard to their impact on the environment.

SPECIFIC OUTCOME 3

Record and report information related to the condition and operation of the vehicle, machine or equipment.

SPECIFIC OUTCOME 4

Discuss and explain concepts and principles related to the operation of equipment.

No. 688 **15 July 2005**

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

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

Law, Military Science and Security

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 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, Hatfield Forum West, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the qualification and unit standards should reach SAQA at the address ***below and no later than 15 August 2005.*** All correspondence should be marked **Standards Setting – SGB for Combat Weapons Maintenance** and addressed to

The Director: Standards Setting and Development
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e-mail: ebrown@saqa.co.za

DUGMORE MPHUTHING
ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

Further Education and Training Certificate: Firearms Maintenance

SAQA QUAL ID	*QUALIFICATION TITLE*		
49739	Further Education and Training Certificate: Firearms Maintenance		
SGB NAME		*NSB 08*	*PROVIDER NAME*
SGB Combat Weapons Maintenance		Law, Military Science and Security	
QUAL TYPE		*FIELD*	*SUBFIELD*
National Certificate		Law, Military Science and Security	Safety in Society
ABET BAND	*MINIMUM CREDITS*	*NQF LEVEL*	*QUALIFICATION CLASS*
Undefined	130	Level 4	Regular-Unit Stds Based

PURPOSE AND RATIONALE OF THE QUALIFICATION

Purpose:

This qualification will allow a learner in the Firearms Maintenance Industry and Statutory Forces to obtain a nationally recognised qualification for maintaining firearms. It will also contribute to the upliftment of the Firearms Maintenance and Statutory Forces personnel (i.e. armourers, gunsmiths, weapon fitters and armament fitters, etc.) by setting a professional standard within this industry. Qualifying learners will be able to:

> Communicate with internal and external clients by compiling technical reports and perform related administration.
> Use mathematical knowledge to read and interpret engineering drawings.
> Maintain, repair and inspect firearms according to manufacturer's specifications.
> Adhere to safety regulations and laws pertaining to firearms and ammunition.

Rationale of the qualification:

This qualification reflects the workplace-based needs of the Firearms Maintenance Industry that relates to maintaining firearms as expressed by employers, employees and education, training and development providers. This qualification will standardise firearms maintenance across the different sectors of the Firearms Maintenance Industry and contribute to the safety and security of society. This qualification provides the learner with access to employment within the Firearms Maintenance Industry and provides qualifying learners with the flexibility to pursue different careers in the broader Firearms Maintenance Industry and Statutory Forces.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

> Communication NQF Level 3.
> Mathematical Literacy NQF Level 3.

Recognition of Prior Learning:

This qualification may be achieved in part or whole through the recognition of prior learning gained in the Firearms Maintenance Industry. For the purposes of recognizing prior learning, providers are required to develop structured means of assessment of individual candidates against the exit level outcomes and unit standards of the qualification on a case by case basis. Such procedures and assessment of individual

candidates must be moderated by the relevant ETQA.

ACCESS TO THE QUALIFICATION

Learners embarking on study towards this qualification must meet all the criteria that are set in the firearm legislation pertaining to persons who may maintain firearms and must also have completed the unit standard Select use and care for engineering hand tools at NQF level 2 or its equivalent.

QUALIFICATION RULES

To qualify with the Further Education and Training Certificate in Firearms Maintenance at NQF level 4, learners are required to complete 56 credits in the fundamental and 65 credits in the core components of the qualification which are compulsory. Learners are required to choose a minimum of 9 credits from the elective component to complete the 130 credit requirement of the qualification.

EXIT LEVEL OUTCOMES

1. Communicate with internal and external clients by compiling technical reports and perform related administration.
2. Use mathematical knowledge to read and interpret engineering drawings.
3. Maintain, repair and inspect firearms according to manufacturer's specifications.
4. Adhere to safety regulations and laws pertaining to firearms and ammunition.

Critical Cross-field Outcomes:

The way in which the critical cross-field outcomes are addressed in this qualification is presented in detail in the unit standards. (See unit standards) The qualification addresses the following Critical Cross-Field Outcomes:
> Identifying and solving problems in which responses display that responsible decisions using critical and creative thinking have been made.
> Working effectively with others as a member of a team, group, organization or community.
> Organizing and managing oneself and one's activities responsibly and effectively.
> Communicating effectively using visual, mathematical and/or language skills in the modes of oral and/or written persuasion.
> Demonstrating an understanding of the world as a set of related systems by recognizing that problem solving contexts do not exist in isolation.
> Using science and technology effectively and critically showing responsibility towards the environment and health of others.
> Collecting, analysing, organising and critically evaluating information.

ASSOCIATED ASSESSMENT CRITERIA

1.
> Communication skills are demonstrated within the context of client service.
> Technical reports are compiled in order to facilitate communication with internal and external clients.
> Administrative procedures are adhered to, to expedite service delivery to clients.

2.
> Engineering drawings are read in order to establish maintenance requirements on firearms.
> Engineering drawings are analysed using mathematical principles in the planning of maintenance repairs to firearms.
> Engineering drawings are interpreted in order to affect maintenance on firearms according to manufacturer's specifications.

3.
> Firearms are inspected in order to determine whether repairs, and subsequently which repairs, are necessary in order to maintain the firearm.
> Firearms are maintained to ensure its continued safe operation.
> Firearms are repaired in accordance with manufacturer's specifications.

4.
> Firearms and ammunition are handled in accordance with accepted safety regulations.
> Firearms and ammunition are handled in accordance with legal prescripts.

Integrated Assessment

Assessment should focus on the candidates' ability to apply theoretical knowledge and understanding to

practical application. Assessors should use a range of strategies to allow candidates to demonstrate applied competence. Assessment strategies and procedures should be in alignment with the purpose and exit level outcomes of the qualification. These should primarily consist of practical assessments supported by written assignments, tests and/or examinations, case studies, problem solving assignments, portfolios of learning and projects.

INTERNATIONAL COMPARABILITY

A comparison of this qualification and the unit standards of the New Zealand certificate, the Arms Maintenance Diagnostics Advisor Certificate revealed that the content of this level 4 qualification compares well with the knowledge, understanding, skills and value orientations covered in the New Zealand certificate. A search of United States of America qualifications revealed that courses in Weapons Maintenance were too specialised to compare with what the SGB wanted to cover.

In the USA the Weapons Maintenance industry does not cover firearms in general as this qualification intends to. One specialises in pistols, shotguns, semi-automatic carbines, automatic carbines, etc. and this was found to be lacking in content and coverage for the South African context. A search of a number of African countries did not produce any comparable courses in Weapons Maintenance.

ARTICULATION OPTIONS

This qualification is equivalent to other FETCs at NQF level 4 in the Engineering, Mechanical and Maintenance field. Learners qualifying with this qualification may proceed to other level 5 qualifications in Weapons Maintenance that are yet to be developed by the SGB.

MODERATION OPTIONS

Providers offering this qualification must be accredited by the relevant ETQA. Accredited providers must establish moderation procedures and systems in line with the requirements of the ETQA.

One or more external moderators should moderate results of assessments. External moderators should provide reports not only on the fairness and consistency of assessment, but also on the validity of the assessment design in terms of the specified outcomes.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

Anyone assessing learners against this qualification must be registered as an assessor with the relevant ETQA. Assessors should have a level 5 qualification in Firearms Maintenance or its equivalent and an additional three years experience in the Firearms Maintenance Industry (as an Armourer, Gunsmith, Weapon Fitter or Armament Fitter etc).

NOTES

N/A

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

	UNIT STANDARD ID AND TITLE	LEVEL	CREDITS	STATUS
Core	119775 Explain and understand the legislation related to handling and storage of ammunition and firearms during maintenance	Level 4	3	Draft - Prep for P Comment
Core	119776 Maintain optical and non-optical firearm sighting systems	Level 4	18	Draft - Prep for P Comment
Core	119777 Apply safety precautions in the maintenance of firearms	Level 4	6	Draft - Prep for P Comment
Core	119778 Demonstrate an understanding of basic internal and external ballistics	Level 4	7	Draft - Prep for P Comment
Core	119780 Demonstrate an understanding of small arms ammunition	Level 4	4	Draft - Prep for P Comment
Core	119781 Demonstrate the use and care of firearm measuring equipment	Level 4	5	Draft - Prep for P Comment
Core	119782 Explain firearm surface treatments	Level 4	4	Draft - Prep for P Comment
Core	119783 Demonstrate and understanding of the operating principles in the maintenance of firearms	Level 4	18	Draft - Prep for P Comment
Elective	12255 Weld workpieces with the gas metal arc welding process in all positions	Level 3	15	Registered

Elective	119779	Explain the construction of firearm stocks	Level 4	9	Draft - Prep for P Comment
Fundamental	8968	Accommodate audience and context needs in oral communication	Level 3	5	Reregistered
Fundamental	8969	Interpret and use information from texts	Level 3	5	Reregistered
Fundamental	8970	Write texts for a range of communicative contexts	Level 3	5	Reregistered
Fundamental	8973	Use language and communication in occupational learning programmes	Level 3	5	Reregistered
Fundamental	7468	Use mathematics to investigate and monitor the financial aspects of personal, business, national and international issues	Level 4	6	Reregistered
Fundamental	8974	Engage in sustained oral communication and evaluate spoken texts	Level 4	5	Reregistered
Fundamental	8975	Read analyse and respond to a variety of texts	Level 4	5	Reregistered
Fundamental	8976	Write for a wide range of contexts	Level 4	5	Reregistered
Fundamental	8979	Use language and communication in occupational learning programmes	Level 4	5	Reregistered
Fundamental	9015	Apply knowledge of statistics and probability to critically interrogate and effectively communicate findings on life related problems	Level 4	6	Reregistered
Fundamental	9016	Represent analyse and calculate shape and motion in 2-and 3-dimensional space in different contexts	Level 4	4	Reregistered

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 1

Explain and understand the legislation related to handling and storage of ammunition and firearms during maintenance

SAQA US ID	*UNIT STANDARD TITLE*		
119775	Explain and understand the legislation related to handling and storage of ammunition and firearms during maintenance		
SGB NAME		*NSB 08*	*PROVIDER NAME*
SGB Combat Weapons Maintenance		Law, Military Science and Security	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Law, Military Science and Security	Safety in Society
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	3	Level 4	Regular

SPECIFIC OUTCOME 1

Explain the prohibitions of unlicensed firearms and ammunition in the working environment.

SPECIFIC OUTCOME 2

Explain the legislation pertaining to gunsmiths.

SPECIFIC OUTCOME 3

Explain the legislation pertaining to the storage and transport of firearms and ammunition.

SPECIFIC OUTCOME 4

Explain the legislation pertaining to the control of ammunition and firearm parts.

SPECIFIC OUTCOME 5

Explain the legislation pertaining to the requirements of mandatory inspections by authorised official.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 2

Maintain optical and non-optical firearm sighting systems

SAQA US ID	*UNIT STANDARD TITLE*		
119776	Maintain optical and non-optical firearm sighting systems		
SGB NAME		*NSB 08*	*PROVIDER NAME*
SGB Combat Weapons Maintenance		Law, Military Science and Security	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Law, Military Science and Security	Safety in Society
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	18	Level 4	Regular

SPECIFIC OUTCOME 1

Demonstrate an understanding of the basic principles of sighting systems.

SPECIFIC OUTCOME 2

Maintain sighting systems.

SPECIFIC OUTCOME 3

Trouble shoot faulty sighting systems by analysing the target.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 3

Apply safety precautions in the maintenance of firearms

SAQA US ID	*UNIT STANDARD TITLE*		
119777	Apply safety precautions in the maintenance of firearms		
SGB NAME		*NSB 08*	*PROVIDER NAME*
SGB Combat Weapons Maintenance		Law, Military Science and Security	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Law, Military Science and Security	Safety in Society
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	6	Level 4	Regular

SPECIFIC OUTCOME 1

Explain the reasons for performing safety precautions when maintaining firearms.

SPECIFIC OUTCOME 2

Perform safety procedures according to manufacturers requirements when maintaining different types of firearms.

SPECIFIC OUTCOME 3

Take corrective actions when unsafe conditions are identified during firearm maintenance.

SPECIFIC OUTCOME 4

Demonstrate an understanding of the cycle of operation of firearms.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 4

Demonstrate an understanding of basic internal and external ballistics

SAQA US ID	*UNIT STANDARD TITLE*
119778	Demonstrate an understanding of basic internal and external ballistics

SGB NAME	*NSB 08*	*PROVIDER NAME*
SGB Combat Weapons Maintenance	Law, Military Science and Security	
UNIT STANDARD TYPE	***FIELD DESCRIPTION***	***SUBFIELD DESCRIPTION***
Regular	Law, Military Science and Security	Safety in Society

ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	7	Level 4	Regular

SPECIFIC OUTCOME 1

Explain ballistic definitions, terms and tables.

SPECIFIC OUTCOME 2

Demonstrate an understanding of internal ballistics.

SPECIFIC OUTCOME 3

Demonstrate an understanding of external ballistics.

SPECIFIC OUTCOME 4

Describe the effects of ammunition construction on internal and external ballistics.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 5

Explain the construction of firearm stocks

SAQA US ID	*UNIT STANDARD TITLE*		
119779	Explain the construction of firearm stocks		
SGB NAME		*NSB 08*	*PROVIDER NAME*
SGB Combat Weapons Maintenance		Law, Military Science and Security	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Law, Military Science and Security	Safety in Society
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	9	Level 4	Regular

SPECIFIC OUTCOME 1

Explain the layouts, components of and types of firearm stocks.

SPECIFIC OUTCOME 2

Explain the types of materials used to manufacture firearm stocks.

SPECIFIC OUTCOME 3

Explain the types of treatments and finishing methods used on firearm stocks.

SPECIFIC OUTCOME 4

Explain the types of recoil compensating methods.

SPECIFIC OUTCOME 5

Explain the types, methods and purposes of stock bedding.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 6

Demonstrate an understanding of small arms ammunition

SAQA US ID	*UNIT STANDARD TITLE*		
119780	Demonstrate an understanding of small arms ammunition		
SGB NAME		*NSB 08*	*PROVIDER NAME*
SGB Combat Weapons Maintenance		Law, Military Science and Security	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Law, Military Science and Security	Safety in Society
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	4	Level 4	Regular

SPECIFIC OUTCOME 1

Explain the various identified components of ammunition.

SPECIFIC OUTCOME 2

Explain the identified marking systems as well as the calibres of ammunition.

SPECIFIC OUTCOME 3

Demonstrate an understanding of the handling and storage of ammunition according to safety procedures.

SPECIFIC OUTCOME 4

Identify defective ammunition in order to report such defects to avoid unsafe conditions.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 7

Demonstrate the use and care of firearm measuring equipment

SAQA US ID	*UNIT STANDARD TITLE*		
119781	Demonstrate the use and care of firearm measuring equipment		
SGB NAME		*NSB 08*	*PROVIDER NAME*
SGB Combat Weapons Maintenance		Law, Military Science and Security	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Law, Military Science and Security	Safety in Society
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	5	Level 4	Regular

SPECIFIC OUTCOME 1

Identify and explain the purpose of firearm measuring equipment.

SPECIFIC OUTCOME 2

Demonstrate the use of firearm measuring equipment.

SPECIFIC OUTCOME 3

Explain and demonstrate care examination and storage of firearm measuring equipment.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 8

Explain firearm surface treatments

SAQA US ID	*UNIT STANDARD TITLE*
119782	Explain firearm surface treatments

SGB NAME	*NSB 08*	*PROVIDER NAME*
SGB Combat Weapons Maintenance	Law, Military Science and Security	
UNIT STANDARD TYPE	***FIELD DESCRIPTION***	***SUBFIELD DESCRIPTION***
Regular	Law, Military Science and Security	Safety in Society

ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	4	Level 4	Regular

SPECIFIC OUTCOME 1

Describe the effects of surface treatment chemicals on the environment and health of persons.

SPECIFIC OUTCOME 2

Explain the reasons for applying surface treatment to firearms.

SPECIFIC OUTCOME 3

Explain the different surface treatments and their respective preparation methods.

SPECIFIC OUTCOME 4

Explain the defects found in and on different types of surface treatment.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 9

Demonstrate and understanding of the operating principles in the maintenance of firearms

SAQA US ID	*UNIT STANDARD TITLE*		
119783	Demonstrate and understanding of the operating principles in the maintenance of firearms		
SGB NAME		*NSB 08*	*PROVIDER NAME*
SGB Combat Weapons Maintenance		Law, Military Science and Security	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Law, Military Science and Security	Safety in Society
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	18	Level 4	Regular

SPECIFIC OUTCOME 1

Explain the operating systems of firearms.

SPECIFIC OUTCOME 2

Demonstrate an understanding of the types of firearm locking mechanisms.

SPECIFIC OUTCOME 3

Demonstrate an understanding of the types of firearm feeding mechanisms.

SPECIFIC OUTCOME 4

Demonstrate an understanding of the types of firearm trigger mechanisms.

SPECIFIC OUTCOME 5

Demonstrate an understanding of the types of firearm safety mechanisms.

SPECIFIC OUTCOME 6

Demonstrate an understanding of the components of firearms barrels.

No. 689 **15 July 2005**

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

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

Business, Commerce and Management Studies

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 unit standards. The 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, Hatfield Forum West, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the qualification and unit standards should reach SAQA at the address ***below and no later than 15 August 2005.*** All correspondence should be marked **Standards Setting – SGB Procurement, Logistics and Supply Chain Management** and addressed to

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

DUGMORE MPHUTHING
ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 1

Apply technological capability establishment principles to programmes in the defence and security industry

SAQA US ID	*UNIT STANDARD TITLE*		
119851	Apply technological capability establishment principles to programmes in the defence and security industry		
SGB NAME		*NSB 03*	*PROVIDER NAME*
SGB Procurement, Logistics and Supply Chain Mngt		Business, Commerce and Management Studies	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Business, Commerce and Management Studies	Procurement
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	6	Level 5	Regular

SPECIFIC OUTCOME 1

Initiate and apply the concepts and practice of technological capability development as prior technological risk-reduction in preparation for medium to long-term RSA military acquisition programmes.

SPECIFIC OUTCOME 2

Establish a risk reduction process for existing programmes by integrating Technological Capability development.

SPECIFIC OUTCOME 3

Establish project plans to close Technological Capability gaps between that derived from the operational level of war requirement in the African context (requirement pull) and the current Technological Capability available (technology push).

SPECIFIC OUTCOME 4

Use a process tailored from the organisation's acquisition practices to establish and manage a Technological Capability Development contract.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 2

Apply System Engineering Technical Management to system development projects

SAQA US ID	*UNIT STANDARD TITLE*		
119852	Apply System Engineering Technical Management to system development projects		
SGB NAME		*NSB 03*	*PROVIDER NAME*
SGB Procurement, Logistics and Supply Chain Mngt		Business, Commerce and Management Studies	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Business, Commerce and Management Studies	Procurement
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	8	Level 5	Regular

SPECIFIC OUTCOME 1

Critically analyse and review the techniques for System Engineering Process Control.

SPECIFIC OUTCOME 2

Perform Engineering process control activities to support project objectives.

SPECIFIC OUTCOME 3

Tailor the System Engineering process for a specific project/system.

SPECIFIC OUTCOME 4

Apply Risk Management as part of the System Engineering process.

SPECIFIC OUTCOME 5

Apply System Integration, Verification and Validation Processes as part of a system development.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 3

Apply system engineering processes to an acquisition programme life cycle

SAQA US ID	*UNIT STANDARD TITLE*		
119853	Apply system engineering processes to an acquisition programme life cycle		
SGB NAME		*NSB 03*	*PROVIDER NAME*
SGB Procurement, Logistics and Supply Chain Mngt		Business, Commerce and Management Studies	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Business, Commerce and Management Studies	Procurement
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	8	Level 5	Regular

SPECIFIC OUTCOME 1

Apply the concepts of Requirements engineering.

SPECIFIC OUTCOME 2

Apply the concepts of systems analysis at product system level.

SPECIFIC OUTCOME 3

Critically analyse the activities of system design (synthesising a solution) for each acquisition phase at product system level.

SPECIFIC OUTCOME 4

Analyse and review the activities of assessment and selection between alternatives for each acquisition phase at product system level.

SPECIFIC OUTCOME 5

Analyse and review the role and function of Systems Engineering Documentation and Reports.

SPECIFIC OUTCOME 6

Analyse and review the role and function of System Engineering tools.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 4

Apply configuration management as a subset of the system engineering process

SAQA US ID	*UNIT STANDARD TITLE*		
119854	Apply configuration management as a subset of the system engineering process		
SGB NAME		*NSB 03*	*PROVIDER NAME*
SGB Procurement, Logistics and Supply Chain Mngt		Business, Commerce and Management Studies	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Business, Commerce and Management Studies	Procurement
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	8	Level 5	Regular

SPECIFIC OUTCOME 1

Apply Configuration Management principles throughout the life cycle of a product.

SPECIFIC OUTCOME 2

Apply Configuration Identification to projects.

SPECIFIC OUTCOME 3

Apply Configuration Control to projects.

SPECIFIC OUTCOME 4

Apply Configuration Status Accounting (CSA) to projects.

SPECIFIC OUTCOME 5

Apply Configuration Audits to projects.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 5

Analyse and apply engineering management in an acquisition programme

SAQA US ID	*UNIT STANDARD TITLE*		
119855	Analyse and apply engineering management in an acquisition programme		
SGB NAME		*NSB 03*	*PROVIDER NAME*
SGB Procurement, Logistics and Supply Chain Mngt		Business, Commerce and Management Studies	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Business, Commerce and Management Studies	Procurement
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	6	Level 5	Regular

SPECIFIC OUTCOME 1

Structure the acquisition Life Cycle of a programme.

SPECIFIC OUTCOME 2

Analyse and review the role of System Engineering in Acquisition Programmes.

SPECIFIC OUTCOME 3

Integrate related engineering disciplines into the structure of an acquisition programme.

SPECIFIC OUTCOME 4

Tailor the System Engineering process to the acquisition process.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 6

Apply logistics engineering principles in the acquisition management process and during steady state operations of a system

SAQA US ID	*UNIT STANDARD TITLE*		
119856	Apply logistics engineering principles in the acquisition management process and during steady state operations of a system		
SGB NAME		*NSB 03*	*PROVIDER NAME*
SGB Procurement, Logistics and Supply Chain Mngt		Business, Commerce and Management Studies	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Business, Commerce and Management Studies	Procurement
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	8	Level 5	Regular

SPECIFIC OUTCOME 1

Manage the logistic engineering activities as a sub-set of the system-engineering process in the acquisition life cycle.

SPECIFIC OUTCOME 2

Manage and improve logistic engineering and support activities during the steady state operation of a system.

SPECIFIC OUTCOME 3

Develop and implement risk management strategies according to organizational policies and procedures as applicable to logistics management.

SPECIFIC OUTCOME 4

Develop and implement a test and validation plan for logistics engineering during the acquisition and steady state operations phases.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 7

Plan and implement Quality Management Systems in corporate and project

SAQA US ID	*UNIT STANDARD TITLE*		
119857	Plan and implement Quality Management Systems in corporate and project		
SGB NAME		*NSB 03*	*PROVIDER NAME*
SGB Procurement, Logistics and Supply Chain Mngt		Business, Commerce and Management Studies	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Business, Commerce and Management Studies	Procurement
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	8	Level 5	Regular

SPECIFIC OUTCOME 1

Critically analyse the concepts of Quality and Quality Management.

SPECIFIC OUTCOME 2

Review the roles and responsibilities of stakeholders in ensuring quality in a project or organisation.

SPECIFIC OUTCOME 3

Select, plan and implement corporate Quality Management Systems.

SPECIFIC OUTCOME 4

Manage Supply Chain Quality Processes.

SPECIFIC OUTCOME 5

Select and develop Quality Assurance Plans for Acquisition Programmes.

No. 690 **15 July 2005**

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

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

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 qualification. The qualification 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 15 Aug 2005.*** All correspondence should be marked **Standards Setting – SGB Manufacturing and Assembly Processes** and addressed to

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

DUGMORE MPHUTHING
ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Diploma: Rubber Technology

SAQA QUAL ID	*QUALIFICATION TITLE*		
22774	National Diploma: Rubber Technology		
SGB NAME		*NSB 06*	*PROVIDER NAME*
SGB Manufacturing and Assembly Processes		Manufacturing, Engineering and Technology	
QUAL TYPE		*FIELD*	*SUBFIELD*
National Diploma		Manufacturing, Engineering and Technology	Manufacturing and Assembly
ABET BAND	*MINIMUM CREDITS*	*NQF LEVEL*	*QUALIFICATION CLASS*
Undefined	240	Level 5	Regular-Unit Stds Based

PURPOSE AND RATIONALE OF THE QUALIFICATION

Purpose:

The purpose of the qualification is to provide learners, education and training providers and employers with the standards and the range of learning required to work effectively as rubber technologists within the rubber manufacturing and assembly environment and meet the challenges of such an environment.

The chief skills that are recognised in this qualification are the ability to test and analyse rubber materials, components and products, determine requirements for rubber applications, perform auditing activities and manage projects. These skills require an in-depth understanding of rubber manufacturing and assembly processes and applicable rubber chemistry, rubber physics, organic chemistry and mathematical concepts.

Qualified learners will also understand:

> How to maintain and influence relationships in a complex production environment.
> How to achieve change.
> How to maintain quality specifications to optimise the quality assurance process.
> How to work with a range of information sources to optimise performance.

Qualifying learners will also be able to support the various policies and procedures related to the safety, health and environmental systems that govern their workplace.

Rationale:

The rubber manufacturing industry is characterized by a sophisticated manufacturing and assembly process within a competitive and challenging environment. The rubber products produced must meet a wide variety of exacting safety, quality, customer and consumer specifications. The industry has to respond to quality issues and increasing competition in export and domestic markets and ensure the on-going development of new products required by changing customer needs. Within the rubber manufacturing and assembly industry, the rubber technology skills area is concerned with ensuring that all inputs to the manufacturing and assembly process deliver the required quality and quantity of product. People working as rubber technologists require specialized technical skills and knowledge in order to assure that material specifications critical to the manufacturing process are met, quality assurance practices are adhered to during the rubber manufacturing and assembly process, and processes are in place to adapt to and meet the requirements of the constantly changing products that must be manufactured.

This is one of a series of qualifications for learners who want to follow a career in any industry in which rubber (elastomeric) materials are used.

For those who have been in the workplace for a long time, this qualification represents part of the RPL process to acknowledge workplace skills acquired without the benefit of formal education or training.

The qualification also forms the basis for further development within rubber technology, materials technology and management in the higher education and training band.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

This qualification assumes that learners have an FETC in Industrial Rubber or equivalent. If the learner does not already have such a qualification, it is assumed that learners are competent in:

> Communication and Mathematical Literacy at NQF Level 4.
> Understand rubber materials, components and products and their functions.
> Understand rubber manufacturing process.
> Concepts of influencing small levels of changes in quality assurance practices.
> Dealing with change in relation to procedures that support workplace relationships, procedures, roles and responsibilities.

Recognition of prior learning:

This qualification may be obtained through a process of RPL. The learner should be thoroughly briefed prior to the assessment and support provided and guidance should be provided to assist in the process of developing a portfolio. While this is primarily a workplace-based qualification, evidence from other areas of endeavour may be introduced if pertinent to any of the exit-level outcomes.

Care should be taken that the process used provides the learner with an opportunity to demonstrate competence and is not too demanding as to prevent learners from taking up the RPL option towards gaining the qualification.

ACCESS TO THE QUALIFICATION

This qualification is designed for learners who:

> Are new-entry workers to a rubber and material technology environment.
> Have attended courses and then apply the knowledge gained to activities in the workplace.
> Are already workers and have acquired the skills and knowledge without attending formal courses.
> Are part of a learnership programme, which integrates structured learning, and work experience.

Access for learners with physical disabilities is dependent on the:

> Type and severity of disability.
> Nature of the manufacturing process and the requirements of equipment operation.

QUALIFICATION RULES

In order to be awarded this qualification, learners have to be declared competent in:

> All listed unit standards in the Fundamental (42 credits) and Core category (167 credits) of the qualification.
> A minimum of 31 credits from the list specified under the elective category.

The learner may also choose additional elective unit standards in excess of the minimum required.

EXIT LEVEL OUTCOMES

1. Demonstrate an understanding of rubber compounding and processing and an ability to conduct investigations for verification purposes, to explain product non-conformances, for product modifications and for new product development.

2. Demonstrate an ability to determine the requirements for common commercial rubber applications.

3. Demonstrate an ability to implement new projects in a rubber manufacturing and assembly process.

4. Demonstrate an ability to audit materials, components, process performance and final product for compliance with specifications, e.g. policies and procedures, company performance criteria.

5. Demonstrate an ability to coordinate work activities and plan, schedule and arrange work.

6. Demonstrate an understanding of options for further learning in this or a related field of learning and preparation requirements for such learning.

ASSOCIATED ASSESSMENT CRITERIA

1.1 Experimental design is determined based on evaluation of presented task.
1.2 Tests are conducted and reliability of test results confirmed.
1.3 Report on findings is generated.
1.4 Can respond to and discuss issues related to rubber compounding and physics as they apply to the testing and analysis of rubber materials, components and products.

2.1 Predictions are formulated.
2.2 Relevant and appropriate information is collected.
2.3 Recommendations are made based on customer requirements.
2.4 Customer is satisfied with performance criteria of product in use, recommendations made and cost/quality relationship.
2.5 Report is compiled.
2.6 Recommendations made are justified with reference to rubber chemistry and physics.

3.1 Project plan is formulated with performance indicators.
3.2 Project is completed.
3.3 Feasibility of implementing project results is determined.
3.4 Report is generated and applicable persons briefed.
3.5 Can respond to and discuss issues related to project management.

4.1 Audit plan is produced.
4.2 Affected stakeholders are informed of audit plan.
4.3 Audit data is collected and recorded.
4.4 Findings are evaluated for conformance / non-conformance to legislation, company policy and procedures.
4.5 Findings report is compiled, processed and circulated to affected parties.
4.6 Audit findings and suitable recommendations are discussed with affected parties.
4.7 Corrective action(s) / improvements made are evaluated, recorded and processed.
4.8 Can respond to and discuss issues related to auditing activities.

5.1 Work schedules are met.
5.2 Work activities are planned.
5.3 Goals set are specific, measurable and achievable and aligned to customer and business needs.
5.4 Schedules are developed in consultation with relevant parties and any scheduling conflicts are resolved.

6.1 Options are explained.
6.2 Preparation requirements are explained.
6.3 Learning plan is developed.

Integrated assessment:

Integrated assessment at the level of the qualification provides an opportunity for learners to show they are able to integrate concepts, actions and ideas achieved across a range of unit standards and contexts.

Integrated assessment must evaluate the quality of observable performance as well as the thinking behind the performance, and must be based on a summative assessment guide. The guide will spell out how the assessor will assess different aspects of the performance and will include:

> Observing the learner at work (both in the primary activity as well as other interactions).
> Asking questions and initiating short discussions to test understanding.
> Looking at records and reports in the portfolio and reviewing previous assessments.

In some cases inference will be necessary to determine competence depending on the nature and context within which performance takes place.

It is necessary to ensure that the fundamental part of the qualification is also targeted to ensure that while the competence may have been achieved in a particular context, learners are able to apply it in a range of other contexts and for further learning. The assessment should also ensure that all the critical cross-field outcomes have been achieved.

The learner may choose in which language s/he wants to be assessed. This should be established as part of a process of preparing the learner for assessment and familiarising the learner with the approach being taken.

While this is primarily a workplace-based qualification, evidence from other areas of endeavour may be introduced if pertinent to any of the exit-level outcomes. The assessment process should cover both the explicit tasks required for the qualification as well as the understanding of the concepts and principles that underpin the activities associated with the tube and pipe manufacturing process.

INTERNATIONAL COMPARABILITY

This qualification has been designed in response to a need from the rubber manufacturing and assembly industry for persons at NQF level 5 with a particular set of skills. No direct international comparisons were found for this qualification at the equivalent of NQF level 5. However, this qualification articulates into further learning within the higher education band in materials and polymer technology. Such higher level qualifications are found in many countries such as Australia, New Zealand, United Kingdom, the United States and Canada.

ARTICULATION OPTIONS

The qualification has been designed and structured so that qualifying learners can move both horizontally from one area of specialisation to another, and vertically, further specialising in a particular skills area.

> Vertical articulation can occur with the National Diploma in Rubber Technology: NQF Level 6 (NLRD ID 1655) and horizontally with the National Certificate in Industrial Rubber Level 5 (NLRD ID 23260).

Employers or institutions should be able to evaluate the outcomes of these qualifications against the needs of their context and structure top-up learning appropriately. Equally, holders of other qualifications may be evaluated against this qualification for the purpose of RPL.

MODERATION OPTIONS

> Anyone assessing a learner or moderating the assessment of a learner against this unit standard must be registered as an assessor with the relevant Education, Training, Quality, Assurance (ETQA) Body, or with an ETQA that has a Memorandum of Understanding with the relevant ETQA.

> Any institution offering learning that will enable the achievement of this unit standard must be accredited as a provider with the relevant Education, Training, Quality, Assurance (ETQA) Body, or with an ETQA that has a Memorandum of Understanding with the relevant ETQA.

> Assessment and moderation of assessment will be overseen by the relevant Education, Training, Quality, Assurance (ETQA) Body, or by an ETQA that has a Memorandum of Understanding with the relevant ETQA, according to the ETQA's policies and guidelines for assessment and moderation.

> Moderation must include both internal and external moderation of assessments, unless ETQA policies specify otherwise. Moderation should also encompass achievement of the competence described in the Unit Standard.

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

CRITERIA FOR THE REGISTRATION OF ASSESSORS

Assessors should be in possession of:

> Appropriate qualification at one level above the level of the qualification and a minimum of three years experience in a rubber manufacturing and assembly environment. The subject matter experience of the assessor can be established by recognition of prior learning.
> Registered as an assessor with the relevant ETQA.

NOTES

N/A

UNIT STANDARDS

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

	UNIT STANDARD ID AND TITLE	LEVEL	CREDITS	STATUS
Core	9406 Manage a team	Level 5	4	Registered
Core	12669 Implement new projects in a rubber manufacturing and assembly process	Level 5	30	Registered
Core	12670 Test and analyse rubber materials, components and products	Level 5	45	Registered
Core	12671 Determine requirements for rubber applications	Level 5	60	Registered
Core	12674 Perform auditing activities	Level 5	12	Registered
Core	13237 Optimise the quality assurance system	Level 5	6	Registered
Core	13256 Maintain business processes	Level 5	10	Registered
Elective	13301 Produce complex engineering drawings	Level 4	6	Registered
Elective	13942 Demonstrate a basic understanding of the role of a business strategy in managing a small business or a business unit	Level 4	5	Registered
Elective	13949 Apply technical knowledge and skill to align business unit performance to business goals	Level 4	5	Registered
Elective	14473 Develop and produce computer aided drawings	Level 4	4	Registered
Elective	14539 Demonstrate an understanding and apply physical science and chemistry in construction materials testing	Level 4	8	Registered
Elective	114210 Use drawing equipment and apply drawing techniques to produce detail drawings of basic structural steelwork assemblies and arrangement drawings	Level 4	28	Registered
Elective	114585 Plan strategically to improve business performance	Level 4	4	Registered
Elective	113810 Interpret the principles contained in basic South African law as entrenched in the constitution and the Bill of Rights	Level 5	6	Registered
Elective	114204 Use advanced 3D computer modelling techniques in the production of detail drawings and other data leading to the fabrication of commercial and industrial structural steel buildings	Level 5	28	Registered
Elective	115824 Appraise the SMME business owner and or manager	Level 5	5	Registered
Elective	116793 Determine the viability of a business and monitor its performance	Level 5	10	Registered
Fundamental	12433 Use communication techniques effectively	Level 5	8	Registered
Fundamental	12675 Use mathematical and statistical techniques effectively as a rubber technologist	Level 5	34	Registered

No. 691 **15 July 2005**

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

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

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 standards. The 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, Hatfield Forum West, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the unit standards should reach SAQA at the address ***below and no later than 15 Aug 2005.*** All correspondence should be marked **Standards Setting – SGB for Mining and Minerals** and addressed to

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

DUGMORE MPHUTHING
ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 1

Describe the need for illumination in a working place

SAQA US ID	*UNIT STANDARD TITLE*		
119813	Describe the need for illumination in a working place		
SGB NAME		*NSB 06*	*PROVIDER NAME*
SGB Mining and Minerals		Manufacturing, Engineering and Technology	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Manufacturing, Engineering and Technology	Fabrication and Extraction
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	1	Level 1	Regular

SPECIFIC OUTCOME 1

Explain the specified requirements pertaining to illumination in a working place.

SPECIFIC OUTCOME 2

Describe the effects on the worker due to poor illumination.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 2

Describe the basic knowledge of HIV/ Aids, TB, STI's and substance abuse in the workplace

SAQA US ID	*UNIT STANDARD TITLE*		
119814	Describe the basic knowledge of HIV/ Aids, TB, STI's and substance abuse in the workplace		
SGB NAME		*NSB 06*	*PROVIDER NAME*
SGB Mining and Minerals		Manufacturing, Engineering and Technology	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Manufacturing, Engineering and Technology	Fabrication and Extraction
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	1	Level 1	Regular

SPECIFIC OUTCOME 1

Explain the basic knowledge of body systems, causes and implication of HIV/AIDS, TB, STI's and substance abuse in the work place.

SPECIFIC OUTCOME 2

Describe the signs and symptoms of HIV/Aids, TB, STI's and substance abuse.

SPECIFIC OUTCOME 3

Describe basic health education for promotion, prevention and curative care for HIV/Aids, TB, STI's and substance abuse.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 3

Identify and describe sources and controlling of noise in a working place

SAQA US ID	*UNIT STANDARD TITLE*		
119815	Identify and describe sources and controlling of noise in a working place		
SGB NAME		*NSB 06*	*PROVIDER NAME*
SGB Mining and Minerals		Manufacturing, Engineering and Technology	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Manufacturing, Engineering and Technology	Fabrication and Extraction
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	1	Level 1	Regular

SPECIFIC OUTCOME 1

Explain the specified requirements pertaining to noise exposure in a working place.

SPECIFIC OUTCOME 2

Describe the various sources of noise in a working place.

SPECIFIC OUTCOME 3

Explain the personal protective measures that can be taken against exposure to excessive noise.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 4

Describe Process Control Systems for Processing Diamond Gemstones

SAQA US ID	*UNIT STANDARD TITLE*		
119817	Describe Process Control Systems for Processing Diamond Gemstones		
SGB NAME		*NSB 06*	*PROVIDER NAME*
SGB Mining and Minerals		Manufacturing, Engineering and Technology	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Manufacturing, Engineering and Technology	Fabrication and Extraction
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	1	Level 1	Regular

SPECIFIC OUTCOME 1

Describe the stages of processing diamond gemstones.

SPECIFIC OUTCOME 2

Describe the controls in the process to ensure that the diamond gemstone is processed to the design, quality and productivity required.

SPECIFIC OUTCOME 3

Explain the consequences of non-adherence to process control systems.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 5

Know, use and select various modes to communicate technological ideas

SAQA US ID	*UNIT STANDARD TITLE*		
119820	Know, use and select various modes to communicate technological ideas		
SGB NAME		*NSB 06*	*PROVIDER NAME*
SGB Mining and Minerals		Manufacturing, Engineering and Technology	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Manufacturing, Engineering and Technology	Fabrication and Extraction
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
ABET Level 4	2	Level 1	Regular

SPECIFIC OUTCOME 1

Know and use various modes to communicate technological ideas.

SPECIFIC OUTCOME 2

Select and apply appropriate mode(s) to communicate technological idea(s).

No. 692 **15 July 2005**

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

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

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 qualification and unit standards. The 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, Hatfield Forum West, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the unit standards should reach SAQA at the address ***below and no later than 15 Aug 2005.*** All correspondence should be marked **Standards Setting – SGB Measurement, Control and Instrumentation** and addressed to

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

DUGMORE MPHUTHING
ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Measurement, Control and Instrumentation

SAQA QUAL ID	QUALIFICATION TITLE		
49746	National Certificate: Measurement, Control and Instrumentation		
SGB NAME		NSB 06	PROVIDER NAME
SGB Measurement, Control and Instrumentation		Manufacturing, Engineering and Technology	
QUAL TYPE		FIELD	SUBFIELD
National Certificate		Manufacturing, Engineering and Technology	Engineering and Related Design
ABET BAND	MINIMUM CREDITS	NQF LEVEL	QUALIFICATION CLASS
Undefined	121	Level 5	Regular-Unit Stds Based

PURPOSE AND RATIONALE OF THE QUALIFICATION

Purpose:

The purpose of the qualification is to build the necessary knowledge, understanding, abilities and skills for further learning towards becoming a professional practicing engineer in Measurement, Control and Implementation of engineering equipments.

Qualifying learners will gain competencies that will promote expertise in this sub field by being able to:

> Fault find and repair advanced Instrumentation
> Set-up and Configure a Process Control System
> Apply Measurement principles and related applications
> Apply management principles to a business environment

Rationale:

The National Certificate in Measurement, Control and Implementation is designed to contribute to developing Engineering and related design competence in terms of Measurement, Control and Implementation equipment with particular application to the flow, temperature, level and pressure field instrumentation.

This is the fourth qualification in a series designed for learners who want to follow a career in Measurement, Control and Instrumentation. The series outlines a learning progression from NQF level 2 to NQF level 5 for learners learning and working in the field of measurement, control and instrumentation. It reflects the skills, knowledge and understanding required to participate effectively in this field, whether in small, medium or large operations.

This learning pathway recognizes the skills, knowledge and values relevant to a workplace. It is designed for learners who:

> Have acquired the skills and knowledge without attending formal courses or training.
> Are part of a learnership or skills programme which integrates structured learning and work experience.
> Have attended courses or training sessions and then apply the knowledge and skills gained to activities in the workplace initiatives.
> Have full physical mobility as the Measurement, Control and Instrumentation environment is physically demanding.
> Do not suffer from colour blindness, which will require testing for, in order to safeguard industry and the learner.

> Level: Certificate 1,2,3,4,Diploma & Advanced Diploma
> Context: Contextual
> Assessment: Institution and work-based
> Essential embedded knowledge: Very detailed & specific (Referred to as underpinning knowledge)
> Credits: Not specified
> Fundamental learning: Not formally specified
> Business relations: Not formally specified
> Working with and developing others: Specified with a unit standard
> Life skills: Not covered

New Zealand:

> Scope: Nominal competence in a wide range of specific tasks
> Approach: Competency based
> Level: Level 3 to 6
> Context: Contextual
> Assessment: Institution and work-based
> Essential embedded knowledge: Specified without to much detail (Referred to as entry information)
> Credits: > Level 4 233
> Level 5 90
> Fundamental learning: Not formally specified
> Business relations: Not formally specified
> Working with and developing others: Not formally specified
> Life skills: Mentioned under the sub section of Humanities & includes a unit standard, but not well covered

South Africa:

> Scope: Mastery of specific outcomes in context
> Approach: Competency based
> Level: Level 2, 3 and 4
> Context: Contextual
> Assessment: Institution and work-based
> Essential embedded knowledge: Specified with reasonable detail
> Credits: > Level 2 189
> Level 3 195
> Level 4 167
> Level 5 136
> Fundamental learning: Specified
> Business relations: Specified
> Working with and developing others: Specified under the critical cross field outcomes
> Life skills: Specified under fundamental unit standards

In summary, there are considerable similarities in the technical competence required but the approach of the South African series of qualifications looks at whole-person development in not only technological, but also in team- and business-related skills and makes explicit assumptions related to level of schooling and life skills.

ARTICULATION OPTIONS

This series of qualifications can articulate directly to learning programmes and qualifications in the Measurement, Control and Instrumentation field. The qualification articulates horizontally with the National Certificate in Metrology: NQF Level 5. It also opens the possibility for further learning in the sub-field of Engineering and related design to the National Diploma in Measurement, Control and Instrumentation.

MODERATION OPTIONS

Anyone assessing a learner or moderating the assessment of a learner against this unit standard must be registered as an assessor with the relevant Education, Training, Quality, Assurance (ETQA) Body, or with an ETQA that has a Memorandum of Understanding with the relevant ETQA.

Any institution offering learning that will enable the achievement of this unit standard must be accredited as a provider with the relevant Education, Training, Quality, Assurance (ETQA) Body, or with an ETQA that has a Memorandum of Understanding with the relevant ETQA.

The relevant Education, Training, Quality, Assurance (ETQA) Body will oversee assessment and

moderation of assessment, or by an ETQA that has a Memorandum of Understanding with the relevant ETQA, according to the ETQA's policies and guidelines for assessment and moderation.

Moderation must include both internal and external moderation of assessments, unless ETQA policies specify otherwise. Moderation should also encompass achievement of the competence described in the Unit Standard.

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

CRITERIA FOR THE REGISTRATION OF ASSESSORS

Assessors should be in possession of:

> Appropriate qualification in the field of Measurement, Control and Instrumentation at one level higher than the level of the qualification and preferably relevant workplace practical experience.The subject matter experience of the assessor can be established by recognition of prior learning.
> Registered as an assessor with the relevant ETQA.

NOTES

N/A

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

	UNIT STANDARD ID AND TITLE	LEVEL	CREDITS	STATUS
Core	10148 Supervise a project team of a business project to deliver project objectives	Level 5	14	Reregistered
Core	119803 Integrate a Process Control System	Level 5	12	Draft - Prep for P Comment
Core	119805 Apply diagnostic techniques to a process control system	Level 5	8	Draft - Prep for P Comment
Core	119806 Understand electromagnetic and particle radiation principles and applications	Level 5	10	Draft - Prep for P Comment
Core	119809 Design and apply modifications to existing process control systems	Level 5	15	Draft - Prep for P Comment
Core	119811 Demonstrate an understanding of the Integrity of Measurement and Control Philosophy of a process	Level 5	10	Draft - Prep for P Comment
Core	119812 Install, configure, test and analyze process communication systems	Level 5	10	Draft - Prep for P Comment
Elective	15220 Set, monitor and measure the achievement of goals and objectives for a team, department or division within an organisation	Level 5	4	Registered
Elective	15225 Identify and interpret related legislation and its impact on the team, department or division and ensure compliance	Level 5	4	Registered
Elective	114049 Demonstrate an understanding of Computer Database Management Systems	Level 5	7	Registered
Elective	119255 Apply the ISO document "guide to the expression of uncertainty in measurement" to estimate uncertainty of measurement	Level 5	5	Registered
Elective	119804 Demonstrate an understanding of Custody Transfer	Level 5	4	Draft - Prep for P Comment
Elective	119807 Fault find and repair Electromagnetic and Particle Radiation Sensing Devices	Level 5	10	Draft - Prep for P Comment
Elective	119810 Fault find and repair Specialised sensing devices	Level 5	6	Draft - Prep for P Comment
Elective	7880 Prepare, implement, manage and control budgets	Level 6	10	Reregistered
Fundamental	12433 Use communication techniques effectively	Level 5	8	Registered
Fundamental	119808 Apply engineering mathematics in the Measurement, Control and Instrumentation environment	Level 5	10	Draft - Prep for P Comment

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 1

Integrate a Process Control System

SAQA US ID	*UNIT STANDARD TITLE*		
119803	Integrate a Process Control System		
SGB NAME		*NSB 06*	*PROVIDER NAME*
SGB Measurement, Control and Instrumentation		Manufacturing, Engineering and Technology	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Manufacturing, Engineering and Technology	Engineering and Related Design
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	12	Level 5	Regular

SPECIFIC OUTCOME 1

Plan and prepare for integration of a process control system.

SPECIFIC OUTCOME 2

Assemble hardware architecture.

SPECIFIC OUTCOME 3

Set-up software.

SPECIFIC OUTCOME 4

Verify system integrity.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 2

Demonstrate an understanding of Custody Transfer

SAQA US ID	*UNIT STANDARD TITLE*		
119804	Demonstrate an understanding of Custody Transfer		
SGB NAME		*NSB 06*	*PROVIDER NAME*
SGB Measurement, Control and Instrumentation		Manufacturing, Engineering and Technology	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Manufacturing, Engineering and Technology	Engineering and Related Design
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	4	Level 5	Regular

SPECIFIC OUTCOME 1

Understand custody transfer requirements with reference to the Trade Metrology Act.

SPECIFIC OUTCOME 2

Explain the function of equipment in a metering system.

SPECIFIC OUTCOME 3

Perform metering calculations.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 3

Apply diagnostic techniques to a process control system

SAQA US ID	*UNIT STANDARD TITLE*		
119805	Apply diagnostic techniques to a process control system		
SGB NAME		*NSB 06*	*PROVIDER NAME*
SGB Measurement, Control and Instrumentation		Manufacturing, Engineering and Technology	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Manufacturing, Engineering and Technology	Engineering and Related Design
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	8	Level 5	Regular

SPECIFIC OUTCOME 1

Establish conditions for fault finding and repairing a process control system.

SPECIFIC OUTCOME 2

Diagnose faults in a process control system.

SPECIFIC OUTCOME 3

Repair a process control system.

SPECIFIC OUTCOME 4

Establish normal operating conditions after completion.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 4

Understand electromagnetic and particle radiation principles and applications

SAQA US ID	*UNIT STANDARD TITLE*		
119806	Understand electromagnetic and particle radiation principles and applications		
SGB NAME		*NSB 06*	*PROVIDER NAME*
SGB Measurement, Control and Instrumentation		Manufacturing, Engineering and Technology	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Manufacturing, Engineering and Technology	Engineering and Related Design
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	10	Level 5	Regular

SPECIFIC OUTCOME 1

Demonstrate an understanding of electromagnetic and particle radiation.

SPECIFIC OUTCOME 2

Identify the types of radiation detectors and their application.

SPECIFIC OUTCOME 3

Demonstrate an understanding of radiation theory.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 5

Fault find and repair Electromagnetic and Particle Radiation Sensing Devices

SAQA US ID	*UNIT STANDARD TITLE*		
119807	Fault find and repair Electromagnetic and Particle Radiation Sensing Devices		
SGB NAME		*NSB 06*	*PROVIDER NAME*
SGB Measurement, Control and Instrumentation		Manufacturing, Engineering and Technology	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Manufacturing, Engineering and Technology	Engineering and Related Design
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	10	Level 5	Regular

SPECIFIC OUTCOME 1

Establish conditions for fault finding and repairing electromagnetic and particle radiation sensing devices.

SPECIFIC OUTCOME 2

Diagnose faults in electromagnetic and particle radiation sensing devices.

SPECIFIC OUTCOME 3

Repair electromagnetic and particle radiation sensing devices.

SPECIFIC OUTCOME 4

Establish normal conditions after completion.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 6

Apply engineering mathematics in the Measurement, Control and Instrumentation environment

SAQA US ID	*UNIT STANDARD TITLE*		
119808	Apply engineering mathematics in the Measurement, Control and Instrumentation environment		
SGB NAME		*NSB 06*	*PROVIDER NAME*
SGB Measurement, Control and Instrumentation		Manufacturing, Engineering and Technology	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Manufacturing, Engineering and Technology	Engineering and Related Design
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	10	Level 5	Regular

SPECIFIC OUTCOME 1

Perform Orifice calculations.

SPECIFIC OUTCOME 2

Perform Mass-Flow calculations.

SPECIFIC OUTCOME 3

Perform Polynomial calculations.

SPECIFIC OUTCOME 4

Perform valve-sizing calculations.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 7

Design and apply modifications to existing process control systems

SAQA US ID	*UNIT STANDARD TITLE*		
119809	Design and apply modifications to existing process control systems		
SGB NAME		*NSB 06*	*PROVIDER NAME*
SGB Measurement, Control and Instrumentation		Manufacturing, Engineering and Technology	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Manufacturing, Engineering and Technology	Engineering and Related Design
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	15	Level 5	Regular

SPECIFIC OUTCOME 1

Design modifications to process control systems.

SPECIFIC OUTCOME 2

Comply with documentation requirements.

SPECIFIC OUTCOME 3

Apply modifications to process control systems.

SPECIFIC OUTCOME 4

Manage the modification of a process control system.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 8

Fault find and repair Specialised sensing devices

SAQA US ID	***UNIT STANDARD TITLE***		
119810	Fault find and repair Specialised sensing devices		
SGB NAME		***NSB 06***	***PROVIDER NAME***
SGB Measurement, Control and Instrumentation		Manufacturing, Engineering and Technology	
UNIT STANDARD TYPE		***FIELD DESCRIPTION***	***SUBFIELD DESCRIPTION***
Regular		Manufacturing, Engineering and Technology	Engineering and Related Design
ABET BAND	***CREDITS***	***NQF LEVEL***	***UNIT STANDARD TYPE***
Undefined	6	Level 5	Regular

SPECIFIC OUTCOME 1

Plan and prepare for fault finding and repairing Specialised sensing devices.

SPECIFIC OUTCOME 2

Diagnose faults in Specialised sensing devices.

SPECIFIC OUTCOME 3

Repair Specialised sensing devices.

SPECIFIC OUTCOME 4

Establish normal conditions after completion.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 9

Demonstrate an understanding of the Integrity of Measurement and Control Philosophy of a process

SAQA US ID	*UNIT STANDARD TITLE*		
119811	Demonstrate an understanding of the Integrity of Measurement and Control Philosophy of a process		
SGB NAME		*NSB 06*	*PROVIDER NAME*
SGB Measurement, Control and Instrumentation		Manufacturing, Engineering and Technology	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Manufacturing, Engineering and Technology	Engineering and Related Design
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	10	Level 5	Regular

SPECIFIC OUTCOME 1

Apply control philosophy.

SPECIFIC OUTCOME 2

Determine loop measurement integrity.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 10

Install, configure, test and analyze process communication systems

SAQA US ID	*UNIT STANDARD TITLE*		
119812	Install, configure, test and analyze process communication systems		
SGB NAME		*NSB 06*	*PROVIDER NAME*
SGB Measurement, Control and Instrumentation		Manufacturing, Engineering and Technology	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Manufacturing, Engineering and Technology	Engineering and Related Design
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	10	Level 5	Regular

SPECIFIC OUTCOME 1

Plan and prepare to install and configure process communications systems.

SPECIFIC OUTCOME 2

Install and configure process communication systems.

SPECIFIC OUTCOME 3

Test and analyse process communication systems.

No. 693 **15 July 2005**

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

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

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 qualification and unit standards. The 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, Hatfield Forum West, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the unit standards should reach SAQA at the address ***below and no later than 15 Aug 2005.*** All correspondence should be marked **Standards Setting – SGB Food Manufacturing** and addressed to

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ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: First Line Manufacturing Management

SAQA QUAL ID	*QUALIFICATION TITLE*		
49743	National Certificate: First Line Manufacturing Management		
SGB NAME		*NSB 06*	*PROVIDER NAME*
SGB Food Manufacturing		Manufacturing, Engineering and Technology	
QUAL TYPE		*FIELD*	*SUBFIELD*
National Certificate		Manufacturing, Engineering and Technology	Manufacturing and Assembly
ABET BAND	*MINIMUM CREDITS*	*NQF LEVEL*	*QUALIFICATION CLASS*
Undefined	125	Level 5	Regular-Unit Stds Based

PURPOSE AND RATIONALE OF THE QUALIFICATION

Purpose

A person acquiring this qualification will be able to plan work processes to ensure that (a) production line(s) operate effectively within the performance requirements of the manufacturing unit, lead people within a production environment to ensure organisational objectives are achieved, maintain health, safety and quality control standards, organise, control and continuously improve a production process in the South African manufacturing context to enable the unit and the organisation to remain competitive in the global market place.

The skills, knowledge and understanding demonstrated within this qualification are essential for the creation of an experienced production and effective first line managers that represents the demographics of the South African society.

This qualification will create a leadership cadre for the manufacturing industry that will be able to apply in the workplace the skills and knowledge acquired.

Rationale

This qualification reflects the needs of the Manufacturing Industry for an individual with first line management skills and with a sound knowledge base and experience in production and manufacturing. A generic first line management qualification does not address the specific needs for manufacturing with regards to management of materials, problem-solving in a manufacturing context and integration and coordination of multiple activities to optimise a production process.

The learners will typically be first line manufacturing managers with an automated production process. The Manufacturing industry has identified the need to develop first line manufacturing management skills to enable organisations to implement integrated systems and management processes. Learners will become internationally competitive and learners could specialise within this qualification in a contextualised manufacturing area.

The qualification ensures that the levels of skills in the South African Manufacturing environment are enhanced and that learners completing this qualification will be able to manage a production line at a standard comparable with the rest of the world. The qualification, although developed specifically for the food and beverage industry also provides the flexibility to articulate with other manufacturing environments such as fast moving consumable products, pharmaceutical, chemical, motor assembly, wood milling and a packaging.

The level of flexibility within the range of electives will allow the individual to pursue some further specialization within human resources management, training and development, general management, senior manufacturing management or packaging technology development.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

This qualification assumes that learners have manufacturing skill and knowledge at NQF level 4 or equivalent and have had experience in managing or supervising individuals or team activities. It is further assumed that learners have knowledge, comprehension and application of language, mathematical literacy at NQF 4 or equivalent as well as an understanding and application of the relevant legislation of health, safety quality assurance practices and procedures in a manufacturing or production environment.

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.

QUALIFICATION RULES

Rules of combination

The Fundamental Component of the qualification is compulsory and a learner must demonstrate his/her competence in all the unit standards (total 25 credits) within the fields of communication, business and finance, manufacturing operations and self-management.

The unit standards in the Core Component of the qualification are compulsory and reflect the skills and competencies needed for transportability in manufacturing, operations and people management are necessary. In the Core Component, the learner must demonstrate his/her competence in the total of 63 credits.

The Elective Component of the qualification enables the learner to pursue specialisation areas such as (a) food and beverage, (b) education training and development, (c) project, quality and management, or any manufacturing related specialisation which are all directly related to the core of the qualification. The learner needs to choose a minimum of 15 credits at level 5 from any of the specialization areas and additional electives of 22 credits at level 4.

Learning components: Number of credits allocated
□
Fundamental: 25
Core: 63
Elective: 37
Total: Min 125

EXIT LEVEL OUTCOMES

1. Plan work processes to ensure that production lines operate effectively within the operational requirements of the manufacturing unit.
2. Lead people within a production environment to ensure organisational objectives are achieved.
3. Maintain health, safety, quality control and environmental standards during the production process.
4. Organise, control and improve a production process continuously to ensure global competitiveness.

ASSOCIATED ASSESSMENT CRITERIA

1.
> Relevant policies, procedures and legislation are used as guidelines to the formulation of all plans
> All plans are developed in accordance with the integrated activities of the organisation's supply chain.
> Operational budgets are developed for a production process.
> Material resource plans are developed for a production process.
> Human resource plans are developed for a production process.
> Operational and production plans linked to standard operating procedures and the manufacturing strategy of the organisation, are developed for production process.

2.

> A common vision for a new or established team is developed or enhanced reflecting the organisation's culture and committed to the achievement of defined organisational objectives within the production process.
> Leadership styles are selected that best contribute to the commitment of the team members and portrays the organisation ethics, values and culture.
> High levels of trust is developed and maintained through the creation of a culture of honesty and integrity
> Individuals and team performance is measured against all plans developed for the production process, variances are highlighted and feedback given, corrective actions applied where necessary.

3.
> Personal, environment and product safety are maintained during the manufacturing of the product.
> Ensure good manufacturing practices are applied during the production process.
> Verify conformity to quality parameters during the production process.
> Process tools and equipment are effectively organised to minimise waste.

4.
> Standards and controls related to work processes are managed within the production process.
> Variance between forecasts and plans and the outcome of the work processes is recorded, analysed and reported
> Process, product and quality deviations are identified and feedback and corrective actions implemented.
> Suggestions for improvement are fostered, discussed, debated, collated and distributed through the organisation according to the specific communication channels of the organisation.
> Implement new ideas and improvements as approved by the organisation.

Integrated Assessment

Integrated assessment at the level of the qualification provides an opportunity for learners to show they are able to integrate concepts, actions and ideas achieved across a range of unit standards and contexts.

Integrated assessment must evaluate the quality of observable performance as well as the thinking behind the performance, and must be based on a summative assessment guide. The guide will spell out how the assessor will assess different aspects of the performance and will include:
> Observing the learner at work (both in the primary activity as well as other interactions)
> Asking questions and initiating short discussions to test understanding
> Looking at records and reports in the portfolio and reviewing previous assessments

In some cases inference will be necessary to determine competence depending on the nature and context within which performance takes place.

It is necessary to ensure that the fundamental part of the qualification is also targeted to ensure that while the competence may have been achieved in a particular context, learners are able to apply it in a range of other contexts and for further learning. The assessment should also ensure that all the critical cross-field outcomes have been achieved.

The learner may choose in which language s/he wants to be assessed. This should be established as part of a process of preparing the learner for assessment and familiarising the learner with the approach being taken.

While this is primarily a workplace-based qualification, evidence from other areas of endeavour may be introduced if pertinent to any of the exit-level outcomes. The assessment process should cover both the explicit tasks required for the qualification as well as the understanding of the concepts and principles that underpin the activities associated with the first line manufacturing management process.

INTERNATIONAL COMPARABILITY

This qualification was compared to other similar outcomes-based qualifications of Australia and New Zealand, in particular the National Certificate in Firstline Management (Level4) in New Zealand and the Diploma in Business (Firstline Management) (Level 5) in Australia. In both of the above cases the fundamental learning is not specified but there are considerable similarities in the competencies outlined.

ARTICULATION OPTIONS

This qualification will enable the qualifying candidate to progress to learning for other national management diplomas on NQF 5 and national first degrees in management on NQF 6. This qualification provides entry to qualifications in manufacturing management, quality control and assurance, business management, production management and process artisan.

MODERATION OPTIONS

> Anyone assessing a learner or moderating the assessment of a learner against this Qualification must be registered as an assessor with the relevant ETQA.
> 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 the exit points of the qualification, unless ETQA policies specify otherwise. Moderation should also encompass achievement of the competence at the exit level 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.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

For an applicant to register as an assessor, the applicant needs:

> Well-developed interpersonal skills, subject matter and assessment experience.
> The assessor needs to be competent in the planning and conducting assessment of learning outcomes as described in the unit standards Plan and conduct assessment of learning outcomes NQF level 5. The subject matter experience must be well developed with in the field of manufacturing management.
> A national first degree in food or beverage manufacturing management on NQF level 7 and 6 months field experience.
> The subject matter experience of the assessor can be established by recognition of prior learning.
> Assessors need to be registered with the relevant Sector Education and Training Quality Assurance Body.
> Detailed documentary proof of educational qualification, practical training undergone, and experience gained by the applicant must be provided (Portfolio of evidence).

NOTES

This qualification replaces 21813, "National Certificate: First Line Manufacturing Management: Food and Beverage", Level 5, 120 credits.

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

	UNIT STANDARD ID AND TITLE	*LEVEL*	*CREDITS*	*STATUS*
Core	11473 Manage individual and team performance	Level 4	8	Registered
Core	13947 Motivate a team	Level 4	6	Registered
Core	13952 Demonstrate basic understanding of the Primary labour legislation that impacts on a business unit	Level 4	8	Registered
Core	13953 Apply the principles of situational leadership to a business unit	Level 4	5	Registered
Core	9893 Maintain production efficiencies	Level 5	12	Registered
Core	9894 Optimise the production process	Level 5	24	Registered
Elective	7997 Managing self-development	Level 4	12	Reregistered
Elective	10134 Participate in the estimation and preparation of cost budgets for an element of work and monitor and control actual cost against budget	Level 4	6	Reregistered
Elective	10144 Identify, suggest and implement corrective actions to improve quality	Level 4	6	Reregistered
Elective	14357 Demonstrate an understanding of a selected business environment	Level 4	10	Registered
Elective	116280 Demonstrate understanding of warehouse manufacturing and inventory assembly	Level 4	20	Registered
Elective	10148 Supervise a project team of a business project to deliver project objectives	Level 5	14	Reregistered
Elective	11286 Institute disciplinary action	Level 5	8	Registered
Elective	15217 Develop an organisational training and development plan	Level 5	6	Registered
Elective	115753 Conduct outcomes-based assessment	Level 5	15	Registered
Elective	117874 Guide learners about their learning, assessment and recognition opportunities	Level 5	6	Registered
Elective	119797 Conduct audits within a quality management system	Level 5	8	Draft - Prep for P Comment

Elective	119799	Provide information on scientific, technical and quality standards for food or sensitive consumer products	Level 5	7	Draft - Prep for P Comment
Elective	119800	Optimise product and process quality in a food or sensitive consumer product environment	Level 5	8	Draft - Prep for P Comment
Elective	119801	Demonstrate an understanding of microbiological principles and its application in a food handling environment.	Level 5	12	Draft - Prep for P Comment
Elective	15218	Conduct an analysis to determine outcomes of learning for skills development and other purposes	Level 6	4	Registered
Fundamental	10622	Conduct communication within a business environment	Level 5	8	Reregistered
Fundamental	10631	Demonstrate an understanding of manufacturing, principles, methodologies and processes	Level 5	7	Reregistered
Fundamental	12999	Contribute to the management of costs and the enhancement of value	Level 5	10	Registered

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 1

Monitor and control quality assurance procedures in a food or sensitive consumer product environment

SAQA US ID	*UNIT STANDARD TITLE*		
119796	Monitor and control quality assurance procedures in a food or sensitive consumer product environment		
SGB NAME		*NSB 06*	*PROVIDER NAME*
SGB Food Manufacturing		Manufacturing, Engineering and Technology	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Manufacturing, Engineering and Technology	Manufacturing and Assembly
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	8	Level 4	Regular

SPECIFIC OUTCOME 1

Demonstrate an understanding of a quality assurance system for a food or sensitive consumer product environment.

SPECIFIC OUTCOME 2

Monitor and control quality assurance procedures within a food or sensitive consumer product environment.

SPECIFIC OUTCOME 3

Implement a quality assurance procedure in a food or sensitive consumer product environment.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 2

Conduct audits within a quality management system

SAQA US ID	*UNIT STANDARD TITLE*		
119797	Conduct audits within a quality management system		
SGB NAME		*NSB 06*	*PROVIDER NAME*
SGB Food Manufacturing		Manufacturing, Engineering and Technology	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Manufacturing, Engineering and Technology	Manufacturing and Assembly
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	8	Level 5	Regular

SPECIFIC OUTCOME 1

Demonstrate an understanding of auditing principles relating to a quality management system within a food or sensitive consumer product environment.

SPECIFIC OUTCOME 2

Plan for and perform an audit within a quality management system for a food or sensitive consumer product environment.

SPECIFIC OUTCOME 3

Evaluate and report on the findings of the audit within a quality management system for a food or sensitive consumer product environment.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 3

Optimise a quality management system in a food or sensitive consumer product value chain

SAQA US ID	*UNIT STANDARD TITLE*		
119798	Optimise a quality management system in a food or sensitive consumer product value chain		
SGB NAME		*NSB 06*	*PROVIDER NAME*
SGB Food Manufacturing		Manufacturing, Engineering and Technology	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Manufacturing, Engineering and Technology	Manufacturing and Assembly
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	12	Level 6	Regular

SPECIFIC OUTCOME 1

Demonstrate an understanding of the quality management system in a food or sensitive consumer product value chain.

SPECIFIC OUTCOME 2

Assess and analyse the quality management system in a food or sensitive consumer product value chain.

SPECIFIC OUTCOME 3

Identify and validate areas for improvement to the quality management system in a food or sensitive consumer product value chain.

SPECIFIC OUTCOME 4

Implement and sustain improvements to the quality management system in a food or sensitive consumer product value chain.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 4

Provide information on scientific, technical and quality standards for food or sensitive consumer products

SAQA US ID	*UNIT STANDARD TITLE*		
119799	Provide information on scientific, technical and quality standards for food or sensitive consumer products		
SGB NAME		*NSB 06*	*PROVIDER NAME*
SGB Food Manufacturing		Manufacturing, Engineering and Technology	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Manufacturing, Engineering and Technology	Manufacturing and Assembly
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	7	Level 5	Regular

SPECIFIC OUTCOME 1

Demonstrate an understanding of scientific, technical and quality standards for food or sensitive consumer products.

SPECIFIC OUTCOME 2

Provide information on standards and specifications for food or sensitive consumer products.

SPECIFIC OUTCOME 3

Write production, quality and technical reports.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 5

Optimise product and process quality in a food or sensitive consumer product environment

SAQA US ID	*UNIT STANDARD TITLE*
119800	Optimise product and process quality in a food or sensitive consumer product environment

SGB NAME	*NSB 06*	*PROVIDER NAME*
SGB Food Manufacturing	Manufacturing, Engineering and Technology	
UNIT STANDARD TYPE	***FIELD DESCRIPTION***	***SUBFIELD DESCRIPTION***
Regular	Manufacturing, Engineering and Technology	Manufacturing and Assembly

ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	8	Level 5	Regular

SPECIFIC OUTCOME 1

Demonstrate an understanding of the relevant quality management system.

SPECIFIC OUTCOME 2

Monitor the quality in a food or sensitive consumer product environment.

SPECIFIC OUTCOME 3

Control the quality in a food or sensitive consumer product environment.

SPECIFIC OUTCOME 4

Implement quality improvements in a food or sensitive consumer product environment.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 6

Demonstrate an understanding of microbiological principles and its application in a food handling environment.

SAQA US ID	*UNIT STANDARD TITLE*		
119801	Demonstrate an understanding of microbiological principles and its application in a food handling environment.		
SGB NAME		*NSB 06*	*PROVIDER NAME*
SGB Food Manufacturing		Manufacturing, Engineering and Technology	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Manufacturing, Engineering and Technology	Manufacturing and Assembly
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	12	Level 5	Regular

SPECIFIC OUTCOME 1

Demonstrate an understanding of the occurrence of micro-organisms in a food handling environment.

SPECIFIC OUTCOME 2

Demonstrate an understanding of the preventative methods and procedures for microbial growth in a food handling environment.

SPECIFIC OUTCOME 3

Demonstrate an understanding of determining the microbiological status in food products or in a food handling environment.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 7

Perform quality control practices in a food or sensitive consumer product operation

SAQA US ID	*UNIT STANDARD TITLE*		
119802	Perform quality control practices in a food or sensitive consumer product operation		
SGB NAME		*NSB 06*	*PROVIDER NAME*
SGB Food Manufacturing		Manufacturing, Engineering and Technology	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Manufacturing, Engineering and Technology	Manufacturing and Assembly
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	6	Level 3	Regular

SPECIFIC OUTCOME 1

Demonstrate an understanding of the relevant quality control and quality assurance system for a food or sensitive consumer product operation.

SPECIFIC OUTCOME 2

Measure and record quality control practices in a food or sensitive consumer product operation.

SPECIFIC OUTCOME 3

Report on quality in a food or sensitive consumer product operation.

No. 694 **15 July 2005**

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DUGMORE MPHUTHING
ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Value Engineering

SAQA QUAL ID	*QUALIFICATION TITLE*		
49745	National Certificate: Value Engineering		
SGB NAME		*NSB 06*	*PROVIDER NAME*
SGB Engineering		Manufacturing, Engineering and Technology	
QUAL TYPE		*FIELD*	*SUBFIELD*
National Certificate		Manufacturing, Engineering and Technology	Engineering and Related Design
ABET BAND	*MINIMUM CREDITS*	*NQF LEVEL*	*QUALIFICATION CLASS*
Undefined	120	Level 5	Regular-Unit Stds Based

PURPOSE AND RATIONALE OF THE QUALIFICATION

Purpose

This qualification is aimed at people who work or intend to work within any industry, and who seek recognition for essential skills in Value Engineering.

Recipients of this qualification know about and are able to conduct Value Engineering studies and workshops.

The qualification is designed to be flexible and accessible so that people are able to demonstrate the competencies required to apply the Value Engineering methodology in various fields of applications.

People credited with this qualification are able to:

> Manage Human Dynamics & Change
> Apply basic principles of Costing, Pricing and Budgeting
> Manage a Project
> Conform to relevant Legislations
> Measure Performance & Improve Productivity
> Apply Functional Thinking

Rationale

This qualification provides a learner with all the skills and knowledge required of a Value Engineer.

Candidates for this qualification are likely to be working in the industry where continuous improvement of products, services and systems is a requirement. This qualification will give them the opportunity to balance their practical skills with the essential knowledge needed to earn a formal qualification in Value Engineering.

There is a critical need in the industry to identify people who are able to apply the essential methodologies associated with efficient and successful Value Engineering studies and workshop applications. This will lead to competence in the field of work and thereby add value to the industry and improve the economy of the country. It will also lead to a balanced society in that learners will understand how the work they do fits into the greater needs of the industry.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

It is assumed that candidates embarking on learning towards this qualification are already competent in the following areas:

> Communication and Mathematical Literacy at NQF Level 4
> Computer Literacy
> Has the ability to source, gather, analyse and synthesise information using a variety of data collection and organising techniques.
> Has a general understanding of product orientated and general management processes.
> Project management competencies at NQF Level 4

Recognition of Prior Learning:

This qualification can be achieved wholly or in part through recognition of prior learning in terms of the defined exit level outcomes and/or individual unit standards.

Evidence can be presented in various ways, including international and/or previous local qualifications, products, reports, testimonials mentioning functions performed, work records, portfolios, videos of practice and performance records.

All such evidence will be judged in accordance with the general principles of assessment described above and the requirements for integrated assessment.

QUALIFICATION RULES

Credit allocation of exit level outcomes:

> Manage Human Dynamics and Change, 3 Fundamental credits, 11 Core credits
> Apply basic principles of Costing, Pricing and Budgeting, 11 Fundamental credits, 10 Core credits
> Manage a Project, 4 Fundamental credits, 22 Core credits, 42 Elective credits
> Conform to a relevant Legislation, 8 Core credits
> Measure Performance and Improve Productivity, 4 Core credits, 54 Elective credits
> Apply Functional Thinking, 10 Core credits

Total : 17 Fundamental credits, 65 Core credits, 96 Elective credits (Of which 38 credits are required)

Rules of combination:

Fundamental:
Candidates are required to achieve all 17 credits listed in the Fundamental category

Core: □
Candidates must achieve all 65 credits listed in the Core category in Exit Level Outcomes.

Elective: □
Candidates must achieve at least 38 credits of their choice from any of the available Elective credits in Exit Level Outcomes. In order to achieve an Exit Level Outcome, candidates must achieve all of the credits for that particular ELO.

Structure of the qualification:

The qualification has the following general structure:

The rationale and purpose provides, among other things, a broad description of what holders of the qualification can do.

The qualification is further defined by means of a number of Exit Level Outcomes. These ELOs provide a means for candidates to exit the qualification with recognition for clusters of competencies, even if they do not achieve the whole qualification. The ELOs also provide a means to organise the unit standards into coherent clusters, thus facilitating integrated assessment.

Each ELO is further defined by means of the associated unit standards. Some of these unit standards may be indicated as CORE (compulsory), while others may be identified as ELECTIVES, with rules of combination provided.Assessment criteria are provided for each ELO where required, mainly to address the need for evidence of integration of competencies.

Each unit standard contains details of specific outcomes, range statements and assessment criteria, thus making it possible for assessors to judge competence in terms of each unit standard, while at the same time providing possible evidence of integration of competencies.

EXIT LEVEL OUTCOMES

Exit Level Outcome 1
> Manage Human Dynamics & Change.

Exit Level Outcome 2
> Apply basic principles of Costing, Pricing and Budgeting.

Exit Level Outcome 3
> Manage a Project.

Exit Level Outcome 4
> Conform to a relevant Legislation.

Exit Level Outcome 5
> Measure Performance and Improve Productivity.

Exit Level Outcome 6
> Apply Functional Thinking.

Critical Cross-Field Outcomes:

This qualification addresses the following critical cross-field outcomes, as detailed in the unit standards:

> Identifying and solving problems in which responses indicate that responsible decisions using critical and creative thinking have been made.
>[Exit Level Outcomes: 3; 4; 5; 6]

> Working effectively with others as a member of a team, group, organisation or community.
> [Exit Level Outcomes: 1; 3; 4; 5; 6]

> Organising and managing oneself and one's activities responsibly and effectively.
> [Exit Level Outcomes: 1; 3; 5]

> Collecting, analysing, organising and critically evaluating information.
> [Exit Level Outcomes: 2; 3; 4; 5; 6]

> Communicating effectively using visual, mathematical and/or language skills in the modes of oral/written persuasion.
> [Exit Level Outcomes: 1; 3; 5; 6]

> Using science and technology effectively and critically, showing responsibility towards the environment and health of others.
> [Exit Level Outcomes: 3; 4; 5; 6]

> Demonstrating and understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation.
> [Exit Level Outcomes: 3; 4; 5: 6]

Learning programmes directed towards this qualification will also contribute to the full personal development of each learner and the social and economic development of society at large, by making individuals aware of the importance of:
> Reflecting on and exploring a variety of strategies to learn more effectively.
> Participating as responsible citizens in the life of local, national and global communities.
> Being culturally and aesthetically sensitive across a range of social contexts.
> Exploring education and career opportunities; and developing entrepreneurial opportunities.

ASSOCIATED ASSESSMENT CRITERIA

For award of the whole qualification, candidates must achieve the required number of credits as specified in

the rules of combination in point 15 as well as the criteria specified for integrated assessment in point 18 below.

Should candidates exit the qualification without completing the whole qualification, recognition may be given for each Exit Level Outcome achieved. For award of a particular Exit Level Outcome, candidates must achieve:

> All the Core and Elective unit standards associated with the particular Exit Level Outcome as per the specifications contained within each unit standard, and
> The criteria specified for integrated assessment.

Integrated assessment:

Assessment will take place according to the detailed specifications indicated in the unit standards associated with each exit level outcome (see "associated unit standards" above).

Over and above the achievement of the specified unit standards, evidence of integration will be required as per the following broad criteria, all within the context of workplace activities.

Assessors should note that the evidence of integration (as below) could well be presented by candidates when being assessed against the unit standards - thus there should not necessarily be separate assessments for each unit standard and then further assessment for integration. Well-designed assessments should make it possible to gain evidence against each unit standard while at the same time gain evidence of integration.

Candidates must demonstrate the ability to engage in the operations selected in an integrative way, dealing with divergent and "random" demands related to these work operations, effectively. Evidence is required that the candidate is able to achieve the purpose of the qualification as a whole at the time of the award of the qualification. Integration of skills will be demonstrated through the achievement of the core operational standards.

Criteria for integrative assessment of generic competence include:

Assessment criteria associated with Exit Level Outcome 1

> Be able to recognise team member performance, encourage participation in decision-making, delegate tasks and review decisions and the progress with delegated tasks.

> Be able to harness diversity and build on strength of a diverse working environment, identify the nature of diversity in the working environment, identify the positive consequences of diversity in the working environment, deal with diverse individuals and groups and deal with disagreements and conflict arising from diversity amongst individuals and groups.

> Be able to demonstrate knowledge of different types of meetings and their procedures, to prepare for a technical practitioners meeting, to chair a technical practitioners meeting and conduct post-meeting follow up for a technical meeting.

> Be able to recognise areas in need of change, then make recommendations and implement change in the team, department and division.

Assessment criteria associated with Exit Level Outcome 2

> Be able to record and analyse information relating to direct costs, to record and analyse information relating to allocation, apportionment and absorption of overhead costs, to prepare and present standard cost reports and demonstrate an understanding of the business and accounting environment.

> Be able to demonstrate an understanding of the business and accounting environment, to collect, analyse and disseminate information about costs and make recommendations to reduce costs and enhance value.

Assessment criteria associated with Exit Level Outcome 3

> Be able to evaluate proposals and select preferred option, to conceptualise plans, to delegate tasks and track projects.

> Be able to identify information flow needs in a team, department or division, to implement information flow systems in a team, department or division and monitor and review information flow.

> Be able to discuss and explain the appropriateness of the various organisational structures, to identify project types and nature and guiding on appropriate project strategies and tactics, to suggest appropriate structures, methods and processes to projects, to check and verify that a project environment is established, to evaluate and consolidate from project experiences and update standard structures and processes.

> Be able to discuss and explain the appropriateness of the various organisational structures, to supervise and monitor a developmental or business or technical project team, to report progress on a developmental or business or technical project, to identify and rectify problems occurring in a developmental or business or technical project and to set up, run and close a developmental project.

> Be able to keep abreast of and analyse innovations or new developments, to create opportunities for innovation, to lead projects to meet new, innovative ideas and to review new projects/procedures to determine effectiveness.

Assessment criteria associated with Exit Level Outcome 4

> Be able to identify Best Practice guidelines, to analyse current operating practices against identified Best Practices, to draw up a plan for implementing Best Practice and implement Best Practice.

> Be able to identify and access legislation, legal documents and rules, to interpret legislation, legal documents and rules, to comply with legislation and rules which regulate business in general and the department/division in particular and to identify areas of non-compliance.

Assessment criteria associated with Exit Level Outcome 5

> Be able to establish performance standards and monitoring systems, to prepare for performance review of team member and to conduct performance review interview.

> Be able to design a framework to collate data in an organisation related to factors influencing capital or labour or material productivity in an organisation, to measure the quantifiable factors that influence capital or labour or material productivity, to assess the identified qualitative factors that influence capital or labour or material productivity and establish the relative impact of each factor on capital or labour or material productivity and to assess capital or labour or material effectiveness.

> Be able to promote productivity improvement as a competitive strategy of the organisation, to nurture pro-active participation in the implementation of the organisational productivity improvement strategy and objectives and to monitor, evaluate and improve the impact of the organisational promotion strategy.

> Be able to identify the causes for unacceptable levels of productivity within the organisation, to identify priority areas for productivity improvement to develop a productivity improvement strategy and to develop plans for implementing the strategy in the identified priority areas.

> Be able to measure value-added productivity, to measure multi-factor productivity and to measure total factor productivity within an organisation.

Assessment criteria associated with Exit Level Outcome 6

> Be able to define the scope of work and functionality of design, to determine functional significance, to generate alternative solutions and to evaluate and select most appropriate solutions.

> Be able to define the scope of the project, to identify and select process and to co-ordinate the process over the various life cycle phases.

Assessment principles

Assessment should be in accordance with the following general and specific principles:
> The initial assessment activities should focus on gathering evidence in terms of the main outcomes expressed in the titles of the unit standards to ensure assessment is integrated rather than fragmented. Where assessment at title level is unmanageable, then the assessment can focus on each specific outcome, or groups of specific outcomes. Take special note of the need for integrated assessment.

> Evidence must be gathered across the entire range specified in each unit standard, as applicable. 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 prove that the candidate is able to perform in the real situation.

> All assessments should be conducted in accordance with the following universally accepted principles of assessment:
> Use appropriate, fair and manageable methods that are integrated into real work-related or learning situations;
> Judge evidence on the basis of its validity, currency, authenticity and sufficiency; and
> Ensure assessment processes are systematic, open and consistent.

INTERNATIONAL COMPARABILITY

This qualification and the component unit standards have been compared with similar qualifications from the following country:
> United States of America

The USA qualification is, "Certified Value Specialist - CVS)" by the Society of American Value Engineers (SAVE)

The USA based qualifications does partially represent the SAQA requirements, therefore this qualification was developed from scratch.

ARTICULATION OPTIONS

This qualification has been designed and structured so that qualifying learners can move from one context to another. It builds onto existing engineering qualifications and acts as a springboard from which learners may progress to more advanced qualifications in the engineering industry.

Employers or institutions should be able to evaluate the outcomes of this qualification against the needs of their context and structure top-up learning appropriately.

The following shows the location of this qualification in terms of other qualifications within the engineering field.

Mechanical Engineering
> NC Mechanical Engineering - NQF Level 5
> ND Mechanical Engineering - NQF Level 6

Value Engineering
> NC Value Engineering - NQF Level 5

Electrical Engineering
> NC Electrical Engineering - NQF Level 5
> ND Electrical Engineering - NQF Level 6

MODERATION OPTIONS

> Providers offering learning towards achievement of any of the unit standards that make up this qualification must be accredited through the relevant ETQA or an ETQA that has a Memorandum of Understanding with the relevant ETQA.

> Internal moderation of assessment must take place at the point of assessment with external moderation provided by the relevant ETQA in conjunction with the relevant Industry, according to the moderation guidelines and the agreed ETQA procedures.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

The following criteria are specified for assessors concerning the technical aspects of the qualification:

> An appropriate qualification with at least eight years experience in Productivity Improvement environment.
> Assessors must be registered with the relevant ETQA.
> Appropriate experience and understanding of assessment theory, processes and practices.
> Good interpersonal skills and ability to balance the conflicting requirements of the interests of the learner,

the provider and the employer.

NOTES

N/A

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

	UNIT STANDARD ID AND TITLE	LEVEL	CREDITS	STATUS
Core	10043 Develop, implement and manage a project / activity plan	Level 5	5	Reregistered
Core	10149 Support the project environment and activities to deliver project objectives	Level 5	14	Reregistered
Core	12996 Record, analyse and prepare cost information	Level 5	10	Registered
Core	15215 Identify and interpret Best Practice guidelines, and plan for and implement Best Practice within the team, department or division	Level 5	4	Registered
Core	15224 Empower team members through recognising strengths, encouraging participation in decision making and delegating tasks	Level 5	4	Registered
Core	15225 Identify and interpret related legislation and its impact on the team, department or division and ensure compliance	Level 5	4	Registered
Core	15226 Implement systems to meet the flow of information in a team, department or division	Level 5	3	Registered
Core	15230 Monitor team members and measure effectiveness of performance	Level 5	4	Registered
Core	15233 Harness diversity and build on strengths of a diverse working environment	Level 5	3	Registered
Core	114051 Conduct a technical practitioners meeting	Level 5	4	Registered
Core	114599 Apply Functional Value to Engineering Design	Level 5	6	Registered
Core	114601 Identify, select and co-ordinate value engineering project life cycle phase	Level 5	4	Registered
Elective	10146 Supervise a project team of a developmental project to deliver project objectives	Level 5	14	Reregistered
Elective	10147 Supervise a project team of a technical project to deliver project objectives	Level 5	14	Reregistered
Elective	10148 Supervise a project team of a business project to deliver project objectives	Level 5	14	Reregistered
Elective	114875 Measure and assess the factors that influence capital productivity and establish the relative impact of each factor	Level 5	8	Registered
Elective	114876 Measure and assess the factors that influence material productivity and establish the relative impact of each factor	Level 5	8	Registered
Elective	114879 Promote a productivity improvement strategy	Level 5	10	Registered
Elective	114882 Develop holistic productivity improvement strategies and plans	Level 5	10	Registered
Elective	114883 Measure value-added, multi factor and total factor productivity within an organisation	Level 5	10	Registered
Elective	114886 Measure and assess the factors that influence labour productivity and establish the relative impact of each factor	Level 5	8	Registered
Fundamental	12999 Contribute to the management of costs and the enhancement of value	Level 5	10	Registered
Fundamental	15214 Recognise areas in need of change, make recommendations and implement change in the team, department or division	Level 5	3	Registered
Fundamental	15216 Create opportunities for innovation and lead projects to meet innovative ideas	Level 5	4	Registered

No. 695

15 July 2005

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

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

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 qualification. The qualification 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 15 Aug 2005.*** All correspondence should be marked **Standards Setting – SGB Engineering** and addressed to

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

DUGMORE MPHUTHING
ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT

Range: Problems are Stage 1 well-defined engineering problems having some or all of the following characteristics:

> Problem statement is concrete, requirements are complete and certain, but may require refinement.
> Problems may be unfamiliar, but occur in familiar contexts and are amenable to solution through established methods.
> Approach to solution involves standardized methods or codified best practice.
> Information is concrete & complete, requires checking and possible supplementation.
> Solutions are encompassed by standards, codes and documented procedures; judgment of outcome is needed.
> Involves imposing conflicting constraints within limitations of procedures.

Competency and Range:

1.1 Identify and define the problem.
1.2 Gather information relating to the problem.
1.3 Analyze the information relating to the problem.
1.4 Evaluate and select appropriate methodologies for the problem solution.
1.5 Synthesize potential solutions to the problem.
1.6 Evaluate and select the preferred solution.

2. Application of Scientific and Engineering Knowledge.

Demonstrate the application of mathematical, science and engineering knowledge in an engineering environment.

Range: Knowledge is characterized by some or all of the following:

> Coherent range of fundamental principles in mathematics, basic science and engineering science underlying a sub-discipline or recognised practice area.
> Coherent range of fundamental principles in engineering science and technology underlying an engineering sub-discipline or recognised practice area.
> Codified practical knowledge in recognised practice area.
> Professional communication, social impact, environmental impact, cost analysis, quality procedures.
> Use of codified engineering analysis methods and procedures, supported by established mathematical formulas, to perform technical calculations.

Competency and Range:

2.1 Demonstrate competence to use and integrate appropriate mathematical, basic science and engineering principles to solve engineering problems.
2.2 Demonstrate competence to use and apply appropriate measuring instruments and techniques to solve engineering problems.
2.3 Describe and perform the operation and maintenance of resources / processes / systems.
2.4 Plan, implement, report and improve on engineering processes.

3. Engineering Design.

Perform procedural design of well-defined components, systems, works, products or processes to meet desired needs within applicable standards, codes of practice and legislation.

Range: Design problems conform to the definition of Stage 1 well-defined engineering problems as indicated under exit level outcome 1.

Competency and Range:

3.1 Identify and analyse specific project objectives, and plan and formulate the criteria for an acceptable design solution.
3.2 Access, acquire and evaluate the relevant knowledge, information and resources.
3.3 Generate and analyse alternative solutions by applying appropriate engineering knowledge.
3.4 Select the optimal (preferred) solution based on technical, operational and economic criteria, and evaluate the impacts and benefits of the proposed design.
3.5 Implement the solution.
3.6 Communicate the design logic and information in the appropriate format.

4. Communication

Communicate technical, supervisory and general management information effectively, both orally and in writing, using appropriate language and terminology, structure, style and graphical support.

Range: Communicate technical information, interpret instructions; issue clear oral and written instructions; receive reports, present technical/project progress information using defined formats.

Competency and Range:

4.1 Generate and assemble appropriate data and information, using available resources.
4.2 Interpret technical data.
> Range: Technical books, periodicals, data packs and quality manuals.
4.3 Apply graphical techniques to present the information effectively.
> Range: Line graphs, histograms, pie charts, bar charts.
4.4 Generate, construct and assemble technical documents.
> Range: Pre-defined weekly and monthly technical reports, project progress reports, specifications.
4.5 Communicate interactively with individuals and with peers.
> Range: Meetings.
4.6 Generate, construct, assemble and deliver a technical presentation.
> Range: To a peer-group audience. Project progress reports, product/service overviews, technical reports.

5. Engineering Management.

Apply self-management principles and concepts relating to the development of projects and/or operations within an engineering environment.

Competency and Range:

5.1 Apply entrepreneurial principles to product / service / process development or operations.
> Range: Simple product, service, process
5.2 Practice self-management principles.
> Range: General process operations, product development, service delivery.

6. Application of Complementary Knowledge.

Demonstrate a critical awareness of the impact of engineering activity on the social, industrial and physical environment, and of the need to act professionally within own limits of competence.

Range: The combination of social, workplace and physical environmental factors must be appropriate to the discipline or other designation of the qualification. Evidence may include case studies typical of engineering practice situations in which the graduate is likely to participate.

Competency and Range:

6.1 Relate engineering activity to environmental, cultural and safety issues.
6.2 Exhibit awareness of the need for professionalism.

ASSOCIATED ASSESSMENT CRITERIA

1.1

> A well-defined engineering problem/desired outcome is identified.
> The factors/variables influencing the problem are identified.
> Criteria against which a solution can be measured are identified.
> A clear description of the problem and its localized effect is provided.
> The relevant assumptions, premises and constraints are identified and recorded.

1.2

> Information relating to the problem is gathered.
> Appropriate data collection methods are applied.
> Statistical methods are applied to information sampling.

> Technical, supervisory and general management data and categories are created and selected to organize information pertaining to the documents.
> Information is correctly transferred from one form into another.
> A computer is effectively used to process, produce and present data.
> Valid conclusions are drawn from technical, supervisory and general management data.

4.3

> Data/information that could best be displayed graphically is identified.
> Graphical tools within the selected software package(s) are used to produce an effective graphical presentation of the data.

4.4

> An appropriate type of workplace document for the purpose is chosen and justified against selected criteria.
> The structure, style and language are appropriate to the document type.
> Tables, figures and other graphical techniques are appropriately integrated.
> Task-and readership-appropriate style, register and vocabulary are assessed against given criteria.

4.5

> Ideas are presented clearly.
> Ideas from other individuals are encouraged.
> Listening skills are demonstrated.
> Effective and confident participation in discussions is demonstrated.
> A comprehensive report on the outcome of discussions, including the views of all participants is presented orally and/or in writing.

4.6

> The needs and knowledge of a simulated audience are identified and information is pitched at the appropriate level.
> An appropriate presentation format is chosen according to the occasion.
> Presentation slides and handout documentation are produced using effective layouts and formats.
> A variety of effective verbal presentation techniques are used with confidence.
> The verbal presentation is integrated with the visual aids / electronic media to communicate the information effectively.

5.1

> Relevant entrepreneurial criteria contributing to a successful project in a specialised field are identified.
> A prototype / innovation / systems improvement is conceptualised.
  > Range: Technical and economic feasibility.
> Elements contributing to the business plan are identified and presented.
> The viability of the prototype / innovation / systems improvement is assessed.
  > Range: technical, social or environmental.
> The relevant assumptions, premises and constraints are identified and recorded.

5.2

> Self-management principles are described and justified.
> Self-management principles are applied to a project, process or operation.
> Performance measures/benchmarks are identified.
> Quality assurance issues are identified and integrated.
> Safety assurance issues are identified and integrated.
> Projects, processes and/or operations are monitored and controlled.

6.1

> A problem in a workplace process is identified and possible improvements applied.
> Pertinent social issues, safety and environmental laws and regulations are identified.
> Potential hazards and their consequences are identified.
> The potential impact of engineering activity on social and environmental issues is critically evaluated.

> Relevant environmental management and safety principles are applied and justified.
> The relevant assumptions, premises and constraints are identified and recorded.

6.2

> Reasons for maintaining continued competence and for keeping abreast of up-to-date tools and techniques are listed.
> The system of professional development is described.
> The boundaries of competence in problem solving and design are discerned.
> Decision-making is limited to area of current competence.
> Judgement is displayed in decision- making during problem solving and design.
> The design or solution of a problem is justified in terms of ethical considerations.
> The learner accepts responsibility for own actions.

Integrated assessment:

Providers of programmes shall in the quality assurance process demonstrate that an effective integrated assessment strategy is used. Clearly identified components of assessment must address summative assessment of the exit level outcomes. Evidence should be derived from major work or multiple instances of limited scale work.

INTERNATIONAL COMPARABILITY

International comparability of the whole qualification standard is ensured through the Dublin Accord. The standards are comparable with those for qualifications in engineering in countries having comparable engineering education systems to South Africa, namely, Canada, Ireland and the United Kingdom. Comparability is audited by mutual visits.

ARTICULATION OPTIONS

The exit level outcomes ensure that a graduate of a programme meeting these standards would meet requirements for entry to a number of programmes including:

> A 480 Credit Qualification in Engineering Technology.
> A learnership programme leading to the qualification required for registration as a Professional Engineering Technician/Competent Engineering Practitioner.

MODERATION OPTIONS

The following criteria should be applied by the relevant ETQA:

> Appropriate qualification in the field of engineering at one level higher than the level of the qualification.
> Appropriate experience and understanding of assessment theory, processes and practices.
> Good interpersonal skills and ability to balance the conflicting requirements of:
  > Maintaining national standards
  > The interests of the learner
  > The need for transformation and redressing the legacies of the past
  > The cultural background and language of the learner.
> Registration as an assessor with a relevant ETQA.
> Any other criteria required by a relevant ETQA.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

N/A

NOTES

Appendix A

Definition of Knowledge Areas

Basic Sciences

> Physics (including mechanics), chemistry, earth sciences and the biological sciences which focus on understanding the physical world, as applicable in each engineering disciplinary context.

Complementary Studies

> Those disciplines outside of engineering sciences, basic sciences and mathematics which:

> Are essential to the practice of engineering, including engineering economics, the impact of technology on society and effective communication; and
> Broaden the student's perspective in the humanities and social sciences in order to understand the world in which engineering is practised.

Computing and Information Technologies

> The use of computers, networking and software to support engineering activity, and as an engineering activity in itself, as appropriate to the discipline.

Engineering Design and Synthesis

> The creative, iterative and often open-ended process of conceiving and developing components, systems and processes. Design requires the integration of engineering, basic and mathematical sciences, working under constraints, taking into account economic, health and safety, social and environmental factors, codes of practice and applicable laws.

Engineering Sciences

> These are rooted in the mathematical and physical sciences, and where applicable, in other basic sciences, but extend knowledge and develop models and methods in order to lead to engineering applications and solve engineering problems.

Mathematical Sciences

> This is an umbrella term embracing the techniques of mathematics, numerical analysis and statistics cast in an appropriate mathematical formalism.

Appendix C

Consistency of Exit Level Outcomes with Critical Cross-field Outcomes

SAQA Critical Cross-Field Outcomes:

> Identifying and solving problems in which responses display that responsible decisions using critical thinking have been made.
> Equivalent Exit Level Outcome: 1, 2, 3, 6

> Working effectively with others as a member of a team, group, organisation and community.
> Equivalent Exit Level Outcome: 2, 3, 4, 6

> Organising and managing oneself and one's activities responsibly and effectively.
> Equivalent Exit Level Outcome: 3, 5, 6

> Collecting, analysing, organising and critically evaluating information.
> Equivalent Exit Level Outcome: 1, 2, 3, 4

> Communicating effectively using visual, mathematical and/or language skills.
> Equivalent Exit Level Outcome: 1, 2, 3, 4, 6

> Using science and technology effectively and critically, showing responsibility toward the environment and health of others.
> Equivalent Exit Level Outcome: 1, 2, 3, 5, 6

> Demonstrating an understanding of the world as a set of related systems by recognising that problem contexts do not exist in isolation.
> Equivalent Exit Level Outcome: 1, 2, 3, 6

> 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.
> Equivalent Exit Level Outcome: 2, 6
> Participating as responsible citizens in the life of local, national and global communities.
> Equivalent Exit Level Outcome: 2, 3, 6
> Being culturally and aesthetically sensitive across a range of contexts.
> Equivalent Exit Level Outcome: 3, 4, 5, 6
> Exploring education and career opportunities.
> Equivalent Exit Level Outcome: 5, 6
> Developing entrepreneurial opportunities.
> Equivalent Exit Level Outcome: 5, 6

Appendix D

Calculation of SAQA Credits and Allocation to Knowledge Area

The method of calculation assumes that certain activities are scheduled on a regular weekly basis while others can only be quantified as a total activity over the duration of a course or module. This calculation makes the following assumptions:

> Classroom or other scheduled contact activity generates notional hours of the student's own time for each hour of scheduled contact. The total is given by a multiplier (see third column of table below) applied to the contact time.

> One week of full time activity accounts for assessments in a semester.

> Assigned work generates only the notional hours judged to be necessary for completion of the work and is not multiplied.

Define for each course or module identified in the rules for the technology qualification:

Type of Activity:
□□
> L = number of lectures per week□□
> T = number of tutorial per week□□
> P = total practical periods□□
> X = total other contact periods□□
> A = total assignment non-contact hours□□
> D = total no of days of workplace-based learning□□
> W = number of weeks the course lasts (actual + 2 week per semester for assessment, if applicable to the course or module)

Time Unit in hours:

> TL = duration of a lecture period
> TT = duration of a tutorial period
> TP = duration of an institution-based practical period
> TX = duration of other period
> TA = 1 hour
> TD = duration of work-based learning per day

Contact time multiplier:

> ML=total work per lecture period
> MT=total work per tutorial period
> MP=total work per practical period
> MX=total work per other period
> MD=total workplace-based learning per period.

The credit for the course is calculated using the formula:

> C = {W(LTL ML + TTT MT) + PTP MP + XTX MX + ATA + DTDMD}/10

The resulting credit for a course or value may be divided between more than one knowledge area. In allocating the credit for a course to multiple knowledge areas, only new knowledge or skills in a particular area may be counted. Knowledge and skills developed in other courses and used in the course in question shall not be counted. Such knowledge is classified by the nature of the area in which it is applied. In summary, no knowledge is counted more than once as being new.

MD may differ for different activities e.g. the factor for work-based learning component in which the learner develops skills which integrate theoretical knowledge with actual practice in a working environment will differ from the factor for a related assignment and project work which enhances learner understanding of the work environment and/or new learning.

All learning that is assigned credits must satisfy the following criteria:

> The competencies to be achieved and contributions to knowledge areas are clearly defined and documented.
> The learning is quality assured by the provider.
> A student's performance is assessed against defined outcomes.
> Evidence of the assessment process is presented in the accreditation evaluation.

Qualifiers:

The qualification may have a disciplinary or cross-disciplinary qualifier (discipline, branch, option or endorsement) defined in the provider's rules for the technology qualification and reflected on the academic transcript and technology qualification certificate, subject to the following:

> The designation must contain the word "Engineering". The qualifier may contain one or more combinations of the following descriptors: Chemical, Civil, Computer, Electrical, Electro-mechanical, Industrial, Mechanical, Metallurgical and Mining. Designations are not restricted to this list.
> The qualifier must clearly indicate the nature and purpose of programme.
> The fundamental engineering science content must be consistent with the qualifier.
> The target market indicated by the qualifier may be a traditional branch of engineering or a substantial industry area.
> In the case of a provider offering programmes with minor differences in content, only one programme should be accredited.

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


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