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REPUBLIC OF SOUTH AFRICA
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Vol. 471

Pretoria, 10 September 2004

No. 26769



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

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GOVERNMENT NOTICES

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

No. 1053

10 September 2004

Postnet Suite 248
Private Bag X 06
WATERKLOOF
0145

Hatfield Forum West
1067 Arcadia Street
Hatfield

Tel: +27 (0) 12 431-5000

Fax: +27 (0) 12 431- 5144

*Established in terms of Act 58 of 1995*

Dear Sir/Madam,

The South African Qualifications Authority in terms of the National Standards Body Regulations (Government Gazette No. 18787) published on 28 March 1998, hereby publishes the new names of persons nominated to serve as members of the following National Standards Body (**NSB 09**) and their national stakeholder bodies. SAQA invites comment with respect to the acceptability of the nominees and the representativeness of the national bodies with key interests in the field.

Kindly forward any comment not later than **8 October 2004** to:

South African Qualification Authority
Postnet Suite 248
Private Bag X06
WATERKLOOF
0145

Attention: Mr J Samuels
Director : Standards Setting and Development

Telephone: (012) 431 5007
Fax: (012) 431 5123

Yours sincerely,

JOE SAMUELS

DIRECTOR : STANDARDS SETTING AND DEVELOPMENT

SAQA'S MISSION

"To ensure the development and implementation of a National Qualifications Framework which contributes to the full development of each learner and to the social and economic development of the nation at large."

NSB 09 : HEALTH SCIENCE AND SOCIAL SERVICES

Category	Nomination	Nominated by	Workplace	Gender	PDI status
Providers	Prof J Chikte (replacing Prof J P van Niekerk)	Health Professions Council of South Africa (HPCSA)	University of Stellenbosch	Male	Black

RESIGNATIONS:**NSB 11: SERVICES**

Brad Jacklin

NSB 12: PHYSICAL PLANNING AND CONSTRUCTION

Mr Adrian Stelzer

SAQA'S MISSION

"To ensure the development and implementation of a National Qualifications Framework which contributes to the full development of each learner and to the social and economic development of the nation at large."

No. 1054

10 September 2004

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

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, National Standards Body 05, Education, Training and Development, 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 NSB invite 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 NSB at the address below by not later than **10 October 2004**. All correspondence should be marked **SGB for Practitioners Specialising in Inclusive Education** and be addressed to:

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

SGB INFORMATION

As a necessary step in the development and implementation of the National Qualifications Framework, The National Standards Bodies are 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 National Standards Bodies;
- 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 their National Standards Body.

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 NSB, 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 National Standards Body and the Constituency.
-

PUBLIC NOTICE BY NSB 05, EDUCATION, TRAINING AND DEVELOPMENT, TO REGISTER THE SGB FOR PRACTITIONERS SPECIALISING IN INCLUSIVE EDUCATION

NSB 05 hereby registers the SGB for Practitioners Specialising in Inclusive Education, formally known as the SGB for Practitioners Specialising in Barriers-to-Learning, from 6 November 2004 to 6 November 2007.

BRIEF OF THE SGB

1. Analyse the concepts of Inclusive Education and investigate the sites of learning, types of practitioners, and types of educational practice involved in providing support to all learners.
2. Based on the analysis conducted in (1), design learning pathways and identify standards and qualifications for Inclusive Education for all practitioners in the field 05. *[Regulation 24 (1) (e)]*
3. Analyse existing standards in Field 05 to identify the extent to which they assist practitioners in the various sub-fields to teach learners within an Inclusive Education context.
4. Monitor the continued generation of standards for practitioners and, if necessary, generate additional standards to be included in the practitioner qualifications across the sub-fields in field 05.
5. Generate at least the following qualifications:
 - Certificate at Level 4 in Inclusive Education;
 - Diploma at Level 5 in the Inclusive Education, with one or more specialisations;
 - Degree at Level 6 in Inclusive Education, with one or more specialisations;
 - Certificate at Level 6 in mentoring non-specialist educators so that they can assist all learners;
 - Certificates and Diploma in specialist areas of Inclusive Education practice as required.*[Regulation 24 (1) (a)]*
6. Recommend the qualifications and standards generated under 5 above to the NSB. *[Regulation 24 (1) (c)]*
7. Recommend criteria for the registration of assessors and moderators or moderating bodies. *[Regulation 24 (1) (d)]*
8. Review these qualifications and standards and effect the necessary changes. *[Regulation 24 (1) (b)]*
9. Perform such other tasks as may from time to time be assigned by the NSB. *[Regulation 24 (1) (e)]*

COMPOSITION OF THE SGB

NOMINEE	WORKPLACE	NOMINATING BODY	QUALIFICATION/ EXPERIENCE
Beer, C	Retired	SA Federation for Mental Health	Diploma in Education, Chairperson of the Division for Mental Handicap of SAFMH
Bressan, A	Cato Manor Technical College	Cato Manor Technical College	B A, HDE, Head Business Studies Division and Coordinator of Special Needs Education
Condy, J	Cape Technikon	Committee of Technikon Principals	M Sc, Lecturer in Special Educational Needs
Diack, P (Ms)	Centre for Education and Policy Development (CEPD)	Department of Education	B Sc, Intensive Care Course, PG Course in Paediatric Neuro-developmental Therapy, Senior Physiotherapist
Higgerty, M	The SA Guide-dogs Association for the Blind	The SA Guide-dogs Association for the Blind	B SocSc, Principal of the Orientation and Mobility School
Khumalo, M	South African Federal Council on Disability	South African Federal Council on Disability	B Paed, BA Hons, Senior Secondary Diploma, Divisional Coordinator, Coordinator, Teacher
Koudstaal, C	Unica School for Learners with Autism	Autism South Africa	BA (Speech Therapy), Principal of Unica School for Learners with Autism
Kruger, D	Educational Psychologist (private practice)	University of South Africa (UNISA)	D Ed, Educational psychologist and Senior Lecturer in Special Needs Education at UNISA
Laauwen, H (Ms)	University of the Witwatersrand (Wits)	University of the Witwatersrand (Wits)	BA, B Ed, M Ed, PhD (in progress), THED, FDE, Psychometrist, Educational Psychologist

Levin	Dept of Education	Dept of Education	B Ed (Hons), Project Manager of DANIDA Inclusive education project
Maguvhe, M O	South African National Council for the Blind	South African National Council for the Blind	BA (Education), B Ed, Dip in Special Education, , M Ed, PhD candidate, Educator in school for learners with special needs, Coordinator Education Services
Mahlangu, E	Dept of Education	Dept of Education	B Admin. UED, Deputy Chief Education Specialist in the ELSEN Directorate
Moodley, S	Research and Development Consultant	Disabled People of South Africa	M Ed, Research and Development Consultant
Mudau, P	Sekhukhune College of Education	Sekhukhune College of Education	B Ed, Lecturer in Remedial Education
Nxumalo, Edmund (Mr)	Health and Welfare Sector Education and Training Authority (HWSETA)	WHSETA	BPaed, Senior Secondary Teachers' Diploma, Cert in Conflict Management, Sports Leadership Certificate, Tutor, Teacher, Head of Department, SETA Manager
Okeke, K (Ms)	National Department of Education	National Department of Education	BA, UED, BA Hons, MSc, Chief Education Specialist, Senior Subject Advisor, High School Principal, Lecturer, Teacher
Reddy, M	New Beginnings Early Childhood Development Project	SA Congress of Early Childhood Development	Diploma Pre- School Teaching, Curriculum Developer
Saunders, P	Western Cape Dept of Education	National Council for Persons with Physical Disability in SA	M Ed, Senior Deputy Chief Education Specialist

Stofile, S (Ms)	Inclusive Education Project	Inclusive Education Project	BA, B Ed, Diploma in Applied Linguistics, M Ed, Teacher, HoD, Coordinator
Storbeck, C	Wits University	Deaf Federation of South Africa (DEAFSA)	PhD, Coordinator of Deaf Education

No. 1055

10 September 2004

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

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, National Standards Body 08, Law, Military Science and Security, hereby seeks to notify the public of its intention to establish and register a Standards Generating Body.

Owing to the nature of the proposed body expressions of interest to serve on it are not being sought.

The nominees to this body have been agreed with the relevant organs of state and SAQA and are deemed compliant with respect to representativeness of all interested parties.

More information regarding this application may be obtained on the SAQA website or from the SAQA offices, Hatfield Forum West, 1067 Arcadia Street, Hatfield, Pretoria.

Comment regarding the qualifications **only** will be accepted and may be submitted to the South African Qualifications Authority at the address below by no later than **10 October 2004**. All correspondence should be marked SGB for **Visible Policing** and be addressed to:

The Director: Standards Setting and
Development
SAQA

Attention: Mr. D Mphuthing

Postnet Suite 248

Private Bag X06

Waterkloof

0145

or faxed to 012 – 431-5144

e-mail: dmphuthing@saqa.co.za

SGB INFORMATION

As a necessary step in the development and implementation of the National Qualifications Framework, The National Standards Bodies are 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 National Standards Bodies;
- 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 their National Standards Body.

SAQA, in establishing the Standards Generating body, through the National standards Body has paid due regard for, among other things, "the need for representativeness and equity, redress and relevant experience in terms of the work of the SGB."

**PUBLIC NOTICE BY NSB 08, LAW MILITARY SCIENCE AND SECURITY OF THE
APPLICATION TO RE-REGISTER A STANDARDS GENERATING BODY (SGB) FOR
VISIBLE POLICING CONTROL**

PROPOSED BRIEF OF THE SGB

The National Standards Body 08 has received an application to recognise and re-register an SGB for Visible Policing in the sub-field of Safety in Society from August 2004 to August 2007:

1. Research, review and identify current existing qualifications and standards and determine the applicability thereof to the South African requirements. [Regulation 24(1)(e)]. In particular, the following will be reviewed:
 - National Certificate: Policing NQF Level 5
 - National Higher Certificate: Policing NQF Level 5
 - National Diploma: Policing: NQF Level 6
 - B Tech: Policing NQF Level 6
 - Bachelor Degree: Policing NQF Level 6
 - Honours Degree: Policing NQF Level 7
 - M Tech in Policing NQF Level 8
 - Doctoral Degree: Policing NQF Level 8
 - D Tech in Policing NQF Level 8
2. Determine the South African needs for qualifications and standards, which are not addressed by the current qualifications. [Regulation 24(1)(e)].
3. Generate the following qualifications and unit standards in accordance with SAQA requirements [Regulation 24(1)(a)].
 - Certificate in Policing NQF Level 5 (currently registered)
 - Certificate in Metropolitan Policing NQF Level 5
 - Diploma in Policing NQF Level 5 (currently proposed registration)
 - B Tech Policing NQF Level 6
 - Certificate in Dog Handling NQF Level 5
 - Diploma in Dog Handling NQF Level 6
4. Recommend the qualifications generated above, to the NSB 08 [Regulations 24(1)(c)].
5. Recommend criteria for the registration of assessors and moderators or moderating bodies [Regulation 24(1)(b)].
6. Update and review standards [Regulations 24(1)(b)].

COMPOSITION OF THE SGB

Name of Nominee	Workplace	Nominating Body	Qualifications/Experience
Botha SJC	South African Police Service	SAPS: Training	National Higher Diploma in Policing. National Diploma ETD(P) National Certificate in Assessment
Brink A	South African Police Service	SAPS: Legal	B Iuris LLB LLM
Chachalia NV	Metropolitan Police Johannesburg	Metro Police Johannesburg	M Ed. Director: Education assisting the police with Human Resources issues.
Dreyer TJA	South African Police Service	SAPS: Crime Prevention (Dogs)	National Diploma Policing Administration B Tech: Policing Advanced University Diploma in ETD Certificate in Policy Development Certificate in Project Management
Groenewald HJ	South African Police Service	SAPS: Training	National Diploma in Police Administration.
Koekemoer ZJ	National Police Consultative Forum	National Police Consultative Forum	Involved in policing.
Lottering JD	National Police Consultative Forum	National Police Consultative Forum	Teaching experience, Diploma in Teaching, involved in Community Policing Structures.
Louwrens HB	Private	Man Tracking: Private	Policing Administration Diploma
Marais MA	South African Police Service	SAPS: Crime Prevention (Dogs)	National Diploma Police Administration Certificate: Outcomes Based Assessment ETD: Practitioner course
Mhlongo MA	South African Police Service	SAPS: Functional	B Criminal Justice (Police Science), is involved in Training on Human Rights, Community Policing and Domestic Violence
Mkwunazi NS	South African Police Service	SAPS: Operational Manager	National Diploma B Tech Policing
Mphahlele MB	South African Police Service	SAPS: Training	B A in Policing, Certificate in Community Policing and Human Rights, responsible for Training.
Mokoena CBM	POPCRU	POPCRU	Senior Certificate. Involved in finger printing, counselling skills and correctional management

Nkuna ME	South African Police Service	SAPS: Training	B A in Police Science, National Higher Diploma in Policing, Diploma in Project Management, involved in Training.
Nyathi M	Department of Correctional Services	Department of Correctional Services	Diploma in Agriculture Further Education Teachers Certificate Advanced Diploma in Agricultural Management Higher Diploma in Adult Education Bachelor of Education Masters in Public and Development Management
Pillay DM	SAPS: Security & Protection Services	SAPS: Security & Protection Services	National Diploma in Police Management
Riekert R	Technicon Pretoria	Technicon Pretoria	B Tech Policing National Diploma in Policing BA Social Sciences.
Sewram V	Metropolitan Police Durban	Metro Police Durban	B Iuris LLB CCMA Accredited Commissioner
Surmon AV	Metropolitan Police Johannesburg	Metro Police Johannesburg	Matric, involved in Training and Development for 12 years, involved in Curriculum Development in Metro Policing in Gauteng.
Sinclair I	Technicon SA (UNISA)	Technicon SA (UNISA)	BA Social Science Hons Social Science MA Community Development
Tshangela ME	South African Police Service	SAPS: Security & Protection Services	Senior Certificate. 15 years experience
Truter CN	SAPU	SAPU	Matric, experience in Labour issues and Policing.
Zitha BG	Department of Correctional Services	Department of Correctional Services	National Diploma in Correctional Services

No. 1056

10 September 2004

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

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, National Standards Body 08, Law, Military Science and Security, hereby seeks to notify the public of its intention to establish and register a Standards Generating Body.

Owing to the nature of the proposed body expressions of interest to serve on it are not being sought.

The nominees to this body have been agreed with the relevant organs of state and SAQA and are deemed compliant with respect to representativeness of all interested parties.

More information regarding this application may be obtained on the SAQA website or from the SAQA offices, Hatfield Forum West, 1067 Arcadia Street, Hatfield, Pretoria.

Comment regarding the qualifications **only** will be accepted and may be submitted to the South African Qualifications Authority at the address below by no later **than 10 October 2004**. All correspondence should be marked SGB for **Air Defence** and be addressed to:

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

SGB INFORMATION

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

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- e. perform such other functions as may from time-to-time be delegated by their National Standards Body.

SAQA, in establishing the Standards Generating body, through the National standards Body has paid due regard for, among other things, "the need for representativeness and equity, redress and relevant experience in terms of the work of the SGB.



**PUBLIC NOTICE BY NSB 08, LAW, MILITARY SCIENCE AND SECURITY
OF THE INTENTION TO ESTABLISH AND REGISTER A STANDARDS
GENERATING BODY (SGB) FOR THE AIR DEFENCE**

Proposed Brief of the SGB

The National Standards Body (NSB 08), intends to establish and register an SGB for Air Defence in order to:

1. Develop learning pathways for potential qualifications and unit standards in the Air Defence sector from level 2 through to level 6 [Regulation 24 (1)(a)].
2. Generate qualifications and standards for the Air Defence sector in terms of relevant legislation and the establishment of best practices and ethics across the working environment. [Regulation 24 (1)(a)]
3. Recommend qualifications and standards generated under 1 and 2 above to the NSB [Regulation 24 (1)(c)].
4. Recommend criteria for the registration of assessors and moderators or moderating bodies. [Regulation 24 (1)(d)].
5. Liaise with other NSBs and SGBs – within and outside NSB 08 – which have vested interest in the Air Defence sector [Regulation 24 (1)(e)].
6. Perform such other functions as may from time to time be delegated by NSB 08: Law, Military Science and Security [Regulation 24 (1)(e)].

COMPOSITION OF THE SGB:

Name	Workplace	Nominating Body	Qualification/Experience
Gerald Malinga	Director Education Training and Development	South African Air Force	BA Business Administration Commercial Pilot License and Civil Aviation Diploma
Stephanus Johannes Immelman	Senior Staff Officer South African Air Force Training Integrity Center	South African Air Force	28 years within South African Air Force, Member of various forums during this time pertaining to flying training
Francois Redelinghuys	Staff Officer Training Integrity Center South African Air Force	South African Air Force	Diploma in Training Management Senior Management programme
Jonathan Mickel Madumbo	Staff Officer 2 Logistics Development	South African Air Force	Education: Diploma in Road Transport (RAU)
Andre Pieterse	Officer Commanding: 41 Squadron (Air Transport Training Wing)	South African Air Force	Military Management Diploma 'A' Category Transport Pilot 'A-1' Category Flight Instructor
Ramalingam Iyer	Staff Officer Combat Force Preparation: Directorate Combat Systems	South African Air Force	Masters in Defence and Strategic Studies, Certificate in Defence Management
Johann Willem Jacobs	Helicopters Operational Systems	South African Air Force	Senior Management Diploma Fixed Wing and Helicopter Flyer Instructor
Elsa Zimmer	Senior Staff Officer Command and Control HR and Functional Development	South African Air Force	Fully Qualified Air Traffic Controller Senior Staff Course
Brenda Nosipo Baba	Staff Officer Command and Control HR and Functional Development Comms	South African Air Force	Diploma in Road Transport
Nqaba Daniel Xulu	ETDP – Joint Air Reconnaissance Intelligence Center (JARIC)	South African Air Force	C-Level SAAF Intelligence

Patricia Thembisile Nobanda	Counter-Intelligence Coordinator	South African Air Force	Bachelor in Arts
Herman Slabbert	Protection	South African Air Force	Project Management Management Development Program
Elvis Phale	Senior Staff Officer Education Training and Development Logistics and Technical Training	South African Air Force	Higher National Diploma – Mechanical Engineering (Nigeria)
Steve Smith	Staff Officer Basic Flying Training	South African Air Force	Navigator Instructor
Sidusiso Zolile Mama	Senior Staff Officer Operating Systems	South African Air Force	Member of the Generic SGB
Ellen Magrietha Riekert	Senior Staff Officer Supply Support	South African Air Force	National Diploma Purchasing Management
Helgardt Brink	Senior Staff Officer Resource Information	South African Air Force	National Dip Electrics (LC) T3, Senior Management Programme at PTA University 1997, Certificate Programme in Logistics Pretoria Tech 1994, ISO 9000 Auditor Pretoria Tech 1998
Ahmed Rehiaz Shaik-Latiff	Force Preparation Base Support Systems	South African Air Force	B Tech Fire Service Technology
Lex Rock Heemstra	Directorate Aviation Safety Training	South African Air Force	Military Management Certificate B Com Industrial Psychology
George Athol Muller	Senior Staff Officer Test Flying Air Command	South African Air Force	National Test Pilot School Certificate
Christiaan Bothma	Directorate Technical Support Services Airforce Head Quarters	South African Air Force	B Eng Mechanical M Eng
Andr� Meyer	Directorate Technical Support Services Airforce Head Quarters	South African Air Force	National Technical Diploma Certificate in Explosives Technology Engineering Management Certificate in Logistics

Daniël Hermanus Mathee	Directorate Technical Support Services Airforce Head Quarters	South African Air Force	National Technical Diploma
Frederick Johannes Rall	Directorate Technical Support Services Airforce Head Quarters	South African Air Force	National Higher Diploma

No. 1057

10 September 2004

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

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

Diplomacy, Protocol and Foreign Affairs

Registered by NSB 08, 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 qualification and unit standards upon which qualifications are based. The full qualification and unit standards can be accessed via the SAQA web-site at www.saga.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 10 October 2004***. All correspondence should be marked **Standards Setting – SGB for Diplomacy, Protocol and Foreign Affairs** and addressed to

The Director: Standards Setting and Development
SAQA

Attention: Mr. D Mphuthing

Postnet Suite 248

Private Bag X06

Waterkloof

0145

or faxed to 012 – 431-5144

e-mail: dmphuthing@saqa.co.za



JOE SAMUELS

Director: Standards Setting and Development



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

Advanced Certificate: Foreign Economic Representation

SAQA QUAL ID	QUALIFICATION TITLE	
49055	Advanced Certificate: Foreign Economic Representation	
SGB NAME	SGB Diplomacy, Protocol and Foreign Affairs Assist	
ABET BAND	PROVIDER NAME	
Undefined		
QUALIFICATION CODE	QUAL TYPE	SUBFIELD
LMS-6-National Certificate	National Certificate	Sovereignty of the State
MINIMUM CREDITS	NQF LEVEL	QUALIFICATION CLASS
150	Level 6	Regular-Unit Stds Based
SAQA DECISION NUMBER	REGISTRATION START DATE	REGISTRATION END DATE

PURPOSE OF THE QUALIFICATION

This qualification provides the entry point in the service of foreign economic representation. It will equip qualifying learners with the competencies to: provide direct access links to foreign markets for South African businesses; spot and recruit foreign direct investment into South Africa; gather foreign market intelligence and assist South African and/or foreign businesses to access the Department of Trade and Industry suite of programmes. Qualifying learners will be able to:

- > Communicate effectively with a variety of stakeholders in a foreign economic office
- > Perform and manage the practical aspects of foreign economic representation
- > Monitor and evaluate the impact of trade diplomacy
- > Manage and coordinate the administrative duties of a foreign economic office

Rationale:

As South Africa competes in the global village, there is a great need to attract foreign investment and ensure that South African businesses access international markets. Foreign Economic representatives are at the interface of marketing South Africa internationally. This qualification constitutes the basic competencies that are needed by a Foreign Economic Representative to execute her/his functions competently.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

Learners embarking on study towards this qualification are assumed to have completed a level 6 qualification in the field of Business, Commerce and Management or its equivalent.

Recognition of Prior Learning:

This qualification may be achieved in part or whole through the recognition of prior learning and /or experience as a Foreign Economic Representative. For the purposes of recognizing prior learning, providers are required to develop structured means of assessment of individual candidates against the exit level outcomes of the qualification on a case by case basis. Such procedures and assessment of individual candidates must be moderated.

QUALIFICATION RULES

N/A

EXIT LEVEL OUTCOMES

Core	114871 Know and apply diplomatic protocols and etiquette	Level 5	8	Registered
Core	7880 Prepare, implement, manage and control budgets	Level 6	10	Registered
Core	10072 Monitor and review activity plan	Level 6	7	Registered
Core	13059 Prepare and analyse financial reports for different types of business entities	Level 6	16	Registered
Core	110483 Develop and manage an organisational records system	Level 6	5	Registered
Core	116722 Identify, initiate, develop and manage trade and investment opportunities	Level 6	20	Draft - Prep for P Comment
Elective	7859 Lead and manage teams of people	Level 6	6	Registered
Elective	7887 Develop and Manage Marketing Plans and Strategies	Level 6	12	Registered
Elective	7889 Manage quality in the organisation	Level 6	6	Reregistered
Elective	10085 Manage research projects	Level 6	30	Registered
Elective	10591 Conduct interpersonal management	Level 6	6	Registered
Elective	12984 Interpret provisions of a contract and assess liability of clients and other parties to an agency agreement	Level 6	10	Registered
Elective	12985 Identify and assess negotiable instruments relating to modes of payment	Level 6	10	Registered
Elective	13104 Determine the relationship between risk and return	Level 6	8	Registered
Elective	14508 Demonstrate knowledge and understanding of globalisation and its implications for financial services in South Africa	Level 6	7	Registered
Fundamental	13925 Present information in a public setting	Level 5	5	Registered
Fundamental	110485 Describe and explain a range of international trends in economic development	Level 5	6	Registered
Fundamental	114846 Demonstrate an understanding of the historical, political, social and economic realities of South Africa	Level 5	10	Registered
Fundamental	12887 Demonstrate an understanding of the functioning of the international financial markets within the South African context	Level 6	18	Registered
Fundamental	114843 Communicate effectively in agency and consular work	Level 6	8	Registered
Fundamental	114855 Evaluate South Africa's economic policies	Level 6	5	Registered
Fundamental	114864 Explain South Africa's key domestic policies	Level 6	5	Registered
Fundamental	116721 Demonstrate a broad understanding of the department of trade and industry	Level 6	5	Draft - Prep for P Comment



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

1

Demonstrate a broad understanding of the department of trade and industry

SAQA US ID	UNIT STANDARD TITLE		
116721	Demonstrate a broad understanding of the department of trade and industry		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Diplomacy, Protocol and Foreign Affairs Assist		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Law, Military Science and Security		Sovereignty of the State	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
LMS-SST-0-SGB DIP	Regular	Level 6	5

Specific Outcomes:

SPECIFIC OUTCOME 1

Demonstrate an understanding of the structure and functions of the DTI.

SPECIFIC OUTCOME 2

Demonstrate an understanding of the mandate and vision of the DTI.

SPECIFIC OUTCOME 3

Demonstrate an understanding of the role, policies, products and services of the DTI.

SPECIFIC OUTCOME 4

Demonstrate an understanding of the interrelation between the DTI, other government structures and e



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

2

Identify, initiate, develop and manage trade and investment opportunities

SAQA US ID	UNIT STANDARD TITLE		
116722	Identify, initiate, develop and manage trade and investment opportunities		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Diplomacy, Protocol and Foreign Affairs Assist		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Law, Military Science and Security		Sovereignty of the State	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
LMS-SST-0-SGB DIP	Regular	Level 6	20

Specific Outcomes:

SPECIFIC OUTCOME 1

Identify, initiate and maintain trade and investment contacts.

SPECIFIC OUTCOME 2

Promote South African businesses abroad and highlight investment opportunities in South Africa.

SPECIFIC OUTCOME 3

Advise South African business about opportunities abroad, foreign businesses about trade opportuniti

SPECIFIC OUTCOME 4

Compile reports about the activities of the foreign economic office.

No. 1058

10 September 2004

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

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

Civil Engineering and Construction

Registered by NSB 12, Physical Planning and Construction, 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 qualification and unit standards upon which qualifications are based. The full qualification and unit standards can be accessed via the SAQA web-site at www.saga.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.

Comment on the unit standards should reach SAQA at the address ***below and no later than 10 October 2004***. All correspondence should be marked **Standards Setting – SGB Civil Engineering and Construction** and addressed to

The Director: Standards Setting and Development
SAQA

Attention: Mr. D Mphuthing

Postnet Suite 248

Private Bag X06

Waterkloof

0145

or faxed to 012 – 431-5144

e-mail: dmphuthing@saga.co.za



JOE SAMUELS

Director: Standards Setting and Development



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Construction Materials Testing

SAQA QUAL ID	QUALIFICATION TITLE	
49017	National Certificate: Construction Materials Testing	
SGB NAME	SGB Civil Engineering Construction	
ABET BAND	PROVIDER NAME	
Undefined		
QUALIFICATION CODE	QUAL TYPE	SUBFIELD
PPC-3-National Certificate	National Certificate	Civil Engineering Construction
MINIMUM CREDITS	NQF LEVEL	QUALIFICATION CLASS
120	Level 3	Regular-Unit Stds Based
SAQA DECISION NUMBER	REGISTRATION START DATE	REGISTRATION END DATE

PURPOSE OF THE QUALIFICATION

Learners found competent against this qualification will be able to safely execute sampling and laboratory testing. These test are for mix designs, quality control during construction and acceptance testing of completed products and stabilised materials.

For those with extensive experience in the workplace, this qualification can be used in the recognition of prior learning process to assess and recognise workplace skills acquired without the benefit of formal education and training.

For the new entrant, this qualification describes the learning outcomes required to effectively participate in a structured workplace.

For education and training providers, this qualification provides guidance for the development of appropriate learning programs and assessment documentation.

For employers, this qualification enables skills gaps to be identified and addressed ensuring that productivity levels are increased and business objectives achieved.

This qualification has been developed to provide flexibility and mobility / portability across the construction materials testing industry. This will allow for future career advancement across the various learning areas of construction materials testing.

Rationale for the qualification

The rationale for the introduction of a unit standard based - "National Certificate in Construction Materials Testing - NQF Level 3" qualification- is to provide an introductory qualification for persons executing laboratory testing on construction materials.

Quality control during the construction process and the manufacturing of products used for construction, are totally dependent on the accurate execution of laboratory test by competent materials testers.

Learners will mostly be employed in the construction industry or the manufacturing of construction material products - where specialisation in the use of concrete, bituminous or soil materials occurs.

There is currently a critical shortage of competent Materials Testers in the Construction Industry.

The combination of learning outcomes in this qualification will provide learners with applied competence in the execution of laboratory sampling and laboratory testing procedures specifically for concrete, bituminous or soil construction materials depending on the Learning area taken.

The qualification will serve as a basis for learning towards the National Certificate in Construction Materials Testing - NQF Level 4

Its contribution to socio-economic transformation is that learners would be able to receive recognition for previous learning and experience. Employability and career prospects are enhanced. Progress to Level 4 - will enable learners to start their own businesses supplying a construction materials testing service - a process that will accelerate economic transformation and give economic empowerment.

The benefits to the economy is that quality products will be constructed / manufactured with lower maintenance cost, longer life spans and meeting the minimum requirements with respect to safety.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

Learners should have acquired the language competencies of NQF level 2 and mathematical literacy competencies of NQF Level 2, prior to embarking on learning towards this qualification.

Recognition of Prior Learning:

The qualification may be obtained through the process of Recognition of Prior Learning (RPL). Learners who have met the requirements of any unit standard in this qualification may apply for recognition of prior learning to the relevant body, and will be assessed against the assessment criteria and specific outcomes for the relevant unit standard/s.

QUALIFICATION RULES

Rules of Combination:

The qualification is composed of Fundamental, Core and Elective learning components: Fundamental - 44 credits. Core - 28 credits.

In order to be awarded the Qualification, the learner has to prove competence on all the Fundamental and Core unit standards, as well as a minimum of 48 credits from the elective list contained in Annexure C.

In order to cluster the elective learning in meaningful combinations that will assist learners to attain marketable skills in a specific direction and facilitate career development / career paths, the following are proposed learning areas.

Bituminous Materials Testing Learning area:

Fundamental: 44 credits Core: 28 credits Elective: 50 Total : 122 credits

- > Execute sampling of asphalt materials for testing - NQF Level 3
- > Execute laboratory testing pertaining to asphalt materials -NQF Level 3
- > Execute sampling of bituminous binder materials for testing - NQF Level 3
- > Execute laboratory testing pertaining to bituminous binders - NQF Level 3
- > Demonstrate knowledge of and produce computer spreadsheets using basic functions -NQF Level 2
- > Demonstrate knowledge of and produce word processing documents using basic functions - NQF Level 2

Concrete Materials Testing Learning area:

Fundamental: 44 credits Core: 28 credits Elective: 48 Total : 120 credits

- > Execute sampling of concrete material for testing - NQF Level 3
- > Execute laboratory testing pertaining to concrete -NQF Level 3
- > Demonstrate knowledge of and produce computer spreadsheets using basic functions -NQF Level 2
- > Demonstrate knowledge of and produce word processing documents using basic functions - NQF Level 2
- > Demonstrate knowledge of concrete construction technology

Soils and Gravel Testing Learning area:

Fundamental: 44 credits Core: 28 credits Elective: 48 Total : 120 credits

- > Execute sampling of soil & gravel material - NQF Level 3

- > Execute laboratory testing pertaining to soils and gravels - NQF Level 3
- > Demonstrate knowledge of and produce word processing documents using basic functions - NQF Level 2
- > Demonstrate knowledge of and produce computer spreadsheets using basic functions - NQF Level 2
- > Produce word processing documents for business - NQF Level 3
- > Produce and use spreadsheets for business - NQF Level 3

EXIT LEVEL OUTCOMES

On completion of this qualification learners are able to demonstrate the following generic competence:

- > Apply knowledge of physics and chemistry in the sampling and testing process of construction materials.
- > Apply knowledge of occupational health and safety specifically applicable to construction materials testing.
- > Apply knowledge of aggregate sampling and testing.

Elective exit level outcomes and associated assessment criteria for the different proposed learning areas are as follows:

Bituminous Materials, Concrete Materials, Soil and Gravel Materials Learning area

Demonstrate a basic competence to sample and test asphalt materials and bituminous binders, or concrete materials, or soil and gravel materials- in a safe and efficient manner.

ASSOCIATED ASSESSMENT CRITERIA

On completion of this qualification learners are able to demonstrate the following generic competence:

- > The ability to apply knowledge of chemistry and physics is evaluated against standardised test procedures contained in various codes of practise.
- > Industry norms and specifications are used to evaluate the application of occupational health and safety issues in the construction materials testing environment.
- > Industry norms and specifications are used to evaluate the sampling and testing of aggregates.

Elective exit level outcomes and associated assessment criteria for the different proposed learning areas are as follows:

Bituminous Materials, Concrete Materials, Soil and Gravel Materials Learning area

- > The identification of materials to be sampled and tested is demonstrated
- > The correct apparatus are identified
- > Both the apparatus and materials to be tested are prepared
- > The test is executed under supervision and in compliance to specified test procedures
- > Test readings are taken and test results recording

Integrated Assessment:

Formative assessments conducted during the learning process will consist of written tests, demonstrations and a number of self-assessments. The purpose of formative assessment is to diagnose learner strengths and weaknesses and to determine readiness for summative assessment.

Summative assessment would consist of written tests coupled with assignments, case studies and practical demonstrations. Summative assessments would only be conducted once the learner has indicated that he/she is ready to undergo summative assessment.

Before qualifying, the learners will be expected to demonstrate competence in a practical situation that integrates the assessment of all specific outcomes, for all unit standards.

Integrated assessment provides learners with an opportunity to display an ability to integrate practical performance, actions, concepts and theory across unit standards in order to achieve competence in relation to the purpose of this qualification.

In particular, assessors should check that the learner is able to demonstrate the ability to consider a range of options and make decisions about:

- > The quality of the observed practical performance as well as the theory and underpinning knowledge behind it.

- > The different methods that can be used by the learner to display thinking and decision making in the demonstration of practical performance.
- > Reflexive competencies

INTERNATIONAL COMPARABILITY

The learning area qualification design model for the qualifications " National Certificate in Construction Materials Testing - NQF Levels 2; 3 & NQF 4 is unique to South Africa. In terms of this model, a learner can specialize in one of the three learning areas indicated in the articulation part of the qualification. On completion of any of the learning areas - the same qualification is awarded.

The learning area model is however comparable to the - "strand" - concept in qualifications registered on the New Zealand Qualifications Framework. The "strand " enables learners to specialise.

No information could be found on the New Zealand National Qualifications Framework for qualifications in Construction Materials Testing.

One training provider in Australia does offer a post certificate / diploma / degree course in Construction Materials Testing.(soils and concrete) The course has a duration of 108 hours.

By comparison, the National Certificates in Construction Materials Testing in South Africa all have a minimum of 142 credits - that is 1420 hours of training. The learning area - Concrete materials - is a much more comprehensive training program if the material range, number test procedures, and the number of training hours is considered.

The Scottish Qualifications Authority has a unit standard at level 4 "Building Materials: Performance Studies " - which contains a outcome - " describe and carry out tests on building materials and prepare laboratory reports. " - range statement - cement, aggregates, fresh concrete, hardened concrete, masonry products, timber and steel.

ARTICULATION OPTIONS

This qualification has been developed for mobility across various Learning areas in Construction Materials Testing.

Horizontal articulation is possible because the fundamental learning and the core units are the same for all the various Learning areas.

Refer to annexure C elective unit standards - rules of combination - where different combinations of electives together with Fundamental and Core learning - formatted in learning areas- on completion will result in the same generic National Certificate in Construction Materials Testing - NQF Level 3.

Articulation with the National Certificate in the Supervision of Construction processes at NQF Level 4 is possible since this qualification contains a unit standard dealing with the interpretation of test/ laboratory results.

Articulation with the National Diploma in the Management of Construction processes at NQF Level 5 is also possible since this qualification contains a unit standard dealing with the initiation of and interpretation of test / laboratory results.

Vertical articulation is also possible.

Learners can progress from level 2 to level 6 in the various Learning fields.

The following qualifications provide a learning pathway for the Construction Materials Tester / Technician / Technologist

NQF level 2:

National Certificate in Construction Materials Testing - various learning areas

NQF level 3: (this qualification)

National Certificate in Construction Materials Testing - various learning areas

NQF level 4: (generic qualification in process of registration)

National Certificate in Construction Materials Testing - various learning areas

NQF level 5: (still to be developed)

National Diploma in Construction Materials Technology - various learning areas

NQF level 6: (still to be developed)
National Degree in Construction Materials Technology

Equally, holders of other qualifications may be evaluated against this qualification for the purpose of RPL.

MODERATION OPTIONS

Assessment of learner achievements takes place at providers accredited by the relevant body (RSA, 1998b) for the provision of programs that result in the outcomes specified for the National Certificates in Construction Materials Testing. The relevant- ETQA, or other ETQA's who have a Memorandum of Understanding in place with the relevant - ETQA, is responsible for the moderation of learner achievements of learners who meet the requirements of this qualification.

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 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 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, which is accredited by the relevant ETQA

CRITERIA FOR THE REGISTRATION OF ASSESSORS

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

- > A recognized assessor qualification.
- > Compliance with the relevant ETQA's requirements for assessor / moderator registration.
- > Subject matter expertise in the unit standard/s for which assessor / moderation registration is sought, as well as an understanding of the context of the qualification in order to enable integrated assessment.
- > A moderator qualification for applicants to register as moderator.

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	7547 Operate a personal computer system	Level 2	6	Reregistered
Core	116560 Execute laboratory testing pertaining to aggregate materials	Level 3	10	Draft - Prep for P Comment
Core	116585 Execute sampling of aggregate materials for testing	Level 3	4	Draft - Prep for P Comment
Core	14547 Implement Occupational Health and Safety measures in a construction materials testing laboratory	Level 4	10	Registered
Elective	7568 Demonstrate knowledge of and produce word processing documents using basic functions	Level 2	3	Reregistered
Elective	7572 Demonstrate knowledge of and produce computer spreadsheets using basic functions	Level 2	3	Reregistered
Elective	7567 Produce and use spreadsheets for business	Level 3	5	Reregistered
Elective	7570 Produce word processing documents for business	Level 3	5	Reregistered
Elective	116557 Execute sampling of soils and gravels for testing	Level 3	12	Draft - Prep for P Comment

Elective	116568 Execute laboratory testing pertaining to asphalt materials	Level 3	20	Draft - Prep for P Comment
Elective	116570 Execute sampling of concrete material for testing	Level 3	7	Draft - Prep for P Comment
Elective	116576 Execute laboratory testing pertaining to bituminous materials	Level 3	10	Draft - Prep for P Comment
Elective	116584 Execute sampling of asphalt materials for testing	Level 3	10	Draft - Prep for P Comment
Elective	116586 Execute laboratory testing pertaining to soils and gravels	Level 3	20	Draft - Prep for P Comment
Elective	116588 Execute laboratory testing pertaining to concrete	Level 3	25	Draft - Prep for P Comment
Elective	15169 Organize and control the construction of bulk earthworks	Level 4	12	Registered
Elective	15172 Interpret test/lab results in civil construction	Level 4	4	Registered
Elective	15175 Plan, organise and control the construction of stabilized and unstabilized pavement layers	Level 4	12	Registered
Elective	15183 Demonstrate knowledge of concrete construction technology	Level 4	10	Registered
Elective	116589 Execute sampling of bituminous materials for testing	Level 4	3	Draft - Prep for P Comment
Elective	116591 Demonstrate an understanding of and adjust concrete mix design	Level 4	5	Registered
Elective	15190 Plan, organise and control asphalt paving construction	Level 5	15	Registered
Elective	15192 Plan, organise and control bituminous surfacing seal construction	Level 5	15	Registered
Fundamental	7456 Use mathematics to investigate and monitor the financial aspects of personal, business and national issues	Level 3	2	Registered
Fundamental	8968 Accommodate audience and context needs in oral communication	Level 3	5	Registered
Fundamental	8969 Interpret and use information from texts	Level 3	5	Registered
Fundamental	8970 Write texts for a range of communicative contexts	Level 3	5	Registered
Fundamental	8973 Use language and communication in occupational learning programmes	Level 3	5	Registered
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	Registered
Fundamental	9012 Investigate life and work related problems using data and probabilities	Level 3	5	Registered
Fundamental	9013 Describe, apply, analyse and calculate shape and motion in 2-and 3-dimensional space in different contexts	Level 3	4	Registered
Fundamental	14539 Demonstrate an understanding and apply physical science and chemistry in construction materials testing	Level 4	8	Registered



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

1

Execute sampling of soils and gravels for testing

SAQA US ID	UNIT STANDARD TITLE		
116557	Execute sampling of soils and gravels for testing		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Civil Engineering Construction		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Physical Planning and Construction		Civil Engineering Construction	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
PPC-CEC-0-SGB CEC	Regular	Level 3	12

Specific Outcomes:

SPECIFIC OUTCOME 1

Determine the number, size and type of samples.

SPECIFIC OUTCOME 2

Prepare for sampling under supervision.

SPECIFIC OUTCOME 3

Execute sampling under supervision.

SPECIFIC OUTCOME 4

Label containers and transport samples to laboratory under supervision.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

2

Execute laboratory testing pertaining to aggregate materials

SAQA US ID	UNIT STANDARD TITLE		
116560	Execute laboratory testing pertaining to aggregate materials		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Civil Engineering Construction		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Physical Planning and Construction		Civil Engineering Construction	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
PPC-CEC-0-SGB CEC	Regular	Level 3	10

Specific Outcomes:

SPECIFIC OUTCOME 1

Plan the execution of the testing.

SPECIFIC OUTCOME 2

Prepare sampled material for testing.

SPECIFIC OUTCOME 3

Execute the laboratory tests.

SPECIFIC OUTCOME 4

Record and store test readings.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

3

Execute laboratory testing pertaining to asphalt materials

SAQA US ID	UNIT STANDARD TITLE		
116568	Execute laboratory testing pertaining to asphalt materials		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Civil Engineering Construction		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Physical Planning and Construction		Civil Engineering Construction	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
PPC-CEC-0-SGB CEC	Regular	Level 3	20

Specific Outcomes:

SPECIFIC OUTCOME 1

Plan the execution of the testing.

SPECIFIC OUTCOME 2

Prepare sampled material for testing.

SPECIFIC OUTCOME 3

Execute the laboratory tests.

SPECIFIC OUTCOME 4

Record and store test readings.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

4

Execute sampling of concrete material for testing

SAQA US ID	UNIT STANDARD TITLE		
116570	Execute sampling of concrete material for testing		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Civil Engineering Construction		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Physical Planning and Construction		Civil Engineering Construction	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
PPC-CEC-0-SGB CEC	Regular	Level 3	7

Specific Outcomes:

SPECIFIC OUTCOME 1

Determine the number, size and type of samples.

SPECIFIC OUTCOME 2

Prepare for sampling.

SPECIFIC OUTCOME 3

Execute sampling.

SPECIFIC OUTCOME 4

Label containers and transport samples to laboratory.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

5

Execute laboratory testing pertaining to bituminous materials

SAQA US ID	UNIT STANDARD TITLE		
116576	Execute laboratory testing pertaining to bituminous materials		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Civil Engineering Construction		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Physical Planning and Construction		Civil Engineering Construction	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
PPC-CEC-0-SGB CEC	Regular	Level 3	10

Specific Outcomes:

SPECIFIC OUTCOME 1

Plan the execution of the testing.

SPECIFIC OUTCOME 2

Prepare sampled material for testing.

SPECIFIC OUTCOME 3

Execute the laboratory tests.

SPECIFIC OUTCOME 4

Record and store test readings.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

6

Execute sampling of asphalt materials for testing

SAQA US ID		UNIT STANDARD TITLE	
116584		Execute sampling of asphalt materials for testing	
SGB NAME		ABET BAND	PROVIDER NAME
SGB Civil Engineering Construction		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Physical Planning and Construction		Civil Engineering Construction	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
PPC-CEC-0-SGB CEC	Regular	Level 3	10

Specific Outcomes:

SPECIFIC OUTCOME 1

Determine the number, size and type of samples.

SPECIFIC OUTCOME 2

Prepare for sampling.

SPECIFIC OUTCOME 3

Execute sampling.

SPECIFIC OUTCOME 4

Label containers and transport samples to laboratory.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

7

Execute sampling of aggregate materials for testing

SAQA US ID	UNIT STANDARD TITLE		
116585	Execute sampling of aggregate materials for testing		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Civil Engineering Construction		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Physical Planning and Construction		Civil Engineering Construction	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
PPC-CEC-0-SGB CEC	Regular	Level 3	4

Specific Outcomes:

SPECIFIC OUTCOME 1

Determine the number, size and type of samples.

SPECIFIC OUTCOME 2

Prepare for sampling.

SPECIFIC OUTCOME 3

Execute sampling.

SPECIFIC OUTCOME 4

Label containers and transport samples to laboratory.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

8

Execute laboratory testing pertaining to soils and gravels

SAQA US ID	UNIT STANDARD TITLE		
116586	Execute laboratory testing pertaining to soils and gravels		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Civil Engineering Construction		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Physical Planning and Construction		Civil Engineering Construction	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
PPC-CEC-0-SGB CEC	Regular	Level 3	20

Specific Outcomes:**SPECIFIC OUTCOME 1**

Plan the execution of the testing.

SPECIFIC OUTCOME 2

Prepare sampled material for testing.

SPECIFIC OUTCOME 3

Execute the laboratory tests.

SPECIFIC OUTCOME 4

Record and store test readings.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

9

Execute laboratory testing pertaining to concrete

SAQA US ID	UNIT STANDARD TITLE		
116588	Execute laboratory testing pertaining to concrete		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Civil Engineering Construction		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Physical Planning and Construction		Civil Engineering Construction	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
PPC-CEC-0-SGB CEC	Regular	Level 3	25

Specific Outcomes:

SPECIFIC OUTCOME 1

Plan the execution of the testing.

SPECIFIC OUTCOME 2

Prepare sampled material for testing.

SPECIFIC OUTCOME 3

Execute the laboratory tests.

SPECIFIC OUTCOME 4

Record and store test readings.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

10

Execute sampling of bituminous materials for testing

SAQA US ID	UNIT STANDARD TITLE		
116589	Execute sampling of bituminous materials for testing		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Civil Engineering Construction		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Physical Planning and Construction		Civil Engineering Construction	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
PPC-CEC-0-SGB CEC	Regular	Level 4	3

Specific Outcomes:

SPECIFIC OUTCOME 1

Determine the number, size and type of samples.

SPECIFIC OUTCOME 2

Prepare for sampling.

SPECIFIC OUTCOME 3

Execute sampling.

SPECIFIC OUTCOME 4

Label containers and transport samples to laboratory.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Construction: Concreting

SAQA QUAL ID	QUALIFICATION TITLE	
49016	National Certificate: Construction: Concreting	
SGB NAME	SGB Civil Engineering Construction	
ABET BAND	PROVIDER NAME	
Undefined		
QUALIFICATION CODE	QUAL TYPE	SUBFIELD
PPC-3-National Certificate	National Certificate	Civil Engineering Construction
MINIMUM CREDITS	NQF LEVEL	QUALIFICATION CLASS
152	Level 3	Regular-Unit Stds Based
SAQA DECISION NUMBER	REGISTRATION START DATE	REGISTRATION END DATE

PURPOSE OF THE QUALIFICATION

Learners found competent against this qualification will be able to mix and place concrete in a safe, cost effective manner and in compliance with project specifications.

For those who have been in the workplace for a long time, this Qualification can be used in the recognition of prior learning process to assess and recognise workplace skills acquired without the benefit of formal education and training.

For the new entrant, this Qualification describes the learning outcomes required to participate effectively in a structured workplace.

For education and training providers, this Qualification provides guidance for the development of appropriate learning programmes and assessment documentation.

For employers, this Qualification enables skills gaps to be identified and addressed ensuring that productivity levels are increased and business objectives achieved.

This Qualification has been developed to assist with the advancement of the learner across the Civil Engineering and Construction Industry and is aimed at Construction Concreting practitioners in the Industry, ensuring the upliftment of standards in general.

The combination of learning outcomes will provide the qualifying learner with vocational knowledge and skills appropriate to the context of Construction Concreting in the Civil Engineering and Construction environment. It will also equip learners with a foundation for further intellectual development, opportunities for gainful employment and reward for contributions to society.

This Qualification will provide the Industry with qualified Construction Concreting practitioners, thereby facilitating social and economic transformation, empowerment and upliftment in the Industry and country in general.

The relationship between this Qualification and the principles of the NQF is outlined in the following table:

NQF Principle-National Certificate in Construction concreting - NQF Level 3

Recognition of Prior learning-Allows for Recognition of Prior Learning, especially as a means of career advancement

Credibility-Learning Outcomes are a result of consensus by the Industry

Relevance-Consulting workshops indicated a demand for a unit standard based Qualification in Construction Concreting at NQF Level 3

Access-Removes traditional barriers to Higher Education

Articulation/Progression-Forms part of a Learning Pathway for Construction Concreting practitioners,

spanning NQF Levels 1 - 7

Rationale for the Qualification:

This Qualification has been developed for the Construction Concreting occupational area within the Civil Engineering and Construction Industry.

The rationale for the introduction of a unit standards based Qualification in Construction Concreting is to provide a qualification for persons who perform construction concreting activities on Civil Engineering and Construction sites, whether in micro, small, medium or large operations.

In the past many practitioners in the Civil Engineering and Construction area were denied career advancement and possible professional registration. The introduction of a unit standards based National Certificate in Construction: Concreting, will allow learners, both unemployed and employed, to reach their full potential of advancement and will allow for Recognition of Prior Learning.

This qualification will facilitate the development of a professional community of Construction Concreting practitioners.

The competencies contained in this Qualification are essential for social and economic transformation, empowerment and upliftment within the construction concreting environment, whilst simultaneously improving the skills base of the country.

The combination of learning outcomes will provide qualifying learners with applied competence in the integration of general construction site-work and technical competencies, areas of specialisation in construction concreting, first level supervision of construction concreting activities and basic computer literacy.

This Qualification lays the basis for further learning towards the National Certificate in the Supervision of Construction Processes: - NQF Level 4.

Job Role-Purpose

Concrete Technologist-To design and quality assure concrete to ensure that contractors' requirements for optimization and economy are met

Site Planner-Design and plan site, equipment and resources to ensure cost-effectiveness of operations and activities

Buyer-To procure materials in accordance with specified requirements (economy, time and quality)

Site Establisher-Establish site to ensure optimal concreting operations

Storeman-Receive, check, control, store and issue material, stock and equipment and control losses to ensure ready availability of material

Batcher Person (this could be a Concrete Technician who is computer literate, or a labourer)-Measure correct quantities according to instructions

Scraper Operator-Contribute to batching by supplying aggregate from stock pile to weigh batcher

Mixer Operator-Operate mixing equipment to produce concrete

Driver/Operator-Move concrete from mixer to designated points of placing

Supervisor-Ensure concreting operations take place according to plan

Concrete Hand-Place compact, cure and protect concrete

Finishing Hand-Screed, float, trowel and texture surface to required finish

Quality Controller-Sample and test materials (aggregates, cement extenders, ad-mixtures, pigments, water hardeners, release agents) to establish quality, make recommendations (reporting)

Key Work Areas

- > Concrete Production
- > Concrete Construction
- > Concrete Maintenance
- > Quality Control

RECOGNIZE PREVIOUS LEARNING?

N

LEARNING ASSUMED TO BE IN PLACE

Learners should have acquired the language competencies of NQF level 2 and mathematical literacy competencies of NQF Level 2, prior to embarking on learning towards this qualification.

Recognition of Prior Learning:

The qualification may be obtained through the process of Recognition of Prior Learning (RPL). Learners who have met the requirements of any unit standard in this qualification may apply for recognition of prior learning to the relevant Education and Training Quality Assurance Body (ETQA), and will be assessed against the assessment criteria and specific outcomes for the relevant unit standard/s. ETQA bodies are responsible to facilitate the implementation of the RPL. The ETQA body registers trained assessors against specific unit standards. Learners are prepared for assessment and assessed against the unit standard by these registered assessors. Moderation and also an appeals process are in place. Learners declared competent against a specific unit standard, receives an ETQA certificate indicating this achievement. This information is also recorded on the National Record Learner Database. (NLRD)

QUALIFICATION RULES

N/A

EXIT LEVEL OUTCOMES**Core**

1. Demonstrate an understanding of the Construction Industry and its processes
2. Identify, describe and use concrete and other related material in Civil Engineering Construction.
3. Interpret construction drawings and specifications and calculate construction quantities to develop a work plan
4. Apply productivity and quality principles on a construction site.
5. Demonstrate knowledge of concrete construction technology and basic concrete construction practise when apply concrete materials technology.
6. The properties and characteristics of fresh and hardened concrete, concrete materials and their application in concrete mix design are described.
7. Carry out routine and site tests on raw materials, fresh and hardened concrete and oversee concrete production.

Elective

1. Demonstrate an understanding of and adjust concrete mix design.
2. Supervise the installation of pre-cast concrete elements.
3. Oversee pre-cast concrete production - wet mix.
4. Apply specialised finishes to concrete.
5. Assess appearance, durability and strength of pre-cast elements.
6. Control concrete material quality.
7. Supervise the batching and mixing of concrete by mass using a concrete mixer.
8. Oversee instantly de-moulded pre-cast concrete element production.
9. Supervise underwater concrete
10. Oversee spun pre-cast concrete element production.
11. Operate a personal computer system.

ASSOCIATED ASSESSMENT CRITERIA**Core**

1

- > The composition, role-players, processes and legislation governing the construction industry's impact on an employee's role as an employee within the industry and how these different elements are to be applied in his/her specific work context to enhance performance and promote career development are identified.
- > Health and safety hazards are identified regarding how they contribute to a safe and healthy work environment for self and others
- > Measures to mitigate these hazards are identified
- > Basic First Aid assistance is rendered to fellow workers in the event of an emergency

2.

- > A range of materials used in Civil Engineering Construction are identified.
- > The correct methods for selecting and rejecting materials is applied
- > The use of these materials in Civil Engineering Construction is demonstrated
- > Materials are measured and ordered according to organizational procedures
- > Required tools and equipment are identified, selected and maintained
- > Work site infrastructures and work areas are set out to meet job requirements and using basic survey equipment.

3.
 - > Information contained in drawings and specifications is interpreted and applied to construction activities
 - > Material quantities are calculated for job costings and these calculations are used to develop work plans.
4.
 - > Activity production and resource costs are measured and reported on and decisions regarding the implementation of productivity improvement measures are made
 - > Quality management systems and quality improvement processes are implemented.
 - > Project quality plans are monitored
 - > Appropriate measures are identified to reduce deviations in accordance with quality improvement processes
5.
 - > The properties of concrete and the methods used to produce and install concrete in general and specialised structural applications are described
6.
 - Mathematical practices for sampling and testing the quality of concrete are applied..
 - > The characteristics of concrete materials and their affect on the workability and durability of concrete mix are explained.
 - > Graphic representations of test results are assessed, plotted and produced in accordance with mathematical practices
7.
 - > Sample portions of fine aggregates in fresh concrete are selected and tested.
 - > Post-cutting activities are conducted and joints are sealed to prevent ingress of contaminating substances.
 - > Concrete production and related operations are supervised to ensure that all work is carried out in accordance with health and safety legislation, specifications and industry standards.
 - > The purpose and procedures for conducting concrete tests are explained,
 - > Samples of fresh concrete (slump) and concrete cubes are prepared for testing purposes.
 - > Time and log sheets are maintained and records are completed related to construction processes in accordance with site requirements.

Elective

1.
 - > The clients brief / specification for the concrete is understood
 - > The critical criteria for the specification of the concrete is understood and explained in terms of quality of product and cost
 - > The suitable available concreting materials are identified, and physical properties are obtained or tested to determine suitability
2.
 - > The planning, preparation, installation and post-installation of re-cast concrete elements Supervising ensuring all work is carried out in accordance with health and safety legislation, specifications and industry standards
3.
 - > Elements to produce wet mix precast concrete are planned and prepared, the quality of wet mix precast concrete production elements are supervised and monitored and reports are written up
4.
 - > Shutters for "as struck" finishes are prepared, and the correct textured finishing method to fresh struck and hardened concrete is applied.
 - > Concrete is protected and cured in accordance with health and safety legislative requirements, specifications and industry standards
5.
 - > Visual tests are conducted to pre-cast concrete elements and non-conformances is rectified in accordance with work place policy
- 6.

- > Appropriate methods for testing pre-cast concrete elements to loading requirements are selected in accordance with testing schedules and/or legislative requirements.
- > Schedules for testing the quality of different types of concrete materials are compiled, and non-compliances identified during testing processes is corrected.
- > concrete material quality is protected from contamination and records of material quality test results are maintained

7.

- > Scales are calibrated and set in accordance with known masses and manufacturer's specifications,
- > The batching of materials, the mixing and discharging of concrete and post-mixing operations are supervised to ensure all work is completed in accordance with safety legislation requirements and good housekeeping practices

8.

- > to Instantly de-moulded precast concrete production elements are planned and prepared.
- > The quality of spun precast concrete production elements are supervised and monitoring and reports are written up.

9.

- > The preparing, placing and finishing of concrete placed under water is supervised ensuring all work is carried out in accordance with safety legislative requirements and completed to the required dimensions.

10.

- > The The production of spun precast concrete elements is s planned and prepared.
- > The quality of spun precast concrete production elements are supervised and monitored and reports are written up.

11.

- > Personal computer hardware and software is operated in accordance with software instructions and manufacturer's specifications

Integrated Assessment:

Formative assessments conducted during the learning process will consist of written tests, demonstrations and a number of self-assessments. The purpose of formative assessment is to diagnose learner strengths and weaknesses and to determine readiness for summative assessment.

Summative assessment would consist of written tests and accompanying assignments, case studies and practical demonstrations. Summative assessments would only be conducted once the learner has indicated that he/she is ready to undergo summative assessment.

Before qualifying, learners will be expected to demonstrate competence in a practical situation that integrates the assessment of all specific outcomes, for all Unit Standards.

Integrated assessment provides learners with an opportunity to display an ability to integrate practical performance, actions, concepts and theory across Unit Standards to achieve competence in relation to the purpose of this Qualification.

In particular assessors should check that the learner is able to demonstrate the ability to consider a range of options and make decisions about:

- > The quality of the observed practical performance as well as the theory and underpinning knowledge behind it.
- > The different methods that can be used by the learner to display thinking and decision making in the demonstration of practical performance.
- > Reflexive competencies

INTERNATIONAL COMPARABILITY

New Zealand Qualifications Authority:

The National Certificate in Construction: Concreting was benchmarked against the following New Zealand Qualifications:

- > Concrete Construction with strands in Sitework, Pre-Cast Concrete and Placing and Finishing at Levels 2

or 3 and,

> Concrete Construction (Specialist) with strands in Sitework and Pre-Cast Concrete.

The NZ Qualification, Concrete Construction with strands in Sitework, Pre-Cast Concrete and Placing and Finishing at Levels 2 or 3 has been designed with a core compulsory section, which recognises the core skills and knowledge required by industry for concrete construction workers.

This same principle has been applied in the structuring of the Core category of the National Certificate in Construction: Concreting.

The New Zealand qualification has three strands that recognise the specialised concrete skills in sitework, pre-cast concrete and placing and finishing activities.

This same principle has been applied in the structuring of the Elective category of the National Certificate in Construction: Concreting.

The NZ Qualification, Concrete Construction (Specialist) with strands in Sitework and Pre-Cast Concrete, Level 3 is for people wishing to specialise in the concrete construction industry in either sitework or pre-cast concrete construction activities.

The unit standards contained in the Elective category of the National Certificate in Construction: Concreting include competencies for specialisation in sitework or pre-cast construction activities. In addition, this Qualification includes unit standards for the development of First Line Supervisory skills and basic computer literacy.

This approach has not been incorporated in the design of the New Zealand Level 3 qualifications.

National Training Information Service - Australia

A Certificate III in General Construction (Concreting/Steelfixing) is listed. This Certificate is not based on unit standards and is offered as a training course only. Information on course content is accessible if purchased from training providers accredited by the Australian Qualifications Authority.

Scottish Qualifications Authority

No match was found for Level 3 qualifications listed in the Construction and Civil Engineering Services domain.

ARTICULATION OPTIONS

This Qualification will allow learners access to a National Certificate in the Supervision of Construction Processes: Structures.

The learning pathway for Construction Concreting practitioners, consists of the following Qualifications:

NQF Level 1 National Certificate in Construction:
 NQF Level 2 National Certificate in Construction:
 NQF Level 3 National Certificate in Construction: Concreting
 NQF Level 4 National Certificate in the Supervision of Construction Processes:
 NQF Level 5 National Diploma in the Management of Civil Engineering
 Construction Processes
 NQF Level 6 National First Degree in Construction Management
 NQF Level 7 Professional Degree in Construction Management

Horizontal articulation is possible to the following qualifications at NQF Level 3 since the fundamentals and a large portion of the core is common:

> National Certificate in Construction : Structural Steel Erecting
 > National Certificate in Construction : Concrete Reinforcing

MODERATION OPTIONS

Assessment of learner achievements takes place at providers accredited by the relevant body (RSA, 1998b)

for the provision of programmes that result in the outcomes specified for the National Certificate in Construction: Concreting - NQF Level 3.

The relevant ETQA, or other ETQAs who have a Memorandum of Understanding in place with the relevant ETQA, are responsible for the moderation of learner achievements for those learners who meet the requirements of this Qualification.

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 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 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, which is accredited by the relevant ETQA.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

Persons who apply to register as an Assessor for this Qualification, must meet the following criteria:

- > A recognized assessor Qualification;
- > Compliance with the relevant ETQA's requirements for assessor registration;
- > Detailed documentary proof of educational Qualification, subject matter expertise as well as experience gained (Portfolio of Evidence); and
- > A minimum of three years practical relevant occupational experience at NQF level 3

NOTES

Demonstrate the ability to integrate the following critical cross-field competencies when applying the general, specialist and basic computer competencies:

Identify and solve problems in which responses display that responsible decisions using critical and creative thinking have been made by:

- > Contributing to a safe and healthy work environment for self and others and rendering basic First Aid assistance to fellow workers in the event of an emergency
- > Identifying a range of materials used in Civil Engineering Construction and applying the correct methods for selecting and rejecting materials
- > Measuring and ordering materials, identifying, selecting and maintaining required tools and equipment
- > Working in confined spaces on construction sites and ensuring that all necessary precautions as required by the Occupational Health and Safety Act for the protection of the public and safety of construction workers are adhered to
- > Implementing quality management systems and quality improvement processes, implementing and monitoring project quality plans and identifying appropriate measures to reduce deviations in accordance with quality improvement processes
- > Applying mathematical practices for sampling and testing the quality of concrete
- > Assessing, plotting and producing graphic representations of test results in accordance with mathematical practices
- > Selecting and testing sample portions of fine aggregates in fresh concrete
- > Supervising concrete production and related operations ensuring all work is carried out in accordance with health and safety legislation, specifications and industry standards
- > Supervising the planning, preparation, installation and post-installation of pre-cast concrete elements ensuring all work is carried out in accordance with health and safety legislation, specifications and industry standards
- > Planning and preparing to produce wet mix precast concrete elements, supervising production and monitoring the quality of wet mix precast concrete elements and writing up reports
- > Conducting visual tests to pre-cast concrete elements and rectifying non-conformances in accordance

with work place policy. Selecting appropriate methods for testing pre-cast concrete elements to load requirements in accordance with testing schedules and/or legislative requirements

- > Calibrating and setting scales in accordance with known masses and manufacturer's specifications, supervising the batching of materials, the mixing and discharging of concrete and post-mixing operations ensuring all work is completed in accordance with safety legislation requirements and good housekeeping practices

- > Planning and preparing to produce instantly de-moulded precast concrete elements, supervising production and monitoring the quality of spun precast concrete elements and writing up reports

- > Planning and preparing to produce spun precast concrete elements, supervising production and monitoring the quality of spun precast concrete elements and writing up reports

- > Supervising the preparing, placing and finishing of concrete placed under water ensuring all work is carried out in accordance with safety legislative requirements and completed to the required dimensions

Work effectively with others as a member of a team, group, organisation or community by:

- > Contributing to a safe and healthy work environment for self and others and rendering basic First Aid assistance to fellow workers in the event of an emergency

- > Working in confined spaces on construction sites ensuring that all necessary precautions as required by the Occupational Health and Safety Act for the protection of the public and safety of construction workers are adhered to

- > Measuring and reporting on activity production and resource costs and making decisions regarding the implementation of productivity improvement measures

- > Planning and preparing to produce wet mix precast concrete elements, supervising production and monitoring the quality of wet mix precast concrete elements and writing up reports

- > Planning and preparing to produce instantly de-moulded precast concrete elements, supervising production and monitoring the quality of spun precast concrete elements and writing up reports

- > Planning and preparing to produce spun precast concrete elements, supervising production and monitoring the quality of spun precast concrete elements and writing up reports

- > Calibrating and setting scales in accordance with known masses and manufacturer's specifications, supervising the batching of materials, the mixing and discharging of concrete and post-mixing operations ensuring all work is completed in accordance with safety legislation requirements and good housekeeping practices

- > Supervising the preparing, placing and finishing of concrete placed under water ensuring all work is carried out in accordance with safety legislative requirements and completed to the required dimensions

Organise and manage oneself and one's activities responsibly and effectively by:

- > Identifying how the composition, role-players, processes and legislation governing the construction industry impact on your role as an employee within the industry and how these different elements are to be applied in your specific work context to enhance performance and promote career development

- > Maintaining time and log sheets and completing records related to construction processes in accordance with site requirements

- > Measuring and reporting on activity production and resource costs and making decisions regarding the implementation of productivity improvement measures

- > Planning and preparing to produce wet mix precast concrete elements, supervising production and monitoring the quality of wet mix precast concrete elements and writing up reports

- > Planning and preparing to produce instantly de-moulded precast concrete elements, supervising production and monitoring the quality of spun precast concrete elements and writing up reports

- > Planning and preparing to produce spun precast concrete elements, supervising production and monitoring the quality of spun precast concrete elements and writing up reports

Collect, analyse and critically evaluate information by:

- > Accessing, interpreting and using information from texts to communicate in writing for defined contexts

- > Maintaining time and log sheets and completing records related to construction processes in accordance with site requirements

- > Calculating material quantities for job costings and using these calculations for developing work plans

- > Interpreting and applying information contained in drawings and specifications to construction activities

- > Describing the properties of concrete and the methods used to produce and install concrete in general and specialised structural applications

- > Describing the properties and characteristics of fresh and hardened concrete; concrete materials and their application in concrete mix design. Applying mathematical practices for sampling and testing the quality of concrete

- > Explaining the characteristics of concrete materials and their affect on the workability and durability of

concrete mix. Assessing, plotting and producing graphic representations of test results in accordance with mathematical practices

- > Compiling schedules for testing the quality of different types of concrete materials, correcting non-compliances identified during testing processes
- > Explaining the purpose and procedures for conducting concrete tests, preparing samples of fresh concrete (slump) and concrete cubes for testing purposes
- > Applying keyboard skills accurately entering data for electronic storage and retrieval

Communicate effectively using visual, mathematical and/or language skills in the modes of oral and/or written persuasion by:

- > Using, adapting and maintaining oral communication to accommodate audience needs for a range of communicative contexts
- > Accessing, interpreting and using information from texts to communicate in writing for defined contexts
- > Measuring and reporting on activity production and resource costs and making decisions regarding the implementation of productivity improvement measures
- > Implementing quality management systems and quality improvement processes, implementing and monitoring project quality plans and identifying appropriate measures to reduce deviations in accordance with quality improvement processes

Use science and technology effectively and critically, showing responsibility towards the environment and health of others by:

- > Setting up work site infrastructures that meet job requirements and setting out work areas using basic survey equipment
- > Selecting and testing sample portions of fine aggregates in fresh concrete. Conducting post-cutting activities and sealing joints to prevent ingress of contaminating substances
- > Preparing shutters for "as struck" finishes, and applying the correct textured finishing method to fresh struck and hardened concrete. Protecting and curing concrete in accordance with health and safety legislative requirements, specifications and industry standards
- > Conducting visual tests to pre-cast concrete elements and rectifying non-conformances in accordance with work place policy. Selecting appropriate methods for testing pre-cast concrete elements to load requirements in accordance with testing schedules and/or legislative requirements
- > Compiling schedules for testing the quality of different types of concrete materials, correcting non-compliances identified during testing processes. Protecting concrete material quality from contamination and maintaining records of material quality test results
- > Planning and preparing to produce wet mix precast concrete elements, supervising production and monitoring the quality of wet mix precast concrete elements and writing up reports
- > Planning and preparing to produce instantly de-moulded precast concrete elements, supervising production and monitoring the quality of spun precast concrete elements and writing up reports
- > Planning and preparing to produce spun precast concrete elements, supervising production and monitoring the quality of spun precast concrete elements and writing up reports
- > Calibrating and setting scales in accordance with known masses and manufacturer's specifications, supervising the batching of materials, the mixing and discharging of concrete and post-mixing operations ensuring all work is completed in accordance with safety legislation requirements and good housekeeping practices
- > Operating personal computer hardware and software in accordance with software instructions and manufacturer's specifications

Demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation by:

- > Identifying how the composition, role-players, processes and legislation governing the construction industry impact on your role as an employee within the industry and how these different elements are to be applied in your specific work context to enhance performance and promote career development.

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	9964 Apply health and safety to a work area	Level 2	3	Reregistered
Core	9965 Render basic first aid	Level 2	3	Registered
Core	9966 Establish and prepare a work area	Level 2	4	Registered

Core	9986 Apply quality principles on a construction project	Level 2	12	Registered
Core	13972 Identify describe and use materials in civil engineering construction	Level 2	4	Registered
Core	14336 Maintain Records For Civil Construction Sites	Level 2	2	Registered
Core	14556 Apply productivity principles on a construction site	Level 2	6	Registered
Core	14557 Conduct routine site tests to fresh and hardened concrete	Level 2	4	Registered
Core	9962 Calculate construction quantities to develop a work plan	Level 3	8	Registered
Core	9968 Procure materials, tools and equipment	Level 3	10	Registered
Core	14580 Read and interpret construction drawings and specifications	Level 3	10	Registered
Core	110095 Describe and interpret the composition role-players processes and role of the construction industry	Level 3	4	Registered
Core	116562 Demonstrate knowledge of and apply basic concrete construction practice	Level 3	10	Draft - Prep for P Comment
Core	15183 Demonstrate knowledge of concrete construction technology	Level 4	10	Registered
Core	116563 Demonstrate knowledge of and apply concrete materials technology	Level 4	10	Registered
Core	116564 Oversee concrete production	Level 4	5	Registered
Core	116571 Carry out routine tests on raw materials for concrete production	Level 4	10	Registered
Elective	7547 Operate a personal computer system	Level 2	6	Reregistered
Elective	15034 Work in confined spaces on construction sites	Level 2	2	Registered
Elective	116559 Apply specialised finishes to concrete	Level 3	7	Draft - Prep for P Comment
Elective	116582 Supervise the batching and mixing of concrete by mass using a concrete mixer	Level 3	5	Draft - Prep for P Comment
Elective	14428 Set out construction work areas	Level 4	10	Registered
Elective	116558 Oversee pre cast concrete production - wet mix	Level 4	5	Registered
Elective	116561 Oversee instantly de-moulded pre cast concrete element production	Level 4	5	Registered
Elective	116572 Control concrete material quality	Level 4	5	Registered
Elective	116574 Assess appearance, durability and strength of precast elements	Level 4	5	Registered
Elective	116579 Supervise installation of precast concrete elements	Level 4	8	Registered
Elective	116580 Oversee spun pre cast concrete element production	Level 4	5	Registered
Elective	116581 Supervise under water concreting	Level 4	4	Registered
Elective	116591 Demonstrate an understanding of and adjust concrete mix design	Level 4	5	Registered
Fundamental	7456 Use mathematics to investigate and monitor the financial aspects of personal, business and national issues	Level 3	2	Registered
Fundamental	8968 Accommodate audience and context needs in oral communication	Level 3	5	Registered
Fundamental	8969 Interpret and use information from texts	Level 3	5	Registered
Fundamental	8970 Write texts for a range of communicative contexts	Level 3	5	Registered
Fundamental	8973 Use language and communication in occupational learning programmes	Level 3	5	Registered
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	Registered
Fundamental	9012 Investigate life and work related problems using data and probabilities	Level 3	5	Registered
Fundamental	9013 Describe, apply, analyse and calculate shape and motion in 2-and 3-dimensional space in different contexts	Level 3	4	Registered
Fundamental	14086 Work with a wide range of patterns and basic functions and solve related problems	Level 3	3	Registered



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Construction: Concrete Reinforcing

SAQA QUAL ID	QUALIFICATION TITLE	
49012	National Certificate: Construction: Concrete Reinforcing	
SGB NAME	SGB Civil Engineering Construction	
ABET BAND	PROVIDER NAME	
Undefined		
QUALIFICATION CODE	QUAL TYPE	SUBFIELD
PPC-3-National Certificate	National Certificate	Civil Engineering Construction
MINIMUM CREDITS	NQF LEVEL	QUALIFICATION CLASS
120	Level 3	Regular-Unit Stds Based
SAQA DECISION NUMBER	REGISTRATION START DATE	REGISTRATION END DATE

PURPOSE OF THE QUALIFICATION

Learners found competent against this qualification will be able to erect / install concrete reinforcing in a safe, cost effective manner and in compliance with project specifications.

This Qualification is intended to assist all relevant stakeholders and role-players.

For those who have been in the workplace for a long time, this Qualification can be used in the recognition of prior learning process to assess and recognise workplace skills acquired without the benefit of formal education and training.

For the new entrant, this Qualification describes the learning outcomes required to participate effectively in a structured workplace.

For education and training providers, this Qualification provides guidance for the development of appropriate learning programmes and assessment documentation.

For employers, this Qualification enables skills gaps to be identified and addressed ensuring that productivity levels are increased and business objectives achieved.

This Qualification has been developed to assist with the advancement of the learner across the Civil Engineering and Construction Industry and is aimed at Construction Concrete Reinforcing practitioners in the Industry, ensuring the upliftment of standards in general.

The combination of learning outcomes will provide the qualifying learner with vocational knowledge and skills appropriate to the context of Construction Concrete Reinforcing in the Civil Engineering and Construction environment. It will also equip learners with a foundation for further intellectual development, opportunities for gainful employment and reward for contributions to society.

This Qualification will provide the Industry with qualified Construction Concrete Reinforcing practitioners, thereby facilitating social and economic transformation, empowerment and upliftment in the Industry and country in general.

The relationship between this Qualification and the principles of the NQF is outlined in the following:

NQF Principle - National Certificate in Construction: Concrete Re-Inforcing - NQF Level 3

Recognition of Prior learning - Allows for Recognition of Prior Learning, especially as a means of career advancement

Credibility - Learning Outcomes are a result of consensus by the Industry

Relevance - Consulting workshops indicated a demand for a unit standard based Qualification in

Construction Concrete Reinforcing at NQF Level 3

Access - Removes traditional barriers to Higher Education

Articulation/Progression - Forms part of a Learning Pathway for Construction Concrete Reinforcing practitioners, spanning NQF Levels 1 - 7

Rationale for the Qualification:

This Qualification has been developed for the Construction Concrete Reinforcing occupational area within the Civil Engineering and Construction Industry.

The rationale for the introduction of a unit standards based Qualification in Construction Concrete Reinforcing is to provide a qualification for persons who perform construction concrete reinforcing activities on Civil Engineering and Construction sites, whether in micro, small, medium or large operations.

In the past many practitioners in the Civil Engineering and Construction area were denied career advancement and possible professional registration. The introduction of a unit standards based National Certificate in Construction: Concrete Reinforcing, will allow learners, both unemployed and employed, to reach their full potential of advancement and will allow for Recognition of Prior Learning.

This qualification will facilitate the development of a professional community of Construction Concrete Reinforcing practitioners.

The competencies contained in this Qualification are essential for social and economic transformation, empowerment and upliftment within the construction concrete reinforcing environment, whilst simultaneously improving the skills base of the country.

The combination of learning outcomes will provide qualifying learners with applied competence in the integration of general construction site work and technical competencies, areas of specialisation in construction concrete reinforcing, first level supervision of construction concrete reinforcing activities and basic computer literacy.

This Qualification lays the basis for further learning towards the National Certificate in the Supervision of Construction Processes: - NQF Level 4.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

Learners should have acquired the language competencies of NQF level 2 and mathematical literacy competencies of NQF Level 2, prior to embarking on learning towards this qualification.

Recognition of Prior Learning:

The qualification may be obtained through the process of Recognition of Prior Learning (RPL). Learners who have met the requirements of any unit standard in this qualification may apply for recognition of prior learning to the relevant Education and Training Quality Assurance Body (ETQA), and will be assessed against the assessment criteria and specific outcomes for the relevant unit standard/s. ETQA bodies are responsible to facilitate the implementation of the RPL. The ETQA body registers trained assessors against specific unit standards. Learners are prepared for assessment and assessed against the unit standard by these registered assessors. Moderation and also an appeals process are in place. Learners declared competent against a specific unit standard, receives an ETQA certificate indicating this achievement. This information is also recorded on the National Record Learner Database (NLRD)

QUALIFICATION RULES

Rules of combination:

Fundamental: 36 compulsory

Core: 73 compulsory

Elective: A minimum of 11 credits from list must be taken

Additional Elective Unit Standards could be added to the Qualification over time.

EXIT LEVEL OUTCOMES

On completion of this Qualification learners are able to:

Perform a range of general construction sitework and construction concrete reinforcing activities in the Civil Engineering and Construction context by:

Core Competence:

1. Describe and interpret the composition, role-players, processes, and role of the construction Industry
2. Identify, describe, procure and use materials, tools and equipment in Civil Engineering Construction
3. Establish, set out and prepare a work area.
4. Read and interpret reinforcing materials documentation.
5. Assemble, tie and fix reinforcing cages.
6. Interpret and apply reinforcing drawings
7. Monitor and control cost and production of construction work activities and implement a quality management system.

Elective Competence related to area of specialization.

8. Calculate Construction quantities to develop a work plan.
9. Operate and maintain a steel cutting machine.
10. Tension bonded or unbonded tendons
11. Operate a personal computer system

ASSOCIATED ASSESSMENT CRITERIA

On completion of this Qualification learners are able to:

Perform a range of general construction sitework and construction concrete reinforcing activities in the Civil Engineering and Construction context by:

Core Competence:

1. > The composition, role-players, processes and legislation governing the construction industry impact on his/her role as an employee within the industry and how these different elements are to be applied in his/her specific work context to enhance performance and promote career development are identified.
 - > Health and safety hazards are identified for a safe and healthy work environment for self and others
 - > Measures to mitigate hazards are identified
 - > Basic First Aid assistance is rendered to fellow workers in the event of an emergency
2. > A range of materials used in Civil Engineering Construction are identified.
 - > The correct methods for selecting and rejecting materials is applied
 - > Materials are measured and ordered according to organizational procedures
 - > Required tools and equipment are identified, selected and maintained
3. > Work site infrastructures that meet job requirements is set up and work areas are set out using basic survey equipment
 - > All necessary precautions for working in confined spaces as required by the Occupational Health and Safety Act for the protection of the public and safety of construction workers are adhered to
4. > The requirements of reinforcing drawings are interpreted to locate and determine reinforcing requirements for structures on-site and plan work sequences.
 - > Time and log sheets are maintained and records related to construction processes are completed in accordance with site requirements
5. > Reinforcing materials required for the task are identified, prepared for use and stacked for safe and efficient use at the work area.
 - > Shortages and damaged materials are reported to designated personnel for corrective action
 - > The erected reinforcing is neat and true within SABS tolerances, and matches all design specifications in accordance with given instructions.
6. > Functions in terms of intended use for reinforcing on a construction site are identified from the drawing descriptions.
 - > Abbreviations and symbols are identified and explained in accordance with project requirements
 - > A cutting list is produced in accordance with the Bending Schedule
7. > Activity production and resource costs are measured and reported on.

- > Decisions in regard to the implementation of productivity improvement measures are made.
- > Quality improvement processes are implemented,
- > Project quality plans are implemented and monitored.
- > Appropriate measures are identified to reduce deviations in accordance with quality improvement processes.

Elective Competence related to area of specialization.

- 8. > Material quantities are calculated for job costings
- > Calculations are used to develop work plans

9. > Steel cutting and bending machines are operated, maintained and shut-down in accordance with manufacturer's specifications and legislative and workplace safety requirements

10.> Tendons are tensioned to within specified tolerances in accordance with work place procedures and manufacturer's operating procedures
 > Post-tensioning operations are carried out in accordance with safety legislation and workplace requirements

11. > Personal computer hardware and software are operated in accordance with software instructions and manufacturer's specifications

Integrated Assessment:

Formative assessments conducted during the learning process will consist of written tests, demonstrations and a number of self-assessments. The purpose of formative assessment is to diagnose learner strengths and weaknesses and to determine readiness for summative assessment.

Summative assessment would consist of written tests and accompanying assignments, case studies and practical demonstrations. Summative assessments would only be conducted once the learner has indicated that he/she is ready to undergo summative assessment.

Before qualifying, learners will be expected to demonstrate competence in a practical situation that integrates the assessment of all specific outcomes, for all Unit Standards.

Integrated assessment provides learners with an opportunity to display an ability to integrate practical performance, actions, concepts and theory across Unit Standards to achieve competence in relation to the purpose of this Qualification.

In particular assessors should check that the learner is able to demonstrate the ability to consider a range of options and make decisions about:

- > The quality of the observed practical performance as well as the theory and underpinning knowledge behind it.
- > The different methods that can be used by the learner to display thinking and decision making in the demonstration of practical performance.
- > Reflexive competencies

INTERNATIONAL COMPARABILITY

New Zealand Qualifications Authority:

The National Certificate in Construction: Concrete Reinforcing was benchmarked against the following New Zealand Qualifications:

- > Concrete Construction with strands in Sitework, Pre-Cast Concrete and Placing and Finishing at Levels 2 or 3
- > Concrete Construction (Specialist) with strands in Sitework and Pre-Cast Concrete.

The New Zealand Qualification, Concrete Construction with strands in Sitework, Pre-Cast Concrete and Placing and Finishing at Levels 2 or 3 has been designed with a core compulsory section, which recognises the core skills and knowledge required by industry for concrete construction workers.

This same principle has been applied in the structuring of the Core category of the National Certificate in

Construction: Concrete Reinforcing.

The New Zealand qualification has three strands that recognise the specialised concrete skills in sitework, pre-cast concrete and placing and finishing activities.

This same principle has been applied in the structuring of the Elective category of the National Certificate in Construction: Concrete Reinforcing.

The New Zealand Qualification, Concrete Construction (Specialist) with strands in Sitework and Pre-Cast Concrete, Level 3 is for people wishing to specialise in the concrete construction industry in either sitework or pre-cast concrete construction activities.

The unit standards contained in the Elective category of the National Certificate in Construction: Concrete Reinforcing include competencies for specialisation in sitework or construction concrete reinforcing activities. In addition, this Qualification includes unit standards for the development of First Line Supervisory skills and basic computer literacy.

This approach has not been incorporated in the design of the New Zealand Level 3 qualifications.

National Training Information Service - Australia

A training package "General Construction" is listed on the NTIS (Australia) database. The following Unit of Competency is linked to this training package: "Apply reinforcement schedule".

The following Specific Outcomes are contained in this Unit of Competency:

1. Plan and prepare for concrete construction
2. Read and interpret schedule
3. Check contents of identified bundles
4. Locate reinforcement for element construction

Critical aspects of evidence are listed as:

- > Demonstrate compliance with Occupational Health and Safety regulations applicable to workplace operations
- > Apply organisational quality procedures and processes within the context of constructing reinforced concrete
- > Identify coding and numbering related to a reinforcement schedule
- > Identify structural details of reinforced concrete elements
- > Use safe and effective procedures to handle materials
- > Identify relevant drawings and specifications
- > Interactively communicate with others to ensure effective operations

Pre-Requisite Relationship of Units are listed as:

- > Read and interpret plans
- > Carry out steel fixing
- > Carry out concrete work

These competencies are incorporated in the Core and Elective categories of the National Certificate in Construction: Concrete Reinforcing.

Scottish Qualifications Authority

No match was found for Level 3 qualifications listed in the Construction and Civil Engineering Services domain.

ARTICULATION OPTIONS

This Qualification will allow learners access to a National Certificate in the Supervision of Construction Processes:.

The learning pathway for Construction Concrete Reinforcing practitioners, consists of the following Qualifications:

NQF Level 1 National Certificate in Construction:
 NQF Level 2 National Certificate in Construction:
 NQF Level 3 National Certificate in Construction: Concrete Reinforcing
 NQF Level 4 National Certificate in the Supervision of Construction Processes:
 NQF Level 5 National Diploma in the Management of Civil Engineering
 Construction Processes
 NQF Level 6 National First Degree in Construction Management
 NQF Level 7 Professional Degree in Construction Management

Horizontal articulation is possible to the following qualifications at NQF Level 3 since the fundamentals and a large portion of the core is common:

- > National Certificate in Construction : Concreting
- > National Certificate in Construction : Structural Steel Erecting

Learners who have successfully demonstrated applied competence in this Qualification will be equipped with a foundation for further intellectual development, opportunities for gainful employment and reward for contributions to society.

MODERATION OPTIONS

Assessment of learner achievements takes place at providers accredited by the relevant body (RSA, 1998b) for the provision of programmes that result in the outcomes specified for the National Certificate in Construction: Concrete Reinforcing - NQF Level 3.

The relevant, or other ETQAs who have a Memorandum of Understanding in place with the relevant - ETQA, are responsible for the moderation of learner achievements for those learners who meet the requirements of this Qualification.

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 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 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, which is accredited by the relevant ETQA.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

Persons who apply to register as an Assessor for this Qualification, must meet the following criteria:

- > A recognized assessor Qualification
- > Compliance with the relevant ETQA's requirements for assessor registration
- > Detailed documentary proof of educational Qualification, subject matter expertise as well as experience gained (Portfolio of Evidence)
- > A minimum of three years practical relevant occupational experience at NQF level 3

NOTES

Demonstrate the ability to integrate the following critical cross-field competencies when performing a range of general construction sitework and concrete reinforcing activities in the Civil Engineering and Construction context by:

Identify and solve problems in which responses display that responsible decisions using critical and creative thinking have been made by:

- > Contributing to a safe and healthy work environment for self and others and rendering basic First Aid assistance to fellow workers in the event of an emergency
- > Identifying a range of materials used in Civil Engineering Construction and applying the correct methods for selecting and rejecting materials
- > Measuring and ordering materials, identifying, selecting and maintaining required tools and equipment
- > Working in confined spaces on construction sites and ensuring that all necessary precautions as required by the Occupational Health and Safety Act for the protection of the public and safety of construction workers are adhered to
- > Implementing quality management systems and quality improvement processes, implementing and monitoring project quality plans and identifying appropriate measures to reduce deviations in accordance with quality improvement processes

Work effectively with others as a member of a team, group, organisation or community by:

- > Contributing to a safe and healthy work environment for self and others and rendering basic First Aid assistance to fellow workers in the event of an emergency
- > Supervising the procurement, receipt, use and storage of construction materials in accordance with site procedures, safety and manufacturer specifications
- > Working in confined spaces on construction sites ensuring that all necessary precautions as required by the Occupational Health and Safety Act for the protection of the public and safety of construction workers are adhered to
- > Measuring and reporting on activity production and resource costs and making decisions regarding the implementation of productivity improvement measures

Organise and manage oneself and one's activities responsibly and effectively by:

- > Identifying how the composition, role-players, processes and legislation governing the construction industry impact on your role as an employee within the industry and how these different elements are to be applied in your specific work context to enhance performance and promote career development
- > Maintaining time and log sheets and completing records related to construction processes in accordance with site requirements
- > Measuring and reporting on activity production and resource costs and making decisions regarding the implementation of productivity improvement measures

Collect, analyse and critically evaluate information by:

- > Accessing, interpreting and using information from texts to communicate in writing for defined contexts
- > Maintaining time and log sheets and completing records related to construction processes in accordance with site requirements
- > Reading and interpreting abbreviations and symbols contained in reinforcing materials documentation and determining the types and quantities of reinforcing materials required for construction projects
- > Calculating material quantities for job costings and using these calculations for developing work plans
- > Applying keyboard skills and accurately entering data for electronic storage and retrieval

Communicate effectively using visual, mathematical and/or language skills in the modes of oral and/or written persuasion by:

- > Using, adapting and maintaining oral communication to accommodate audience needs for a range of communicative contexts
- > Accessing, interpreting and using information from texts to communicate in writing for defined contexts
- > Supervising the procurement, receipt, use and storage of construction materials in accordance with site procedures, safety and manufacturer specifications
- > Measuring and reporting on activity production and resource costs and making decisions regarding the implementation of productivity improvement measures
- > Implementing quality management systems and quality improvement processes, implementing and monitoring project quality plans and identifying appropriate measures to reduce deviations in accordance with quality improvement processes

Use science and technology effectively and critically, showing responsibility towards the environment and health of others by:

- > Setting up work site infrastructures that meet job requirements and setting out work areas using basic survey equipment
- > Operating, maintaining and shutting-down steel cutting and bending machines in accordance with

manufacturer's specifications and legislative and workplace safety requirements

> Assembling and tie-ing reinforcing cages and using the correct materials and methods for fixing reinforcing in a safe and efficient manner

> Tensioning bonded and unbonded tensions to within specified tolerances and carrying out post-tensioning operations in accordance with safety legislation and workplace requirements

> Operating personal computer hardware and software in accordance with software instructions and manufacturer's specifications

Demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation by:

Identifying how the composition, role-players, processes and legislation governing the construction industry impact on your role as an employee within the industry and how these different elements are to be applied in your specific work context to enhance performance and promote career development

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	9964 Apply health and safety to a work area	Level 2	3	Reregistered
Core	9965 Render basic first aid	Level 2	3	Registered
Core	9966 Establish and prepare a work area	Level 2	4	Registered
Core	13972 Identify describe and use materials in civil engineering construction	Level 2	4	Registered
Core	14336 Maintain Records For Civil Construction Sites	Level 2	2	Registered
Core	15034 Work in confined spaces on construction sites	Level 2	2	Registered
Core	116573 Assemble, tie and fix reinforcing cages	Level 2	3	Draft - Prep for P Comment
Core	116578 Read and interpret reinforcing materials documentation	Level 2	3	Draft - Prep for P Comment
Core	9968 Procure materials, tools and equipment	Level 3	10	Registered
Core	110095 Describe and interpret the composition role-players processes and role of the construction industry	Level 3	4	Registered
Core	14416 Implement a quality management system, project quality plan and a quality improvement process on a construction project	Level 4	10	Registered
Core	14418 Monitor and control cost and production of construction work activities and implement productivity improvements	Level 4	12	Registered
Core	14428 Set out construction work areas	Level 4	10	Registered
Core	116556 Interpret and apply reinforcing drawings	Level 4	5	Registered
Elective	7547 Operate a personal computer system	Level 2	6	Reregistered
Elective	9962 Calculate construction quantities to develop a work plan	Level 3	8	Registered
Elective	116566 Operate and maintain a steel cutting machine	Level 3	5	Draft - Prep for P Comment
Elective	116569 Operate and maintain a steel bending machine	Level 3	5	Draft - Prep for P Comment
Elective	116592 Tension bonded tendons	Level 4	10	Registered
Elective	116593 Tension unbonded tendons	Level 4	10	Registered
Fundamental	7456 Use mathematics to investigate and monitor the financial aspects of personal, business and national issues	Level 3	2	Registered
Fundamental	8968 Accommodate audience and context needs in oral communication	Level 3	5	Registered
Fundamental	8969 Interpret and use information from texts	Level 3	5	Registered
Fundamental	8970 Write texts for a range of communicative contexts	Level 3	5	Registered
Fundamental	8973 Use language and communication in occupational learning programmes	Level 3	5	Registered
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	Registered
Fundamental	9012 Investigate life and work related problems using data and probabilities	Level 3	5	Registered
Fundamental	9013 Describe, apply, analyse and calculate shape and motion in 2-and 3-dimensional space in different contexts	Level 3	4	Registered
Fundamental	14086 Work with a wide range of patterns and basic functions and solve related problems	Level 3	3	Registered



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Construction: Structural Steel Erecting

SAQA QUAL ID	QUALIFICATION TITLE	
49015	National Certificate: Construction: Structural Steel Erecting	
SGB NAME	SGB Civil Engineering Construction	
ABET BAND	PROVIDER NAME	
Undefined		
QUALIFICATION CODE	QUAL TYPE	SUBFIELD
PPC-3-National Certificate	National Certificate	Civil Engineering Construction
MINIMUM CREDITS	NQF LEVEL	QUALIFICATION CLASS
153	Level 3	Regular-Unit Stds Based
SAQA DECISION NUMBER	REGISTRATION START DATE	REGISTRATION END DATE

PURPOSE OF THE QUALIFICATION

Learners found competent against this qualification will be able to erect structural steel in a safe, cost effective manner and in compliance with project specifications.

For those who have been in the workplace for a long time, this Qualification can be used in the recognition of prior learning process to assess and recognise workplace skills acquired without the benefit of formal education and training.

For the new entrant, this Qualification describes the learning outcomes required to participate effectively in a structured workplace.

For education and training providers, this Qualification provides guidance for the development of appropriate learning programmes and assessment documentation.

For employers, this Qualification enables skills gaps to be identified and addressed ensuring that productivity levels are increased and business objectives achieved.

This Qualification has been developed to assist with the advancement of the learner across the Civil Engineering and Construction industry and is aimed at Construction Structural Steel Erecting practitioners in the industry, ensuring the upliftment of standards in general.

The combination of learning outcomes will provide the qualifying learner with vocational knowledge and skills appropriate to the context of Structural Steel Erecting in the Civil Engineering and Construction environment. It will also equip learners with a foundation for further intellectual development, opportunities for gainful employment and reward for contributions to society.

This Qualification will provide the industry with qualified Construction Structural Steel Erecting practitioners, thereby facilitating social and economic transformation, empowerment and upliftment in the Industry and country in general.

The relationship between this Qualification and the principles of the NQF is outlined in the following table:

NQF Principle-national certificate in construction concreting - nqf level 3

Recognition of Prior learning-Allows for Recognition of Prior Learning, especially as a means of career advancement

Credibility-Learning Outcomes are a result of consensus by the Industry

Relevance-Consulting workshops indicated a demand for a unit standard based Qualification in Construction Structural Steel Erecting at NQF Level 3

Access-Removes traditional barriers to Higher Education

Articulation/Progression-Forms part of a Learning Pathway for Construction Structural Steel Erecting

practitioners, spanning NQF Levels 1 - 7

Rationale for the Qualification:

This Qualification has been developed for the Construction Structural Steel Erecting occupational area within the Civil Engineering and Construction Industry.

The rationale for the introduction of a unit standards based Qualification in Construction Structural Steel Erecting is to provide a qualification for persons who perform structural steel erecting activities on Civil Engineering and Construction sites, whether in micro, small, medium or large operations.

In the past many practitioners in the Civil Engineering and Construction area were denied career advancement and possible professional registration. The introduction of a unit standards based National Certificate in Construction: Structural Steel Erecting, will allow learners, both unemployed and employed, to reach their full potential of advancement and will allow for Recognition of Prior Learning.

This qualification will facilitate the development of a professional community of Construction Structural Steel Erecting practitioners.

The competencies contained in this Qualification are essential for social and economic transformation, empowerment and upliftment within the Construction Structural Steel Erecting environment, whilst simultaneously improving the skills base of the country.

The combination of learning outcomes will provide qualifying learners with applied competence in the integration of general construction site-work and technical competencies, first level supervisory and basic computer literacy skills.

This Qualification lays the basis for further learning towards the National Certificate in the Supervision of Construction Processes: - NQF Level 4.

Typical job roles and purpose

Job Role-Purpose

Construction Supervisor-The construction supervisor is responsible for overseeing the entire structural steel erecting operation

Steel Erector-The steel erector oversees all tasks and activities carried out by the Ground, Connecting and Fixing crews

Yardman-The Yardman receives components and consumable items into the yard. He is responsible for laying out components and selecting the correct components when these are required at the job site

Slinger-Assembles structural steel components into larger units for lifting and erecting

Connector-Receives structural steel components at heights above ground level and secures these components into the building to a stage where they are safe and secure and ready for permanent fastening by means of bolting or welding.

Fixer-The fixer is responsible for checking the alignment of the building and completes the permanent fastening to structural steel components by way of bolting and welding applications.

Rigger-The rigger is responsible for setting up specialised lifting equipment for abnormal loads i.e. loads that are too large, or too heavy to be lifted by means of conventional lifting equipment

Key Work Areas

- > Receive, lay out, select and make available structural steel components on site
- > Assemble structural steel components for lifting and erection
- > Connect erected structural steel components
- > Permanently fix erected structural steel components

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

Learners should have acquired the language competencies of NQF level 2 and mathematical literacy competencies of NQF Level 2, prior to embarking on learning towards this qualification.

Recognition of Prior Learning:

The qualification may be obtained through the process of Recognition of Prior Learning (RPL). Learners

who have met the requirements of any unit standard in this qualification may apply for recognition of prior learning to the relevant Education and Training Quality Assurance Body (ETQA), and will be assessed against the assessment criteria and specific outcomes for the relevant unit standard/s. ETQA bodies are responsible to facilitate the implementation of the RPL. The ETQA body registers trained assessors against specific unit standards. Learners are prepared for assessment and assessed against the unit standard by these registered assessors. Moderation and also an appeals process are in place. Learners declared competent against a specific unit standard, receives an ETQA certificate indicating this achievement. This information is also recorded on the National Record Learner Database. (NLRD)

QUALIFICATION RULES

All the unit standards from the fundamental and core category must be taken plus a minimum of 8 credits from the elective list of unit standards in order to obtain 153 credits - the minimum for this qualification

Supplementary Information:

1. Acts, Regulations, Specifications and Standards applicable to this qualification:

- > Occupational Health and Safety Act 1993.
 - > GNR 1010 of 18 July 2003: Construction Regulations 2003.
 - > South African Bureau of Standards.
 - > National Building Regulations.
 - > Industry Project Specifications: (included but not limited to)
- COTO Standard specifications (Committee of Transport officials)
National Department of Public Works.

EXIT LEVEL OUTCOMES

On completion of this Qualification learners are able to:

Perform a range of general construction sitework and structural steel erecting activities in the Civil Engineering and Construction context by:

Core Competence:

1. Describe and interpret the composition, role-players, processes, and role of the construction Industry.
2. Supervise Health and Safety and render basic first aid on a construction site.
3. Establish, set out and prepare a work area
4. Read and interpret construction drawings and specifications, and procure materials, tools and equipment.
5. Monitor and control cost and production, and apply quality principles on a construction project.
6. Plan and prepare the erection of structural steelwork
7. Lift and position loads
8. Finish off and hand over structural works

Elective Competence related to area of specialization.

1. Calculate construction quantities to develop a work plan.
2. Supervise the procurement, use and storage of construction materials.
3. Lead and supervise construction teams.
4. Work in confined spaces on a construction site.
5. Perform tandem lifting.
6. Supervise the installation of pre-cast concrete elements.
7. Operate a personal computer system.

Demonstrate the ability to integrate the following critical cross-field competencies when performing a range of general construction sitework and structural steel erecting activities in the Civil Engineering and Construction context by:

Identify and solve problems in which responses display that responsible decisions using critical and creative thinking have been made by:

- > Rendering basic First Aid assistance to fellow workers in the event of an emergency
- > Developing, implementing and monitoring a Health and Safety site plan, identifying specific hazards related to the construction environment and supervising the implementation of steps to limit damage to persons and property, identifying and applying procedures for the prevention of the spread of transmittable diseases
- > Measuring and ordering materials, identifying, selecting and maintaining required tools and equipment
- > Implementing quality management systems and quality improvement processes, implementing and

monitoring project quality plans and identifying appropriate measures to reduce deviations in accordance with quality improvement processes

- > Planning and preparing for the erection of structural steelwork ensuring all work is carried out in accordance with safety legislation requirements and completed to industry accepted standards
- > Implementing road side safety procedures and controlling traffic during road construction and road maintenance activities in accordance with safety legislation requirements and project specifications
- > Lifting, positioning and securing loads in accordance with safety legislation requirements and industry procedures for work conducted at heights well above ground level
- > Finishing off structural work, dismantling structures and handing over completed structures in accordance with safety legislation and industry procedures
- > Procuring labour, monitoring the performance of team members including disciplinary action and providing on-job training and coaching
- > Setting up cranes and lifting loads in tandem in accordance with safety legislation requirements and standard industry procedures
- > Working in confined spaces on construction sites and ensuring that all necessary precautions as required by the Occupational Health and Safety Act for the protection of the public and safety of construction workers are adhered to
- > Supervising the planning, preparation, installation and post-installation of pre-cast concrete elements ensuring all work is carried out in accordance with health and safety legislation, specifications and industry standards

Work effectively with others as a member of a team, group, organisation or community by:

- > Rendering basic First Aid assistance to fellow workers in the event of an emergency
- > Developing, implementing and monitoring a Health and Safety site plan, identifying specific hazards related to the construction environment and supervising the implementation of steps to limit damage to persons and property, identifying and applying procedures for the prevention of the spread of transmittable diseases
- > Planning and preparing for the erection of structural steelwork ensuring all work is carried out in accordance with safety legislation requirements and completed to industry accepted standards
- > Implementing road side safety procedures and controlling traffic during road construction and road maintenance activities in accordance with safety legislation requirements and project specifications
- > Lifting, positioning and securing loads in accordance with safety legislation requirements and industry procedures for work conducted at heights well above ground level
- > Supervising the procurement, receipt, use and storage of construction materials in accordance with site procedures, safety and manufacturer specifications
- > Working in confined spaces on construction sites ensuring that all necessary precautions as required by the Occupational Health and Safety Act for the protection of the public and safety of construction workers are adhered to
- > Measuring and reporting on activity production and resource costs and making decisions regarding the implementation of productivity improvement measures

Organise and manage oneself and one's activities responsibly and effectively by:

- > Identifying how the composition, role-players, processes and legislation governing the construction industry impact on your role as an employee within the industry and how these different elements are to be applied in your specific work context to enhance performance and promote career development
- > Measuring and reporting on activity production and resource costs and making decisions regarding the implementation of productivity improvement measures
- > Planning and preparing for the erection of structural steelwork ensuring all work is carried out in accordance with safety legislation requirements and completed to industry accepted standards
- > Procuring labour, monitoring the performance of team members including disciplinary action and providing on-job training and coaching

Collect, analyse and critically evaluate information by:

- > Accessing, interpreting and using information from texts to communicate in writing for defined contexts
- > Interpreting and applying information contained in drawings and specifications to construction activities
- > Developing, implementing and monitoring a Health and Safety site plan, identifying specific hazards related to the construction environment and supervising the implementation of steps to limit damage to persons and property, identifying and applying procedures for the prevention of the spread of transmittable diseases
- > Implementing road side safety procedures and controlling traffic during road construction and road maintenance activities in accordance with safety legislation requirements and project specifications
- > Finishing off structural work, dismantling structures and handing over completed structures in accordance with safety legislation and industry procedures
- > Applying keyboard skills accurately entering data for electronic storage and retrieval

Communicate effectively using visual, mathematical and/or language skills in the modes of oral and/or written persuasion by:

- > Using, adapting and maintaining oral communication to accommodate audience needs for a range of communicative contexts
- > Accessing, interpreting and using information from texts to communicate in writing for defined contexts
- > Measuring and reporting on activity production and resource costs and making decisions regarding the implementation of productivity improvement measures
- > Implementing quality management systems and quality improvement processes, implementing and monitoring project quality plans and identifying appropriate measures to reduce deviations in accordance with quality improvement processes
- > Developing, implementing and monitoring a Health and Safety site plan, identifying specific hazards related to the construction environment and supervising the implementation of steps to limit damage to persons and property, identifying and applying procedures for the prevention of the spread of transmittable diseases
- > Implementing road side safety procedures and controlling traffic during road construction and road maintenance activities in accordance with safety legislation requirements and project specifications
- > Lifting, positioning and securing loads in accordance with safety legislation requirements and industry procedures for work conducted at heights well above ground level
- > Finishing off structural work, dismantling structures and handing over completed structures in accordance with safety legislation and industry procedures
- > Setting up cranes and lifting loads in tandem in accordance with safety legislation requirements and standard industry procedures

Use science and technology effectively and critically, showing responsibility towards the environment and health of others by:

- > Setting up work site infrastructures that meet job requirements and setting out work areas using basic survey equipment
- > Developing, implementing and monitoring a Health and Safety site plan, identifying specific hazards related to the construction environment and supervising the implementation of steps to limit damage to persons and property, identifying and applying procedures for the prevention of the spread of transmittable diseases
- > Planning and preparing for the erection of structural steelwork ensuring all work is carried out in accordance with safety legislation requirements and completed to industry accepted standards
- > Implementing road side safety procedures and controlling traffic during road construction and road maintenance activities in accordance with safety legislation requirements and project specifications
- > Lifting, positioning and securing loads in accordance with safety legislation requirements and industry procedures for work conducted at heights well above ground level
- > Finishing off structural work, dismantling structures and handing over completed structures in accordance with safety legislation and industry procedures
- > Setting up cranes and lifting loads in tandem in accordance with safety legislation requirements and standard industry procedures
- > Supervising the planning, preparation, installation and post-installation activities associated with pre-cast concrete elements ensuring all work is carried out in accordance with health and safety legislation, specifications and industry standards
- > Operating personal computer hardware and software in accordance with software instructions and manufacturer's specifications

Demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation by:

- > Identifying how the composition, role-players, processes and legislation governing the construction industry impact on your role as an employee within the industry and how these different elements are to be applied in your specific work context to enhance performance and promote career development
- > Developing, implementing and monitoring a Health and Safety site plan, identifying specific hazards related to the construction environment and supervising the implementation of steps to limit damage to persons and property, identifying and applying procedures for the prevention of the spread of transmittable diseases
- > Implementing road side safety procedures and controlling traffic during road construction and road maintenance activities in accordance with safety legislation requirements and project specifications

ASSOCIATED ASSESSMENT CRITERIA

Core Competence:

1.

The composition, role-players, processes and legislation governing the construction industry impact on his/her role as an employee within the industry and how these different elements are to be applied in his/her specific work context to enhance performance and promote career development are identified.

2.
 - > Visible vital signs of the injured person are examined.
 - > Universal principles for dealing with infectious diseases are applied.
 - > Serious bleeding is controlled using the most appropriate method.
 - > Signs that indicate shock are accurately identified and correct treatment applied.
 - > Health and Safety site plan are developed, implemented and monitored
 - > Specific hazards related to the construction environment are identified.
 - > The implementation of steps to limit damage to persons and property is supervised.
 - > Procedures for the prevention of the spread of transmittable diseases are applied.
 - > Basic first aid is administered.
3.
 - > Work site infrastructures that meet job requirements are set up.
 - > Set out principles are explained.
 - > Reference and control systems are established.
 - > Works are set out using tapes, spirit level, theodolite in accordance to survey information and drawings.
4.
 - > Materials are measured and ordered according to organizational policies.
 - > Required tools and equipment are identified, selected and maintained.
 - > Information contained in drawings and specifications is interpreted and applied to construction activities
5.
 - > Activity production and resource costs are measured and reported on.
 - > Decisions regarding the implementation of productivity improvement measures are made
 - > Quality management systems and quality improvement processes are implemented
 - > Project quality plans are implemented and monitored.
 - > Appropriate measures to reduce deviations in accordance with quality improvement processes are identified.
6.
 - > Drawings, specifications and attendant technical lists for the assembly of structural steel components are correctly interpreted
 - > Steel components are prepared for erection in accordance with technical specifications
 - > Work is carried out in accordance with safety legislation requirements and completed to industry accepted standards
7.
 - > Lifting, positioning and securing loads is done in accordance with safety legislation requirements and industry procedures for work conducted at heights well above ground level
8.
 - > Structural work is finished off, structures are dismantled and completed structures are handed over in accordance with safety legislation and industry procedures

Elective Competence related to area of specialization.

1.
 - > Material quantities for job costings are calculated and work plans are developed
2.
 - > The procurement, receipt, use and storage of construction materials is supervised in accordance with site procedures, safety, manufacturer and project specifications
3.
 - > Labour resource schedule is developed in accordance with works programme.
 - > Team members are recruited, selected and inducted.
 - > Teams are motivated and their performance is monitored.
- 4.

All necessary precautions as required by the Occupational Health and Safety Act for the protection of the public and safety of construction workers are adhered to.

5.

> Cranes are set up and loads are lifted in tandem in accordance with safety legislation requirements and standard industry procedures

6.

> Preparation, installation and post-installation activities associated with pre-cast concrete elements is carried out in accordance with health and safety legislation, specifications and industry standards

7.

> Personal computer hardware and software are operated in accordance with software instructions and manufacturer's specifications.

Integrated Assessment:

Formative assessments conducted during the learning process will consist of written tests, demonstrations and a number of self-assessments. The purpose of formative assessment is to diagnose learner strengths and weaknesses and to determine readiness for summative assessment.

Summative assessment would consist of written tests and accompanying assignments, case studies and practical demonstrations. Summative assessments would only be conducted once the learner has indicated that he/she is ready to undergo summative assessment.

Before qualifying, learners will be expected to demonstrate competence in a practical situation that integrates the assessment of all specific outcomes, for all Unit Standards.

Integrated assessment provides learners with an opportunity to display an ability to integrate practical performance, actions, concepts and theory across Unit Standards to achieve competence in relation to the purpose of this Qualification.

In particular assessors should check that the learner is able to demonstrate the ability to consider a range of options and make decisions about:

> The quality of the observed practical performance as well as the theory and underpinning knowledge behind it.

> The different methods that can be used by the learner to display thinking and decision making in the demonstration of practical performance.

> Reflexive competencies

INTERNATIONAL COMPARABILITY

Scottish Qualifications Framework:

The qualification has been benchmarked against the SVQ qualification, Construction: Access Operation and Rigging, Level 3. Of the competencies contained in the international qualification, the following similar competencies are incorporated in the National Certificate in Construction: Structural Steel Erecting, NQF Level 3:

> Assist with the organisation of resources

> Contribute to establishing the operational area

> Contribute to the progress of operations

ARTICULATION OPTIONS

This Qualification will allow learners access to a National Certificate in the Supervision of Construction Processes

MODERATION OPTIONS

Assessment of learner achievements takes place at providers accredited by the relevant body (RSA, 1998b) for the provision of programmes that result in the outcomes specified for the National Certificate in Construction: Structural Steel Erecting - NQF Level 3.

The relevant ETQA, or other ETQAs who have a Memorandum of Understanding in place with the relevant -

ETQA, are responsible for the moderation of learner achievements for those learners who meet the requirements of this Qualification.

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 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 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, which is accredited by the relevant ETQA.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

Persons who apply to register as an Assessor for this Qualification, must meet the following criteria:

- > A recognized assessor Qualification;
- > Compliance with the relevant ETQA's requirements for assessor registration;
- > Detailed documentary proof of educational Qualification, subject matter expertise as well as experience gained (Portfolio of Evidence); and
- > A minimum of three years practical relevant occupational experience at NQF level 3

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	9965 Render basic first aid	Level 2	3	Registered
Core	9966 Establish and prepare a work area	Level 2	4	Registered
Core	9986 Apply quality principles on a construction project	Level 2	12	Registered
Core	9968 Procure materials, tools and equipment	Level 3	10	Registered
Core	14580 Read and interpret construction drawings and specifications	Level 3	10	Registered
Core	110095 Describe and interpret the composition role-players processes and role of the construction industry	Level 3	4	Registered
Core	116577 Finish off and hand over structural works	Level 3	12	Registered
Core	116622 Lift and position loads	Level 3	12	Registered
Core	14418 Monitor and control cost and production of construction work activities and implement productivity improvements	Level 4	12	Registered
Core	14428 Set out construction work areas	Level 4	10	Registered
Core	14429 Supervise health and safety on a construction project	Level 4	6	Registered
Core	116615 Plan and prepare for the erection of structural steelwork	Level 4	16	Registered
Elective	7547 Operate a personal computer system	Level 2	6	Reregistered
Elective	15034 Work in confined spaces on construction sites	Level 2	2	Registered
Elective	9962 Calculate construction quantities to develop a work plan	Level 3	8	Registered
Elective	14417 Lead and supervise construction teams	Level 4	8	Registered
Elective	14430 Supervise the procurement, use and storage of construction materials	Level 4	10	Registered
Elective	116579 Supervise installation of precast concrete elements	Level 4	8	Registered
Elective	116583 Perform tandem lifting	Level 4	12	Registered
Fundamental	7456 Use mathematics to investigate and monitor the financial aspects of personal, business and national issues	Level 3	2	Registered

Fundamental	8968 Accommodate audience and context needs in oral communication	Level 3	5	Registered
Fundamental	8969 Interpret and use information from texts	Level 3	5	Registered
Fundamental	8970 Write texts for a range of communicative contexts	Level 3	5	Registered
Fundamental	8973 Use language and communication in occupational learning programmes	Level 3	5	Registered
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	Registered
Fundamental	9012 Investigate life and work related problems using data and probabilities	Level 3	5	Registered
Fundamental	9013 Describe, apply, analyse and calculate shape and motion in 2-and 3-dimensional space in different contexts	Level 3	4	Registered
Fundamental	14086 Work with a wide range of patterns and basic functions and solve related problems	Level 3	3	Registered



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

1

Apply specialised finishes to concrete

SAQA US ID	UNIT STANDARD TITLE		
116559	Apply specialised finishes to concrete		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Civil Engineering Construction	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Physical Planning and Construction		Civil Engineering Construction	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
PPC-CEC-0-SGB CEC	Regular	Level 3	7

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare shutters for 'as struck' finishes.

SPECIFIC OUTCOME 2

Apply texturing finish to fresh struck concrete.

SPECIFIC OUTCOME 3

Apply texturing finish to hardened concrete.

SPECIFIC OUTCOME 4

Ensure concrete and concreting method is appropriate for finish.

SPECIFIC OUTCOME 5

Cure and protect concrete.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

2

Demonstrate knowledge of and apply basic concrete construction practice

SAQA US ID	UNIT STANDARD TITLE		
116562	Demonstrate knowledge of and apply basic concrete construction practice		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Civil Engineering Construction		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Physical Planning and Construction		Civil Engineering Construction	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
PPC-CEC-0-SGB CEC	Regular	Level 3	10

Specific Outcomes:

SPECIFIC OUTCOME 1

Demonstrate knowledge of concrete properties.

SPECIFIC OUTCOME 2

Demonstrate knowledge of concrete materials.

SPECIFIC OUTCOME 3

Demonstrate knowledge of concrete mix design.

SPECIFIC OUTCOME 4

Demonstrate knowledge of quality control of concrete.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

3

Operate and maintain a steel cutting machine

SAQA US ID	UNIT STANDARD TITLE		
116566	Operate and maintain a steel cutting machine		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Civil Engineering Construction		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Physical Planning and Construction		Civil Engineering Construction	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
PPC-CEC-0-SGB CEC	Regular	Level 3	5

Specific Outcomes:

SPECIFIC OUTCOME 1

Implement occupational health and safety measures.

SPECIFIC OUTCOME 2

Prepare to cut steel.

SPECIFIC OUTCOME 3

Cut steel.

SPECIFIC OUTCOME 4

Conduct post cutting operations.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

4

Operate and maintain a steel bending machine

SAQA US ID	UNIT STANDARD TITLE		
116569	Operate and maintain a steel bending machine		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Civil Engineering Construction		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Physical Planning and Construction		Civil Engineering Construction	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
PPC-CEC-0-SGB CEC	Regular	Level 3	5

Specific Outcomes:

SPECIFIC OUTCOME 1

Implement occupational health and safety measures.

SPECIFIC OUTCOME 2

Prepare to bend steel.

SPECIFIC OUTCOME 3

Bend steel.

SPECIFIC OUTCOME 4

Conduct post bending operations.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

5

Assemble, tie and fix reinforcing cages

SAQA US ID	UNIT STANDARD TITLE		
116573	Assemble, tie and fix reinforcing cages		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Civil Engineering Construction		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Physical Planning and Construction		Civil Engineering Construction	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
PPC-CEC-0-SGB CEC	Regular	Level 2	3

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare work area.

SPECIFIC OUTCOME 2

Prepare to fix reinforcing steel.

SPECIFIC OUTCOME 3

Fix reinforcing.

SPECIFIC OUTCOME 4

Describe types and uses of reinforcing.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

6

Read and interpret reinforcing materials documentation

SAQA US ID	UNIT STANDARD TITLE		
116578	Read and interpret reinforcing materials documentation		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Civil Engineering Construction		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Physical Planning and Construction		Civil Engineering Construction	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
PPC-CEC-0-SGB CEC	Regular	Level 2	3

Specific Outcomes:

SPECIFIC OUTCOME 1

Explain the role of drawings and specifications.

SPECIFIC OUTCOME 2

Identify and describe various aspects of reinforcing documentation.

SPECIFIC OUTCOME 3

Interpret requirements from reinforcing documentation.

SPECIFIC OUTCOME 4

Safeguard, store and issue construction drawings.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

7

Supervise the batching and mixing of concrete by mass using a concrete mixer

SAQA US ID	UNIT STANDARD TITLE		
116582	Supervise the batching and mixing of concrete by mass using a concrete mixer		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Civil Engineering Construction		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Physical Planning and Construction		Civil Engineering Construction	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
PPC-CEC-0-SGB CEC	Regular	Level 3	5

Specific Outcomes:**SPECIFIC OUTCOME 1**

Calibrate and set scales.

SPECIFIC OUTCOME 2

Supervise the batching of materials within tolerances.

SPECIFIC OUTCOME 3

Mix and discharge the concrete.

SPECIFIC OUTCOME 4

Supervise post mixing operations.

No. 1059

10 September 2004

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

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

Air-conditioning, Refrigeration and Ventilation

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

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the qualification and unit standards. The qualification and unit standards can be accessed via the SAQA website 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 10 October 2004*. All correspondence should be marked **Standards Setting – SGB for Air-conditioning, Refrigeration and Ventilation** and addressed to

The Director: Standards Setting and Development
SAQA

Attention: Mr. D Mphuthing

Postnet Suite 248

Private Bag X06

Waterkloof

0145

or faxed to 012 – 431-5144

e-mail: dmphuthing@saqa.co.za



JOE SAMUELS

DIRECTOR: STANDARDS SETTING AND DEVELOPMENT



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Air-conditioning, Refrigeration and Ventilation

SAQA QUAL ID	QUALIFICATION TITLE	
48959	National Certificate: Air-conditioning, Refrigeration and Ventilation	
SGB NAME	SGB Air-conditioning Refrigeration and Ventilation	
ABET BAND	PROVIDER NAME	
Undefined		
QUALIFICATION CODE	QUAL TYPE	SUBFIELD
MET-2-National Certificate	National Certificate	Manufacturing and Assembly
MINIMUM CREDITS	NQF LEVEL	QUALIFICATION CLASS
147	Level 2	Regular-Unit Stds Based
SAQA DECISION NUMBER	REGISTRATION START DATE	REGISTRATION END DATE

PURPOSE OF THE QUALIFICATION

People who achieve this qualification will be recognized for their ability to work under supervision in the carrying out of routine tasks in the air-conditioning, refrigeration and ventilation industry and to recognize and identify component parts of plant and equipment.

Qualifying candidates are encouraged to continue their learning paths to a minimum of the NQF Level 3 qualification in air-conditioning and ventilation or refrigeration.

Rationale for the qualification

This is the first qualification in a series for learners following a career in air-conditioning, refrigeration and ventilation. This is a growth industry and there is a demand for workers with technical skills for manufacturing, installing, maintaining and repairing equipment.

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

The qualification also forms the basis for further development and has been designed to articulate directly to learning programmes and qualifications in air-conditioning, refrigeration and ventilation at NQF Level 3, NQF Level 4 and higher levels

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

This qualification assumes that the candidate has already achieved a National Certificate at NQF level 1, ABET Level 4 or Grade 9 school level.

In particular, the following learning is assumed to be in place prior to embarking on learning towards this qualification

- > Basic literacy and numeracy
- > Basic concepts of science and technology

Recognition of prior learning

Whether a candidate attends formal courses or acquires the required skills through informal means, the same standards apply as per the matrix of unit standards. The qualification and the standards have been written in such a way that the learning has to be assessed in an integrated way. Assessors will assess evidence to establish what the learners know and can do. Such evidence may be gathered through course related activities and/or through work related activities. In cases where candidates do not attend formal courses, assessors should seek work related evidence as far as possible.

Where courses are provided for learners, institutions can use the unit standards and this qualification to assess learning achievements.

For candidates who are not able to achieve the outcomes, providers can then use the standards and qualification to determine a specific learning programme to suit the candidate's learning needs.

QUALIFICATION RULES

N/A

EXIT LEVEL OUTCOMES

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

The qualification also addresses the following critical cross-field outcomes:

- > Identify and solve problems and make decisions using critical and creative thinking
- > Work effectively with others as members of a team, group, organization or community
- > Organize and manage themselves and their activities responsibly and effectively
- > Collect, analyse, organize and critically evaluate information
- > Communicate effectively, using visual, mathematical and/or language skills in the modes of oral and/or written persuasion
- > Use science and technology effectively and critically showing responsibility towards the environment and health of others
- > Demonstrate an understanding of the world as a set of related systems by recognizing that problem-solving contexts do not exist in isolation

ASSOCIATED ASSESSMENT CRITERIA

The assessment criteria for each unit standard are to be used by the assessor as the basis for assessment judgments, first in relation to each unit standard, and then in relation to integration at exit outcome level.

Integrated assessment

Assessors will require evidence of competence in terms of each unit standard indicated in the matrix of unit standards required for this qualification. The assessment criteria for each unit standard will serve as the standard against which assessors must make their assessment judgments. When assessors are satisfied that the criteria have been met for each unit standard, assessors must ensure there is sufficient evidence of the ability to integrate the full range of skills required in order to commission, fault find and maintain air-conditioning and ventilation or refrigeration plants and systems. This evidence could be collected through:

- > Observations in a simulated environment
- > Observations during work or participation in work related activities
- > Questions designed to test understanding and knowledge in terms of each unit standard's requirements, and the ability to integrate at qualification level.
- > Records and reports compiled as part of assessment portfolios.

Moderators will check integration of all assessments at qualification level. This could include observing individual assessment.

INTERNATIONAL COMPARABILITY

This qualification compares favourably with the following international qualifications:

- > New Zealand Qualifications Authority/NZEFMITO

ARTICULATION OPTIONS

N/A

MODERATION OPTIONS

Moderation of assessments must take place whenever assessments are carried out at qualification level. Moderators must also be accredited for the particular sub-field and have knowledge and experience of air-conditioning, refrigeration and ventilation.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

Assessor will have to be registered as assessors by the relevant ETQA in line with SAQA's registration requirements. In terms of assessment expertise, assessors will need to prove competence in line with the unit standards for assessors.

In terms of technical expertise, assessors will need to demonstrate evaluative ability in relation to the unit

standards they assess. By evaluative ability is meant the assessor need not necessarily have the psychomotor skills needed to achieve each unit standard they assess themselves, but that knowledge and experience that enables them to make fair, valid and reliable judgments of the candidate's ability relative to the unit standard at hand.

NOTES

This qualification replaces qualification, 20719, "National Certificate in Air Conditioning, Refrigeration and Ventilation", Level 2, 147 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	116224 Explain the operation of basic vapour compression refrigeration systems, and identify and explain the function of the components and accessories as well as their retrieval and storage procedures	Level 2	8	Draft - Prep for P Comment
Core	116226 Identify and set ON-OFF control devices as used in air conditioning and refrigeration systems, explain their operation and discuss their application and fault finding	Level 2	6	Draft - Prep for P Comment
Core	116230 Identify materials, piping, fitting, jointing methods and insulation materials used for air-conditioning and refrigeration installations	Level 2	4	Draft - Prep for P Comment
Core	116232 Demonstrate understanding of fundamentals of electricity and its application in air conditioning, refrigeration and ventilation equipment	Level 2	4	Draft - Prep for P Comment
Core	116234 Identify and apply fixing methods for piping, ducting and equipment used in the trade of air-conditioning, refrigeration and ventilation	Level 2	6	Draft - Prep for P Comment
Core	116236 Define and explain the principles of thermodynamics and carry out basic calculations involving heat	Level 2	5	Draft - Prep for P Comment
Core	116238 Clean air-conditioning, refrigeration and ventilation plants, components and work sites	Level 2	4	Draft - Prep for P Comment
Core	116239 Identify, use and maintain hand tools and measuring instruments used in the air-conditioning, refrigeration and ventilation trades	Level 2	12	Draft - Prep for P Comment
Core	116241 Work Safely and use safety equipment when carrying out mechanical or electrical work on air conditioning, refrigeration and ventilation installations	Level 2	7	Draft - Prep for P Comment
Core	116243 Install, connect and maintain electrical cables and conductors as applied in air conditioning, refrigeration and ventilation installations	Level 2	6	Draft - Prep for P Comment
Core	116244 Sketch and construct electrical circuits applicable to single-phase air conditioning, refrigeration and ventilation installations	Level 2	9	Draft - Prep for P Comment
Core	116334 Identify refrigerant containers, explain handling procedures and discuss the use of refrigerants	Level 2	3	Draft - Prep for P Comment
Core	116335 Identify, use and maintain refrigeration trade specific tools and instruments	Level 2	8	Draft - Prep for P Comment
Core	9389 Join and install refrigerant piping	Level 3	9	Registered
Core	116223 Demonstrate knowledge of the OHS Act as it applies to employees in the air-conditioning, refrigeration and ventilation industries	Level 3	3	Draft - Prep for P Comment
Elective	9266 Install self propelled transport refrigeration systems	Level 2	4	Registered
Elective	9328 Behave in the proper manner under working conditions	Level 2	4	Registered
Elective	114939 Identify causes of stress in own life and indicate techniques to manage it	Level 2	2	Registered
Elective	116233 Identify and state application of belt drives, couplings, gearboxes and bearings used on air-conditioning, refrigeration and ventilation plants and recognize misaligned, mismatched and worn components	Level 2	6	Draft - Prep for P Comment
Elective	116245 Perform basic arc welding of metals as applicable to air-conditioning, refrigeration and ventilation installations	Level 2	4	Draft - Prep for P Comment
Elective	116355 Handle refrigerant containers and transfer refrigerants into service cylinders	Level 2	3	Draft - Prep for P Comment
Fundamental	7469 Use mathematics to investigate and monitor the financial aspects of personal and community life	Level 2	2	Registered
Fundamental	7480 Demonstrate understanding of rational and irrational numbers and number systems	Level 2	3	Registered
Fundamental	8962 Maintain and adapt oral communication	Level 2	5	Registered
Fundamental	8963 Access and use information from texts	Level 2	5	Registered
Fundamental	8964 Write for a defined context	Level 2	5	Registered
Fundamental	8967 Use language and communication in occupational learning programmes	Level 2	5	Registered
Fundamental	9007 Work with a range of patterns and functions and solve problems	Level 2	2	Registered

Fundamental	9008 Identify, describe, compare, classify, explore shape and motion in 2-and 3-dimensional shapes in different contexts	Level 2	3	Registered
Fundamental	9009 Apply basic knowledge of statistics and probability to influence the use of data and procedures in order to investigate life related problems	Level 2	4	Registered
Fundamental	9322 Work in a team	Level 2	3	Registered
Fundamental	12457 Develop learning strategies and techniques	Level 3	3	Registered



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Air-Conditioning, Refrigeration and Ventilation

SAQA QUAL ID	QUALIFICATION TITLE	
48963	National Certificate: Air-Conditioning, Refrigeration and Ventilation	
SGB NAME	SGB Air-conditioning Refrigeration and Ventilation	
ABET BAND	PROVIDER NAME	
Undefined		
QUALIFICATION CODE	QUAL TYPE	SUBFIELD
MET-3-National Certificate	National Certificate	Manufacturing and Assembly
MINIMUM CREDITS	NQF LEVEL	QUALIFICATION CLASS
186	Level 3	Regular-Unit Stds Based
SAQA DECISION NUMBER	REGISTRATION START DATE	REGISTRATION END DATE

PURPOSE OF THE QUALIFICATION

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

This qualification provides the learner with the skills required to repair, maintain and install mechanical / electrical equipment and systems in the air conditioning, refrigeration and ventilation sub-field in a variety of applications, working without direct supervision.

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

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

South Africa is the only country in Sub-Saharan Africa which has established qualifications and a network of training providers countrywide. South African trained technicians are the obvious choice for work in this field in all African countries north of our borders. We also see an untapped potential for training of learners from NEPAD countries which would assist in the further development of our training resources.

This qualification specifically suits learners who have an interest in science and mathematics as well as manual dexterity (ability to use tools) and a consciousness of personal and environmental safety. It is also suitable for workers who have had several years of practical experience working in the air conditioning, refrigeration and ventilation industry who have the practical skills but lack the formal learning required in the qualification and who have a level of competence equivalent to the NQF level 2 qualification in air conditioning, refrigeration and ventilation as determined in formal assessment by an assessor who meets the criteria for the registration of assessors.

To achieve competence in this qualification the learner must be able to:

- > Apply mathematical literacy skills to carry out the required calculations at this level related to the work process and basic finance.
- > Communicate effectively with others at all levels and behave in an appropriate manner under work related circumstances displaying teamwork qualities
- > Be able to give instructions, read and understand drawings and diagrams related to his work.
- > Be able to use and supervise the use of power tools, equipment and instruments, accurately and safely.
- > Be conscious at all times of the need to work safely in an industrial environment and understand the

requirements of the OSH Act in the workplace.

- > Understand the operation of the vapour compression refrigeration system and its components, electrical and control devices and be able to find faults and repair/replace parts.
- > Use the knowledge of the various materials and accessories in an air conditioning, refrigeration or ventilation system to carry out installations.
- > Have knowledge of the systems and processes that he has elected to include in his learning program.

Rationale for the qualification.

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

This is the second qualification in a series of qualifications which will lead to a learner acquiring all the skills required to work in the industry in the repair, maintenance, installation, manufacture and ultimately design of the mechanical / electrical systems which provide temperature control for environmental or process needs. Qualification at this level will be the equivalent of a learner passing a trade test under the apprenticeship of commercial or industrial refrigeration mechanic.

NQF level-credits-title-technical competence

2-145-Learner Mechanic-Has a basic understanding of equipment and is able to carry out technical work under supervision.

3-186-Refrigeration Mechanic / Journeyman-Has a knowledge of equipment and systems and is able to carry out technical work without supervision.

4-149-Technician-Has an advanced knowledge of systems and equipment and is able to supervise technical work

5-136-Senior Technician /Project Leader-Has a knowledge of system design, selection and engineering and has management skills.

The learner will be required to reach competence in the advanced skills of the use of tools of the trade, practice of workplace safety, finding and repair of mechanical and electrical plant faults, installation and dismantling of plants, reading and interpretation of drawings and diagrams. He will be required to lead a work team and communicate at all levels in the workplace.

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

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

The 2010 events and subsequent increase in level of tourism will create further demand for the services of trained technicians to install, service and repair cooling equipment.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

This qualification assumes that the candidate has already achieved one or more of the following:

- > National Certificate in Air conditioning, Refrigeration and Ventilation at NQF level 2 (NLRD 20719)
- > FETC (Further Education and Training Certificate) has an interest in mathematics, science and technology and practical ability in the use on tools and equipment in mechanical and electrical engineering.

Recognition of prior learning

Whether a candidate attends formal courses or acquires the required skills through informal means, the same standards apply as per the matrix of unit standards. The qualification and the standards have been written in such a way that the learning has to be assessed in an integrated way. Assessors will assess evidence to establish what the learners know and can do. Such evidence may be gathered through course related activities and / or through work related activities. In cases where candidates do not attend formal courses, assessors should seek work related evidence as far as possible.

Where courses are provided for learners, institutions can use the unit standards and this qualification to assess learning achievements.

For candidates who are not able to achieve the outcomes, providers can then use the standards and qualifications to determine a specific learning program to suit the candidates learning needs.

QUALIFICATION RULES

N/A

EXIT LEVEL OUTCOMES

- > Demonstrate in the process of assessment the use of appropriate mathematics literacy and financial skills and the skills in written and oral communication applicable to the workplace and life in general
- > Demonstrate and explain the use of power tools and other equipment in the installation and dismantling of air conditioning, refrigeration and ventilation plants always applying safe working practice.
- > Explain the operation of the vapour compression refrigeration cycle and its components in relation to the operating parameters of refrigeration plants.
- > Demonstrate the ability to find and repair faults in a refrigeration system.
- > Demonstrate the ability to understand drawings, diagrams and specifications and write reports.
- > Explain and use the elective skills which are selected.

Critical Cross-field outcomes

- > Appropriate calculations and the associated processes are demonstrated and the consequences of errors in Calculations are emphasized.
Make decisions solve problems.
Technology and science.
Personal development.
Information.
- > Basic accounting/financial calculations are explained in relation to business and life situations.
Make decisions solve problems.
Technology and science .
Related systems.
Personal development.
Information.
- > The skills in verbal and written communication are demonstrated and applied in workplace situations.
Make decisions solve problems.
Organisation teamwork.
Communication.
Related systems.
Personal development.
Information.
- > The purpose of power tools and other installation equipment is explained and demonstrated.
Make decisions solve problems.
Organisation teamwork.
Make decisions solve problems.
Technology and science.
- > Precautions required to ensure the safety of workers and others in the vicinity are explained and demonstrated in terms of the OSH Act.
Make decisions solve problems.
Organisation teamwork.
Communication.
Information.
- > The responsibility of handling refrigerants (groups 1 and 2) and the consequences of unsafe procedures are explained.
Make decisions solve problems.
Technology and science .
Information.

> All system components are identified and their function explained in relation to the complete process.

Make decisions solve problems.

Technology and science .

Related systems.

Personal development.

Information.

> Typical operating temperature / pressure parameters are explained and evaluated.

Make decisions solve problems.

Technology and science .

Related systems.

Personal development.

Information.

> The nature of the electrical or mechanical fault is identified and analysed.

Make decisions solve problems.

Technology and science .

Related systems.

Personal development.

Information.

> The safety precautions that are to be practiced in the identification process are explained and demonstrated.

Organisation teamwork.

Communication.

Technology and science .

Related systems.

Personal development.

Information.

> The contribution to fault finding that refrigeration oil analysis makes is explained.

Make decisions solve problems.

Communication.

Technology and science .

Information.

> The use of drawing, diagrams and specifications as a means of conveying detail instructions is explained and the understanding of these media is demonstrated.

Make decisions solve problems.

Organisation teamwork.

Communication.

Technology and science .

Related systems.

Personal development.

Information.

> The ability to write a report as a communication method is demonstrated.

Organisation teamwork.

Communication.

Technology and science .

Related systems.

Personal development.

Information.

ASSOCIATED ASSESSMENT CRITERIA

1.

> Appropriate calculations and the associated processes are demonstrated and the consequences of errors in calculations are emphasized.

> Basic accounting/financial calculations are explained in relation to business and life situations.

> The skills in verbal and written communication are demonstrated and applied in workplace situations.

2.

> The purpose of power tools and other installation equipment is explained and demonstrated.

- > Precautions required to ensure the safety of workers and others in the vicinity are explained and demonstrated in terms of the OSH Act.
- > The responsibility of handling refrigerants (groups 1 and 2) and the consequences of unsafe procedures are explained.

3.

- > All system components are identified and their function explained in relation to the complete process.
- > Typical operating temperature / pressure parameters are explained and evaluated.

4.

- > The nature of the electrical or mechanical fault is identified and analysed.
- > The safety precautions that are to be practiced in the identification process are explained and demonstrated.
- > The contribution to fault finding that refrigeration oil analysis makes is explained.

5.

- > The use of drawing, diagrams and specifications as a means of conveying detail instructions is explained and the understanding of these media is demonstrated.
- > The ability to write a report as a communication method is demonstrated.

6.

- > The required personal skills are explained and demonstrated.
- > The procedures or processes are explained in relation to the appropriate refrigeration system or component.
- > The required installation methods or application are discussed and safety precautions noted.

Integrated assessment

Integrated assessment at the level of this qualification will evaluate the learner's capacity to integrate engineering principles, processes and behaviour across a range of workplace domains and thus be able to carry out maintenance, repair and installation work under supervision for the benefit of his employer. Integrated assessment must specifically evaluate the learner's ability to:

- > Understand and apply mathematics literacy, communicate and behave appropriately.
- > Understand and use tools, instruments and equipment safely and purposefully.
- > Understand and apply the engineering principles and safety considerations related to the specific workplace tasks and environment.

This will require assessment methodologies which will include demonstration, oral and written responses, both summative and formative, and evidence of these in the form of portfolios or projects. The learner must show sufficient evidence of ability to understand engineering principles and responsibility in workplace behaviour and procedures. Such ability may be obtained in a formal learnership, by practice gained in the workplace (RPL) or by a combination of formal learning and practice in the workplace. The assessment must also ensure that learners have achieved the critical outcomes.

INTERNATIONAL COMPARABILITY

There are no other countries in Sub-Saharan Africa which have established training organizations or formal qualifications in the sub-field of air conditioning, refrigeration and ventilation, comparison in the African context is therefore not possible.

A search was conducted on the Internet and the following qualifications were found:

- > TPC Training Systems - USA - series 430 Air Conditioning and Refrigeration courses 431 - 439 and series 100 fundamentals courses 101 - 110
- > Australian National Training Authority, Qualifications UTE 30999 Electrotechnology Refrigeration and Air Conditioning.
- > New Zealand Qualifications Authority 2004 - Refrigeration and Air Conditioning levels 1 - 6

We are satisfied that our qualifications at NQF level 2 - 4 are comparable with the USA, Australian and New Zealand qualifications in terms of learning components. A direct comparison of level is not possible from the information available to us but feedback from training providers and resultant revisions to this issue of the qualifications has fine-tuned them to South African requirements.

It is noted that the fundamental component of this qualification is based on similar South African qualifications and no attempt has been made to compare this component with those of other countries.

ARTICULATION OPTIONS

Air conditioning, refrigeration and ventilation is a specialized industry embracing technical skills in mechanical, electrical and thermal engineering. Historically, skilled workers in this subfield have entered through:

- > A formal apprenticeship in commercial or industrial refrigeration.
- > An apprenticeship in the trade of millwright.
- > An apprenticeship in the trade of electrician.
- > Appropriate workplace learning in the required skills.

At NQF level 2 there would be commonality between the trades of millwright and electrician in exit level outcomes 1, 2 and 4, but trade specific training in exit level outcomes 3 and 5 would be required to achieve this qualification.

At NQF levels 3 and 4 there would be commonality in the fundamental and some core electrical learning components of air conditioning and refrigeration, electrical and millwright trades as learners would work in similar environments. The trade specific skills in the three trades would have little further commonality but are all engineering based. Skills programs of about 70 - 90 credits based on selective technical unit standards would be required to bring electricians or millwrights qualified at the required NQF level up to technical competence requirements for a qualification in air conditioning, refrigeration and ventilation.

MODERATION OPTIONS

Moderation of the assessment will be determined by the requirements of the MERSETA ETQA.

In addition moderators must have technical knowledge and experience of air conditioning, refrigeration and ventilation.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

Anyone assessing a learner against this qualification must be registered as an assessor with MERSETA ETQA or an ETQA that has a Memorandum of Understanding with the MERSETA ETQA.

Assessors should have a technical knowledge and experience of mechanical, electrical and thermal processes equivalent to one NQF level higher than this qualification. They should also have sufficient expertise to assess communication, mathematical literacy and life skills.

NOTES

This qualification replaces qualification 20720, "National Certificate: Air-Conditioning, Refrigeration and Ventilation", Level 3, 173 credits.

Credits and learning components.

Fundamental components-36 credits

Core components-90 credits

Elective components-60 credits

Total-186 credits

Note:

- > All credits are at NQF level 3 and the associated unit standards are shown in the titles matrix annexure.
- > Certain rules of combination of elective credits are applicable, refer to the titles matrix annexure.

The assessment criteria for each unit standard are to be used by the assessor as the basis for assessment judgments, first in relation to each unit standard, and then in relation to integration at exit outcome level.

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	9329 Identify, use and maintain tools used in the air-conditioning, refrigeration and ventilation trades	Level 3	10	Registered
Core	9330 Fault-find a refrigeration plant stoppage or failure	Level 3	5	Registered
Core	9388 Explain the operation of the vapour compression refrigeration cycle, and identify and explain the operation of the components and the associated controls, safety devices and defrost systems	Level 3	14	Registered
Core	9390 Dismantle and assemble air-conditioning and refrigeration equipment	Level 3	6	Registered
Core	9396 Handle and place in position equipment used within the air-conditioning, refrigeration and ventilation industries	Level 3	4	Registered

Core	9397 Determine, define and evaluate operating parameters of a refrigeration system and transfer refrigerant	Level 3	5	Registered
Core	9529 Compile feasibility and commissioning reports	Level 3	3	Registered
Core	9530 Manage work time effectively	Level 3	3	Reregistered
Core	9535 Identify, handle and sample refrigeration oils for analysis, and demonstrate how oil can indicate the general condition of a refrigeration system	Level 3	3	Registered
Core	9540 Carry out elementary airflow measurements and calculations	Level 3	4	Registered
Core	9541 Maintain safety in the handling of hydrocarbon refrigerants	Level 3	12	Registered
Core	13374 Interpret air-conditioning, refrigeration and ventilation plant layout and component drawings, sketches and specifications	Level 3	6	Registered
Core	116223 Demonstrate knowledge of the OHS Act as it applies to employees in the air-conditioning, refrigeration and ventilation industries	Level 3	3	Draft - Prep for P Comment
Core	116463 Fault find, repair and maintain AC motors, circuitry and controls as applied to air conditioning, refrigeration and ventilation installations	Level 3	8	Draft - Prep for P Comment
Core	116464 Sketch and construct three-phase circuits as used in air-conditioning, refrigeration and ventilation installations	Level 3	8	Draft - Prep for P Comment
Core	116466 Inspect and maintain electrical control panels and circuitry as used for air-conditioning, refrigeration and ventilation installations	Level 3	6	Draft - Prep for P Comment
Elective	9393 Install and service power transmission systems for air-conditioning, refrigeration and ventilation equipment	Level 3	6	Registered
Elective	9394 Remove, install and service bearings used on air-conditioning, refrigeration and ventilation equipment	Level 3	6	Registered
Elective	9527 Lead a team, plan, allocate and assess their work	Level 3	4	Registered
Elective	9531 Show understanding of diversity in the workplace	Level 3	3	Registered
Elective	9532 Demonstrate basic knowledge of computers	Level 3	6	Registered
Elective	9533 Use communication skills to handle and resolve conflict in the workplace	Level 3	3	Registered
Elective	9534 Determine the properties of air from a psychometric chart and carry out basic calculation involving heat and mass transfer	Level 3	7	Registered
Elective	9536 Identify water piping systems, its components, accessories and controls used refrigeration and air conditioning installations	Level 3	4	Registered
Elective	9538 Identify and apply insulation methods and materials for piping and flat surfaces as applicable to air-conditioning and refrigeration systems	Level 3	6	Registered
Elective	9539 List the commonly applied air-conditioning systems, state their application and explain their operation	Level 3	8	Registered
Elective	9542 Maintain safety in the handling of ammonia refrigerant	Level 3	8	Registered
Elective	9543 Supply and fit air conditioners to vehicles	Level 3	6	Registered
Elective	9544 Check and maintain air-conditioners in vehicles	Level 3	4	Registered
Elective	9545 Diagnose and repair air-conditioners in vehicles	Level 3	4	Registered
Elective	9546 Install externally powered transport refrigeration systems	Level 3	6	Registered
Elective	13378 Operate water treatment systems used in air-conditioning and refrigeration installations	Level 3	3	Registered
Elective	13394 Install eutectic and multi-compartment transport refrigeration systems	Level 3	10	Registered
Elective	114946 Identify causes of stress and techniques to manage it in the workplace	Level 3	2	Registered
Elective	116465 Identify and commission modulating control systems as used in air conditioning and refrigeration systems	Level 3	6	Draft - Prep for P Comment
Elective	116468 Adhere to the legal requirements of SANS 10147 (SABS 0147) standards when handling group 1 refrigerants	Level 3	6	Draft - Prep for P Comment
Fundamental	7456 Use mathematics to investigate and monitor the financial aspects of personal, business and national issues	Level 3	2	Registered
Fundamental	8968 Accommodate audience and context needs in oral communication	Level 3	5	Registered
Fundamental	8969 Interpret and use information from texts	Level 3	5	Registered
Fundamental	8970 Write texts for a range of communicative contexts	Level 3	5	Registered
Fundamental	8973 Use language and communication in occupational learning programmes	Level 3	5	Registered
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	Registered
Fundamental	9012 Investigate life and work related problems using data and probabilities	Level 3	5	Registered
Fundamental	9013 Describe, apply, analyse and calculate shape and motion in 2-and 3-dimensional space in different contexts	Level 3	4	Registered



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

Further Education and Training Certificate: Air-conditioning, Refrigeration and Ventilation

SAQA QUAL ID	QUALIFICATION TITLE	
48966	Further Education and Training Certificate: Air-conditioning, Refrigeration and Ventilation	
SGB NAME	SGB Air-conditioning Refrigeration and Ventilation	
ABET BAND	PROVIDER NAME	
Undefined		
QUALIFICATION CODE	QUAL TYPE	SUBFIELD
MET-4-National Certificate	National Certificate	Manufacturing and Assembly
MINIMUM CREDITS	NQF LEVEL	QUALIFICATION CLASS
169	Level 4	Regular-Unit Stds Based
SAQA DECISION NUMBER	REGISTRATION START DATE	REGISTRATION END DATE

PURPOSE OF THE QUALIFICATION

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

This qualification provides the learner with the skills required to service, repair, commission and operate mechanical / electrical equipment and systems in the air conditioning, refrigeration and ventilation sub-field in a variety of applications, and to supervise work teams.

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

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

South Africa is the only country in Sub-Saharan Africa which has established qualifications and a network of training providers countrywide. South African trained technicians are the obvious choice for work in this field in all African countries north of our borders. We also see an untapped potential for training of learners from NEPAD countries which would assist in the further development of our training resources.

This qualification specifically suits learners who have an interest in science and mathematics as well as manual dexterity (ability to use tools) and a consciousness of personal and environmental safety. It is also suitable for workers who have had advanced practical and technical experience working in the air conditioning, refrigeration and ventilation industry but lack the formal learning required in the qualification and who have a level to competence equivalent of the NQF level 3 qualification in air conditioning, refrigeration and ventilation as determined in formal assessment by an assessor who meets the criteria for the registration of assessors.

To achieve competence in this qualification the learner must be able to:

- > Apply mathematical literacy skills to carry out the required calculations at this level related to the work process and financial skills to understand personal, business and national issues.
- > Apply oral and written methods to communicate effectively with others at all levels in workplace and technical matters.
- > Be able to give instructions, read and understand drawings and diagrams related to his work.

- > Be able to supervise the use of power tools, equipment and instruments by work teams, accurately and safely.
- > Have a thorough knowledge of the OSH Act and safety considerations relating to all aspects of the work environment.
- > Understand the operation of vapour compression refrigeration systems, and their electrical and control systems and be able to select components for such systems.
- > Understand and apply quality control systems in the workplace.
- > Have knowledge of the systems and processes that he has elected to include in his learning program.

Rationale of the qualification

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

This is the third qualification in a series of qualifications which will lead to a learner acquiring all the skills required to work in the industry in the repair, maintenance, installation, manufacture and ultimately design of the mechanical / electrical systems which provide temperature control for environmental or process needs. By qualifying at this level a learner will achieve the status of a technician in air conditioning, refrigeration and ventilation and will have an advanced knowledge of systems and equipment and be able to supervise working teams.

- > Learner mechanic - Level 2, Credits 145 - (Technical competence - Has a basic understanding of equipment and is able to carry out technical work under supervision.)
- > Refrigeration Mechanic / Journeyman - Level 3, - (Technical competence - Has a knowledge of equipment and systems and is able to carry out technical work without supervision.
- > Technician - Level 4, - (Technical competence - Has an advanced knowledge of systems and equipment and is able to supervise technical work.)
- > Senior Technician / Project Leader - Level 5, - (Has a knowledge of system design, selection and engineering and has management skills.

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

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

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

The 2010 events and subsequent increase in level of tourism will create further demand for the services of trained technicians to install, service and repair cooling equipment at all skills levels.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

This qualification assumes that the candidate has already achieved the following:

- > National Certificate in Air conditioning, Refrigeration and Ventilation at NQF level 3 (NLRD 20720)
- > FETC (Further Education and Training Certificate), has an interest in science and technology and some practical ability in the use on tools.

Recognition of prior learning

Whether a candidate attends formal courses or acquires the required skills through informal means, the same standards apply as per the matrix of unit standards. The qualification and the standards have been written in such a way that the learning has to be assessed in an integrated way. Assessors will assess evidence to establish what the learners know and can do. Such evidence may be gathered through course related activities and / or through work related activities. In cases where candidates do not attend formal courses, assessors should seek work related evidence as far as possible.

Where courses are provided for learners, institutions can use the unit standards and this qualification to assess learning achievements.

For candidates who are not able to achieve the outcomes, providers can then use the standards and qualifications to determine a specific learning program to suit the candidates learning needs.

QUALIFICATION RULES

N/A

EXIT LEVEL OUTCOMES

1. The exit level outcomes should be read in the context of NQF level 4. Range statements are specified in the relevant unit standards.
2. Demonstrate the ability to service, repair and start-up air conditioning, refrigeration and ventilation systems.
3. Explain the need for control of quality in the manufacturing, installation, maintenance and repair processes relating to air conditioning, refrigeration and ventilation.
4. Explain the operation of the various control devices, control systems and programmable logic systems used in air conditioning, refrigeration and ventilation plants.
5. Explain the operation of a range of refrigeration systems and their application in industry.
6. Explain and use the elective skills which are selected.

The following indicates the critical cross-field outcomes relative to the exit level outcomes of the qualification:

1. Appropriate calculations and the associated processes are undertaken and explained.

Relative to the following critical cross-field outcomes:

- > Make decisions solve problems
- > Technology and science
- > Related systems
- > Personal development
- > Information

2. Accounting/financial calculations are undertaken and explained in terms of business, personal and national context.

Relative to the following critical cross-field outcomes:

- > Make decisions solve problems
- > Technology and science
- > Related systems
- > Personal development
- > Information

3. Skills in verbal and written communication at all levels are demonstrated and their need is explained.

Relative to the following critical cross-field outcomes:

- > Make decisions solve problems
- > Organisation Teamwork
- > Communication
- > Personal development
- > Information

4. The procedures and sequences to carry out the work are identified and discussed.

Relative to the following critical cross-field outcomes:

- > Make decisions solve problems
- > Organisation Teamwork
- > Communication
- > Technology and science
- > Related systems
- > Information

5. The safety considerations of the work team and others in the vicinity are discussed in terms of the OSH Act and practical safety.

Relative to the following critical cross-field outcomes:

- > Make decisions solve problems
- > Organisation Teamwork

- > Communication
- > Related systems
- > Information

6. The consequences of defective material and assembly are explained in terms of safety, legal and contractual considerations.

Relative to the following critical cross-field outcomes:

- > Make decisions solve problems
- > Communication
- > Technology and science
- > Related systems
- > Personal development
- > Information

7. The standards for control of quality are explained and their application is discussed.

Relative to the following critical cross-field outcomes:

- > Communication
- > Technology and science
- > Related systems
- > Personal development
- > Information

8. The need for control devices and systems is explained.

Relative to the following critical cross-field outcomes:

- > Technology and science
- > Related systems
- > Information

9. The functioning of the devices and systems are explained by means of control and wiring diagrams.

Relative to the following critical cross-field outcomes:

- > Technology and science
- > Related systems
- > Personal development
- > Information

10. The operation of different systems and refrigerants is explained and reasons for their selection is given.

Relative to the following critical cross-field outcomes:

- > Make decisions solve problems
- > Technology and science
- > Related systems
- > Personal development
- > Information

The need for ancilliary systems such as water treatment are discussed and explained.

Relative to the following critical cross-field outcomes:

- > Make decisions solve problems
- > Technology and science
- > Related systems
- > Personal development
- > Information

ASSOCIATED ASSESSMENT CRITERIA

1.

- > Appropriate calculations and the associated processes are undertaken and explained.
- > Accounting/financial calculations are undertaken and explained in terms of business, personal and national context.
- > Skills in verbal and written communication at all levels are demonstrated and their need is explained.

2.

- > The procedures and sequences to carry out the work are identified and discussed.
- > The safety considerations of the work team and others in the vicinity are discussed in terms of the OSH Act and practical safety.

3.

- > The consequences of defective material and assembly are explained in terms of safety, legal and contractual considerations.
- > The standards for control of quality are explained and their application is discussed.

4.

- > The functioning of the devices and systems are explained by means of control and wiring diagrams.
- > The need for control devices and systems is explained.

5.

- > The operation of different systems and refrigerants is explained and reasons for their selection is given.
- > The need for ancillary systems such as water treatment are discussed and explained.

6.

- > The required personal skills are explained and demonstrated.
- > The procedures or processes are explained in relation to the appropriate refrigeration system or component.
- > The required installation methods or application are discussed and safety precautions noted.

Integrated assessment

Integrated assessment at the level of this qualification will evaluate the learner's capacity to integrate engineering principles, processes and behaviour across a range of workplace domains and thus be able to carry out maintenance, repair and installation work under supervision for the benefit of his employer.

Integrated assessment must specifically evaluate the learner's ability to:

- > Understand and apply mathematics literacy, communicate and behave appropriately.
- > Understand and use tools, instruments and equipment safely and purposefully.
- > Understand and apply the engineering principles and safety considerations related to the specific workplace tasks and environment.

This will require assessment methodologies which will include demonstration, oral and written responses, both summative and formative, and evidence of these in the form of portfolios or projects. Since this is a basic qualification, the learner must show sufficient evidence of ability to understand engineering principles and workplace behaviour and procedures. Such ability may be obtained in a formal learnership, by practice gained in the workplace (RPL) or by a combination of formal learning and practice in the workplace. The assessment must also ensure that learners have achieved the critical outcomes.

INTERNATIONAL COMPARABILITY

There are no other countries in Sub-Saharan Africa which have established training organizations or formal qualifications, comparison in the African context is therefore not possible.

A search was conducted on the Internet and the following qualifications were found:

- > TPC Training Systems - USA - series 430 Air Conditioning and Refrigeration courses 431 - 439 and series 100 fundamentals courses 101 - 110
- > Australian National Training Authority, Qualifications UTE 30999 Electrotechnology Refrigeration and Air Conditioning.
- > New Zealand Qualifications Authority 2004 - Refrigeration and Air Conditioning levels 1 - 6

We are satisfied that our qualifications at NQF level 2 - 4 are comparable with the USA, Australian and New Zealand qualifications in terms of learning components. A direct comparison of level is not possible from the information available to us but feedback from training providers and resultant revisions to this issue of the qualifications has fine-tuned them to South African requirements.

It is noted that the fundamental component of this qualification is based on similar South African qualifications and no attempt has been made to compare this component with those of other countries.

ARTICULATION OPTIONS

Air conditioning, refrigeration and ventilation is a specialized industry embracing technical skills in mechanical, electrical and thermal engineering. Historically, skilled workers in this subfield have entered through:

- > A formal apprenticeship in commercial or industrial refrigeration.
- > An apprenticeship in the trade of millwright.
- > An apprenticeship in the trade of electrician.
- > Appropriate workplace learning in the required skills.

At NQF level 2 there would be commonality between the trades of millwright and electrician in exit level outcomes 1, 2 and 4, but trade specific training in exit level outcomes 3 and 5 would be required to achieve this qualification.

At NQF levels 3 and 4 there would be commonality in the fundamental and some core electrical learning components of air conditioning and refrigeration, electrical and millwright trades as learners would work in similar environments. The trade specific skills in the three trades would have little further commonality but are all engineering based. Skills programs of about 70 - 90 credits based on selective technical unit standards would be required to bring electricians or millwrights qualified at the required NQF level up to competence requirements for a qualification in air conditioning, refrigeration and ventilation.

MODERATION OPTIONS

Moderation of the assessment will be determined by the requirements of the relevant ETQA. In addition moderators must have technical knowledge and experience of air conditioning, refrigeration and ventilation.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

Anyone assessing a learner against this qualification must be registered as an assessor with relevant ETQA or an ETQA that has a Memorandum of Understanding with the relevant ETQA. Assessors should have a technical knowledge and experience of mechanical, electrical and thermal processes equivalent to one NQF level higher than this qualification. They should also have sufficient expertise to assess communication, mathematical literacy and life skills.

NOTES

This qualification replaces qualification 20721, which is "National Certificate in Air Conditioning, Refrigeration and Ventilation", Level 4, 135 credits.

The assessment criteria for each unit standard are to be used by the assessor as the basis for assessment judgments, first in relation to each unit standard, and then in relation to integration at exit outcome level.

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	116377 Explain the need for water treatment and the methods and equipment used	Level 4	4	Draft - Prep for P Comment
Core	116379 Demonstrate knowledge of the OHS Act applicable to technicians employed in the air-conditioning, refrigeration and ventilation industries	Level 4	4	Draft - Prep for P Comment
Core	116389 Write a technical report	Level 4	4	Draft - Prep for P Comment
Core	116392 Understand, implement, maintain and monitor general quality standards within the air-conditioning, refrigeration and ventilation industries	Level 4	8	Draft - Prep for P Comment
Core	116403 Service a refrigeration system and set it in operation	Level 4	8	Draft - Prep for P Comment
Core	116408 List, define and discuss the characteristics of commonly used refrigerants used in the refrigeration industry	Level 4	4	Draft - Prep for P Comment
Core	116418 Explain function and operation of refrigeration circuits as applied to air-conditioning or refrigeration systems and select and explain the function of components, accessories and controls	Level 4	8	Draft - Prep for P Comment
Core	116421 Repair and overhaul air-conditioning, refrigeration and ventilation equipment	Level 4	8	Draft - Prep for P Comment
Core	116458 Select control systems and instruments for air conditioning, refrigeration and ventilation plants, determine control parameters and draw control sequence and electrical wiring diagrams	Level 4	7	Draft - Prep for P Comment
Core	116460 Demonstrate an understanding of logic controllers as used in air conditioning, refrigeration and ventilation applications	Level 4	7	Draft - Prep for P Comment
Core	116461 Understand basic electrical and mechanical engineering principles as applicable to air conditioning, refrigeration and ventilation	Level 4	9	Draft - Prep for P Comment
Elective	116375 Commission air-conditioning and ventilation systems	Level 4	8	Draft - Prep for P Comment
Elective	116380 Supervise workers at levels 2 and 3	Level 4	6	Draft - Prep for P Comment
Elective	116396 Commission and maintain transport refrigeration systems	Level 4	8	Draft - Prep for P Comment
Elective	116397 Determine if refrigeration plants operating with a group 1 refrigerant conform to the regulations in SANS 10147	Level 4	8	Draft - Prep for P Comment

Elective	116406 Diagnose operational faults in refrigeration systems and take remedial action or propose corrective action	Level 4	6	Draft - Prep for P Comment
Elective	116411 Plot air-conditioning processes on the psychrometric chart and determine plant operating parameters	Level 4	7	Draft - Prep for P Comment
Elective	116413 Monitor an air-conditioning, refrigeration or ventilation system through the building management system	Level 4	8	Draft - Prep for P Comment
Elective	116415 Commission refrigeration systems	Level 4	8	Draft - Prep for P Comment
Fundamental	8974 Engage in sustained oral communication and evaluate spoken texts	Level 4	5	Registered
Fundamental	8975 Read analyse and respond to a variety of texts	Level 4	5	Registered
Fundamental	8976 Write for a wide range of contexts	Level 4	5	Registered
Fundamental	8979 Use language and communication in occupational learning programmes	Level 4	5	Registered
Fundamental	9015 Apply knowledge of statistics and probability to critically interrogate and effectively communicate findings on life related problems	Level 4	5	Registered
Fundamental	9016 Represent analyse and calculate shape and motion in 2-and 3-dimensional space in different contexts	Level 4	4	Registered



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

1

Behave in the proper manner under working conditions

SAQA US ID	UNIT STANDARD TITLE		
116246	Behave in the proper manner under working conditions		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION	SUBFIELD DESCRIPTION		
Manufacturing, Engineering and Technology	Manufacturing and Assembly		
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 2	4

Specific Outcomes:

SPECIFIC OUTCOME 1

Understand workplace ethics in the air-conditioning, refrigeration and ventilation industry.

SPECIFIC OUTCOME 2

Identify and describe the characteristics of a successful worker in the air conditioning, refrigerat

SPECIFIC OUTCOME 3

Discuss workplace ethics in the air-conditioning, refrigeration and ventilation industry and link it



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

2

Clean air-conditioning, refrigeration and ventilation plants, components and work sites

SAQA US ID	UNIT STANDARD TITLE		
116238	Clean air-conditioning, refrigeration and ventilation plants, components and work sites		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 2	4

Specific Outcomes:

SPECIFIC OUTCOME 1

Plan and prepare to clean plant, equipment, components or work site.

SPECIFIC OUTCOME 2

Clean air conditioners.

SPECIFIC OUTCOME 3

Clean equipment and/or components.

SPECIFIC OUTCOME 4

Clean filters.

SPECIFIC OUTCOME 5

Clean work sites.

SPECIFIC OUTCOME 6

Complete the cleaning process and report.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

3

Define and explain the principles of thermodynamics and carry out basic calculations involving heat

SAQA US ID	UNIT STANDARD TITLE		
116236	Define and explain the principles of thermodynamics and carry out basic calculations involving heat		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 2	5

Specific Outcomes:

SPECIFIC OUTCOME 1

Define and explain the relationship between force, work, power and energy.

SPECIFIC OUTCOME 2

Define temperature and heat and explain the different forms of heat.

SPECIFIC OUTCOME 3

Define pressure and explain the different pressures.

SPECIFIC OUTCOME 4

Define and explain the terms density, specific volume, airflow and mass flow.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

4

Demonstrate understanding of fundamentals of electricity and its application in air conditioning, refrigeration and ventilation equipment

SAQA US ID	UNIT STANDARD TITLE		
116232	Demonstrate understanding of fundamentals of electricity and its application in air conditioning, refrigeration and ventilation equipment		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 2	4

Specific Outcomes:

SPECIFIC OUTCOME 1

Demonstrate an understanding of the fundamentals of electricity.

SPECIFIC OUTCOME 2

Define conductors and insulators.

SPECIFIC OUTCOME 3

Define and apply Ohm's law.

SPECIFIC OUTCOME 4

Define and apply circuit protection for single-phase and three-phase circuits.

SPECIFIC OUTCOME 5

List the potential hazards and the methods to prevent injury when using electricity.

SPECIFIC OUTCOME 6

List and explain the common faults that can occur in electrical circuits.

SPECIFIC OUTCOME 7

Differentiate between permanent and temporary magnets.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

5

Explain the operation of basic vapour compression refrigeration systems, and identify and explain the function of the components and accessories as well as their retrieval and storage procedures

SAQA US ID	UNIT STANDARD TITLE		
116224	Explain the operation of basic vapour compression refrigeration systems, and identify and explain the function of the components and accessories as well as their retrieval and storage procedures		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 2	8

Specific Outcomes:

SPECIFIC OUTCOME 1

Explain, with the aid of a block diagram, the operation of the vapour compression refrigeration syst

SPECIFIC OUTCOME 2

Name and indicate the components and pipes in the block diagrams drawn and indicate the direction of

SPECIFIC OUTCOME 3

Explain the process taking place in each component.

SPECIFIC OUTCOME 4

Discuss the relationship between the pressure and the temperature of a refrigerant.

SPECIFIC OUTCOME 5

Identify and explain the function of components and accessories of a refrigeration system.

SPECIFIC OUTCOME 6

Handle and store refrigeration system components and accessories.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

6

Handle refrigerant containers and transfer refrigerants into service cylinders

SAQA US ID	UNIT STANDARD TITLE		
116355	Handle refrigerant containers and transfer refrigerants into service cylinders		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 2	3

Specific Outcomes:

SPECIFIC OUTCOME 1

List and discuss the hazards when handling refrigerants and containers.

SPECIFIC OUTCOME 2

Identify and inspect refrigerant containers.

SPECIFIC OUTCOME 3

Prepare containers for refrigerant transfer.

SPECIFIC OUTCOME 4

Transfer refrigerant into empty, evacuated container.

SPECIFIC OUTCOME 5

Demonstrate the handling and storing of refrigerant containers without endangering self, others, or



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

7

Identify and apply fixing methods for piping, ducting and equipment used in the trade of air-conditioning, refrigeration and ventilation

SAQA US ID	UNIT STANDARD TITLE		
116234	Identify and apply fixing methods for piping, ducting and equipment used in the trade of air-conditioning, refrigeration and ventilation		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 2	6

Specific Outcomes:**SPECIFIC OUTCOME 1**

Identify and state the purpose of various fixing methods.

SPECIFIC OUTCOME 2

Identify and state the purpose of keys and mechanical locking devices.

SPECIFIC OUTCOME 3

Identify and state the purpose, advantages and disadvantages of various bracketing systems used for

SPECIFIC OUTCOME 4

Apply fixing methods.

SPECIFIC OUTCOME 5

Apply keys and locking devices.

SPECIFIC OUTCOME 6

Apply bracketing systems.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

8

Identify and set ON-OFF control devices as used in air conditioning and refrigeration systems, explain their operation and discuss their application and fault finding

SAQA US ID	UNIT STANDARD TITLE		
116226	Identify and set ON-OFF control devices as used in air conditioning and refrigeration systems, explain their operation and discuss their application and fault finding		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 2	6

Specific Outcomes:

SPECIFIC OUTCOME 1

Define the terms used to describe an ON-OFF control system and its functions.

SPECIFIC OUTCOME 2

State and describe the commonly used control systems based on their energy source.

SPECIFIC OUTCOME 3

State and describe the three types of control devices used on air conditioning and refrigeration systems.

SPECIFIC OUTCOME 4

State and describe the commonly used types of measuring elements and sensors.

SPECIFIC OUTCOME 5

Connect and commission ON-OFF control devices.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

9

Identify and state application of belt drives, couplings, gearboxes and bearings used on air-conditioning, refrigeration and ventilation plants and recognize misaligned, mismatched and worn components

SAQA US ID	UNIT STANDARD TITLE		
116233	Identify and state application of belt drives, couplings,gearboxes and bearings used on air-conditioning, refrigeration and ventilation plants and recognize misaligned, mismatched and worn components		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 2	6

Specific Outcomes:

SPECIFIC OUTCOME 1

Identify gearboxes, couplings and belts.

SPECIFIC OUTCOME 2

Identify faulty couplings, belts and drives.

SPECIFIC OUTCOME 3

State the typical applications of belt drives, couplings and gearboxes.

SPECIFIC OUTCOME 4

State and explain the consequences of belts mismatched for length, for type and for pulley.

SPECIFIC OUTCOME 5

State the consequences of misaligned belt drives and couplings and of wrongly tensioned belts.

SPECIFIC OUTCOME 6

Identify and state typical application of various types of bearings.

SPECIFIC OUTCOME 7

Explain the different methods of lubricating bearings.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

10

Identify materials, piping, fitting, jointing methods and insulation materials used for air-conditioning and refrigeration installations

SAQA US ID	UNIT STANDARD TITLE		
116230	Identify materials, piping, fitting, jointing methods and insulation materials used for air-conditioning and refrigeration installations		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION	SUBFIELD DESCRIPTION		
Manufacturing, Engineering and Technology	Manufacturing and Assembly		
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 2	4

Specific Outcomes:

SPECIFIC OUTCOME 1

List, identify and state the application of various materials used for refrigeration and air-conditioning.

SPECIFIC OUTCOME 2

Identify and state application of various types and sizes of piping.

SPECIFIC OUTCOME 3

Identify and state purpose of various pipe fittings.

SPECIFIC OUTCOME 4

Identify and state purpose of various pipe-jointing methods.

SPECIFIC OUTCOME 5

Identify and state purpose of insulation materials used in refrigeration and air-conditioning installations.

SPECIFIC OUTCOME 6

Identify and state the purpose and applications of pipe support and securing fittings.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

11

Identify refrigerant containers, explain handling procedures and discuss the use of refrigerants

SAQA US ID	UNIT STANDARD TITLE		
116334	Identify refrigerant containers, explain handling procedures and discuss the use of refrigerants		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION	SUBFIELD DESCRIPTION		
Manufacturing, Engineering and Technology	Manufacturing and Assembly		
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 2	3

Specific Outcomes:

SPECIFIC OUTCOME 1

Name and identify the type of refrigerants in containers and systems.

SPECIFIC OUTCOME 2

Demonstrate and/or explain the handling and storing of refrigerant containers without endangering se

SPECIFIC OUTCOME 3

Discuss the use of refrigerants in cooling systems.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

12

Identify, use and maintain hand tools and measuring instruments used in the air-conditioning, refrigeration and ventilation trades

SAQA US ID	UNIT STANDARD TITLE		
116239	Identify, use and maintain hand tools and measuring instruments used in the air-conditioning, refrigeration and ventilation trades		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 2	12

Specific Outcomes:

SPECIFIC OUTCOME 1

Identify and state the purpose of hand tools used in the air-conditioning, refrigeration and ventila

SPECIFIC OUTCOME 2

Demonstrate the use and maintenance of hand tools used in the air-conditioning, refrigeration and ve

SPECIFIC OUTCOME 3

Identify and state the purpose of measuring instruments used in the air-conditioning, refrigeration

SPECIFIC OUTCOME 4

Demonstrate the use of measuring instruments used in the air-conditioning, refrigeration and ventila



Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

13

Identify, use and maintain refrigeration trade specific tools and instruments

SAQA US ID	UNIT STANDARD TITLE		
116335	Identify, use and maintain refrigeration trade specific tools and instruments		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 2	8

Specific Outcomes:**SPECIFIC OUTCOME 1**

Identify the tools/instruments used in the refrigeration trade.

SPECIFIC OUTCOME 2

Maintain refrigeration tools/instruments.

SPECIFIC OUTCOME 3

Prepare for use each of the tools/instruments used in the refrigeration trade.

SPECIFIC OUTCOME 4

Use refrigeration trade tools/instruments.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

14

Install self contained diesel/electric refrigeration units

SAQA US ID		UNIT STANDARD TITLE	
116242		Install self contained diesel/electric refrigeration units	
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB ARV	Regular	Level 2	4

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare to install the equipment.

SPECIFIC OUTCOME 2

Install the unit.

SPECIFIC OUTCOME 3

Connect the unit and check operation.

SPECIFIC OUTCOME 4

Carry out post-installation work.



Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY**UNIT STANDARD:**

15

Install, connect and maintain electrical cables and conductors as applied in air conditioning, refrigeration and ventilation installations

SAQA US ID	UNIT STANDARD TITLE		
116243	Install, connect and maintain electrical cables and conductors as applied in air conditioning, refrigeration and ventilation installations		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 2	6

Specific Outcomes:**SPECIFIC OUTCOME 1**

Prepare to install and terminate cables and conductors.

SPECIFIC OUTCOME 2

Prepare to install electrical cables, conductors and wire ways.

SPECIFIC OUTCOME 3

Install electrical cables, conductors and/or wire ways.

SPECIFIC OUTCOME 4

Terminate and connect cables and conductors.

SPECIFIC OUTCOME 5

Complete work task.

SPECIFIC OUTCOME 6

Maintain electrical cables, conductors and wire ways.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

16

Perform basic arc welding of metals as applicable to air-conditioning, refrigeration and ventilation installations

SAQA US ID	UNIT STANDARD TITLE		
116245	Perform basic arc welding of metals as applicable to air-conditioning, refrigeration and ventilation installations		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION	SUBFIELD DESCRIPTION		
Manufacturing, Engineering and Technology	Manufacturing and Assembly		
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 2	4

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare to arc weld metals.

SPECIFIC OUTCOME 2

Arc-weld metals.

SPECIFIC OUTCOME 3

Apply quality checks on completed weld and correct if necessary.

SPECIFIC OUTCOME 4

Perform finishing activities.



Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY**UNIT STANDARD:**

17

Sketch and construct electrical circuits applicable to single-phase air conditioning, refrigeration and ventilation installations

SAQA US ID	UNIT STANDARD TITLE		
116244	Sketch and construct electrical circuits applicable to single-phase air conditioning, refrigeration and ventilation installations		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 2	9

Specific Outcomes:**SPECIFIC OUTCOME 1**

Identify switches, components and loads.

SPECIFIC OUTCOME 2

Sketch and interpret basic single-phase circuit diagrams.

SPECIFIC OUTCOME 3

Construct single-phase circuits.

SPECIFIC OUTCOME 4

Complete the task.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

18

Work Safely and use safety equipment when carrying out mechanical or electrical work on air conditioning, refrigeration and ventilation installations

SAQA US ID	UNIT STANDARD TITLE		
116241	Work Safely and use safety equipment when carrying out mechanical or electrical work on air conditioning, refrigeration and ventilation installations		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION	SUBFIELD DESCRIPTION		
Manufacturing, Engineering and Technology	Manufacturing and Assembly		
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 2	7

Specific Outcomes:

SPECIFIC OUTCOME 1

Interpret and adhere to safety signs, regulations and procedures related to a working environment.

SPECIFIC OUTCOME 2

Care for safety equipment.

SPECIFIC OUTCOME 3

Check tools, equipment and site for safety.

SPECIFIC OUTCOME 4

Adhere to appropriate safety procedures before, during and after job processes.

SPECIFIC OUTCOME 5

Report and record unsafe conditions or working practices in accordance with work site procedures, st

SPECIFIC OUTCOME 6

Take action or describe action to be taken in case of an electrical accident.

SPECIFIC OUTCOME 7

Leave the job site safely.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

19

Adhere to the legal requirements of SANS 10147 (SABS 0147) standards when handling group 1 refrigerants

SAQA US ID	UNIT STANDARD TITLE		
116468	Adhere to the legal requirements of SANS 10147 (SABS 0147) standards when handling group 1 refrigerants		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	6

Specific Outcomes:

SPECIFIC OUTCOME 1

Briefly describe the objectives of SANS 10147 (SABS 0147).

SPECIFIC OUTCOME 2

Define the applicable terms used in SANS 10147 (SABS 0147) and state the requirements for personal p

SPECIFIC OUTCOME 3

List and discuss the regulations regarding machinery areas, plant rooms and cold rooms.

SPECIFIC OUTCOME 4

List and discuss the requirements regarding the operation, maintenance and the provision for servi

SPECIFIC OUTCOME 5

List and discuss the regulations regarding charging, discharging or substituting refrigerants.

SPECIFIC OUTCOME 6

List and discuss the regulations regarding field tests on refrigerating systems.

SPECIFIC OUTCOME 7

State the duty a person has to report cases where an installation does not comply with the requireme

SPECIFIC OUTCOME 8

Generate a report on an installation subject to SANS 10147 (SABS 0147) and using a group 1 refrigera



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

20

Carry out elementary airflow measurements and calculations

SAQA US ID	UNIT STANDARD TITLE		
116698	Carry out elementary airflow measurements and calculations		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB ARV	Regular	Level 3	4

Specific Outcomes:

SPECIFIC OUTCOME 1

Carry out calculations involving sizes and areas of square and round ducts.

SPECIFIC OUTCOME 2

Carry out elementary airflow calculations.

SPECIFIC OUTCOME 3

Prepare for measuring the air pressure in a duct.

SPECIFIC OUTCOME 4

Measure air pressures in a duct.

SPECIFIC OUTCOME 5

Evaluate results.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

21

Check and maintain air-conditioners in vehicles

SAQA US ID		UNIT STANDARD TITLE		
116703		Check and maintain air-conditioners in vehicles		
SGB NAME		ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation		Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION		
Manufacturing, Engineering and Technology		Manufacturing and Assembly		
UNIT STANDARD CODE		UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV		Regular	Level 3	4

Specific Outcomes:**SPECIFIC OUTCOME 1**

Conduct visual and maintenance checks.

SPECIFIC OUTCOME 2

Conduct physical checks.

SPECIFIC OUTCOME 3

Conduct mechanical checks.

SPECIFIC OUTCOME 4

Make final diagnosis.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

22

Complete feasibility and commissioning reports

SAQA US ID	UNIT STANDARD TITLE		
12488	Complete feasibility and commissioning reports		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION	SUBFIELD DESCRIPTION		
Manufacturing, Engineering and Technology	Manufacturing and Assembly		
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-3-SGB ARV	Regular	Level 3	3

Specific Outcomes:

SPECIFIC OUTCOME 1

Demonstrate an understanding of the basic concepts used in the workplace when generating reports.

SPECIFIC OUTCOME 2

Identify three different types of reports required in the work-environment and the type of informati

SPECIFIC OUTCOME 3

Arrange information in such a way that the report is logical, easy to understand and applicable for



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

23

Demonstrate knowledge of the OHS Act as it affects experienced workers in the air conditioning, refrigeration and ventilation industries

SAQA US ID	UNIT STANDARD TITLE		
116719	Demonstrate knowledge of the OHS Act as it affects experienced workers in the air conditioning, refrigeration and ventilation industries		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	3

Specific Outcomes:**SPECIFIC OUTCOME 1**

Demonstrate understanding of section 9 of the OHS ACT.

SPECIFIC OUTCOME 2

Demonstrate understanding of section 15 of the OHS ACT.

SPECIFIC OUTCOME 3

Demonstrate understanding of section 24 of the OHS ACT.

SPECIFIC OUTCOME 4

Demonstrate understanding of the applicable sections of the "general safety regulations".



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

24

Demonstrate knowledge of the OHS Act as it applies to employees in the air-conditioning, refrigeration and ventilation industries

SAQA US ID	UNIT STANDARD TITLE		
116223	Demonstrate knowledge of the OHS Act as it applies to employees in the air-conditioning, refrigeration and ventilation industries		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION	SUBFIELD DESCRIPTION		
Manufacturing, Engineering and Technology	Manufacturing and Assembly		
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB ARV	Regular	Level 3	3

Specific Outcomes:

SPECIFIC OUTCOME 1

State the objectives of the OSH Act and explain the definitions.

SPECIFIC OUTCOME 2

Demonstrate understanding of section 8 of the Occupational Health and Safety Act.

SPECIFIC OUTCOME 3

Demonstrate understanding of section 13 of the Occupational Health and Safety Act.

SPECIFIC OUTCOME 4

Demonstrate understanding of section 14 of the Occupational Health and Safety Act.



Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY**UNIT STANDARD:**

25

Determine the properties of air from a psychrometric chart and carry out basic calculation involving heat and mass transfer

SAQA US ID	UNIT STANDARD TITLE		
116695	Determine the properties of air from a psychrometric chart and carry out basic calculation involving heat and mass transfer		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION	SUBFIELD DESCRIPTION		
Manufacturing, Engineering and Technology	Manufacturing and Assembly		
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	7

Specific Outcomes:**SPECIFIC OUTCOME 1**

Define "Psychrometrics", name and define the properties of air and plot an air condition on the psych

SPECIFIC OUTCOME 2

Calculate the amount of sensible heat (in kilowatt) added to or removed from the air by means of the

SPECIFIC OUTCOME 3

Calculate the amount of sensible heat and latent heat and the total heat removed (in kilowatt) add

SPECIFIC OUTCOME 4

Calculate the amount of moisture added to or removed from the air.

SPECIFIC OUTCOME 5

Calculate the amount of chilled water required for a cooling or heating application.

SPECIFIC OUTCOME 6

Calculate the amount of heat (in kilowatt) required to produce saturated steam.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

26

Determine, define and evaluate operating parameters of a refrigeration system

SAQA US ID	UNIT STANDARD TITLE		
116699	Determine, define and evaluate operating parameters of a refrigeration system		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION	SUBFIELD DESCRIPTION		
Manufacturing, Engineering and Technology	Manufacturing and Assembly		
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	5

Specific Outcomes:

SPECIFIC OUTCOME 1

Measure or determine and define the operating parameters of refrigeration systems.

SPECIFIC OUTCOME 2

Compare the observations with the design parameters for the plant or with normally expected operation.

SPECIFIC OUTCOME 3

Operate the valves in a typical refrigeration system.

SPECIFIC OUTCOME 4

Explain commonly used terms for operating parameters of refrigeration systems.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

27

Diagnose and repair air-conditioners in vehicles

SAQA US ID	UNIT STANDARD TITLE		
116708	Diagnose and repair air-conditioners in vehicles		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	4

Specific Outcomes:**SPECIFIC OUTCOME 1**

Diagnose air conditioners in vehicles.

SPECIFIC OUTCOME 2

Repair fault in air-conditioners in vehicles.

SPECIFIC OUTCOME 3

Test air conditioners in vehicles.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

28

Dismantle and assemble air conditioning and refrigeration equipment

SAQA US ID	UNIT STANDARD TITLE		
116712	Dismantle and assemble air conditioning and refrigeration equipment		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	6

Specific Outcomes:

SPECIFIC OUTCOME 1

State the purpose of dismantling and assembly.

SPECIFIC OUTCOME 2

Plan the dismantling and assembly operation.

SPECIFIC OUTCOME 3

Carry out dismantling and assembly activities.

SPECIFIC OUTCOME 4

Post-assembly activities.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

29

Explain the operation of the components and the associated controls, safety devices and defrost systems

SAQA US ID	UNIT STANDARD TITLE		
116709	Explain the operation of the components and the associated controls, safety devices and defrost systems		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	10

Specific Outcomes:**SPECIFIC OUTCOME 1**

Explain the differences in operation between the basic and the actual vapour compression refrigeration systems.

SPECIFIC OUTCOME 2

Compare and discuss the various types of vapour compression refrigeration systems.

SPECIFIC OUTCOME 3

Explain the effect of actual operating conditions on the performance of the various components in the system.

SPECIFIC OUTCOME 4

List, identify and state the purpose of refrigerant control devices.

SPECIFIC OUTCOME 5

Explain the operation of refrigerant control devices.

SPECIFIC OUTCOME 6

List the commonly applied controls and safety devices for refrigeration plants and explain their purpose.

SPECIFIC OUTCOME 7

Identify refrigeration plant controls and safety devices.

SPECIFIC OUTCOME 8

List the commonly used defrost systems and explain their purpose and operation.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

30

Fault find an air-conditioning, refrigeration or ventilation plant stoppage or failure

SAQA US ID	UNIT STANDARD TITLE		
116697	Fault find an air-conditioning, refrigeration or ventilation plant stoppage or failure		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION	SUBFIELD DESCRIPTION		
Manufacturing, Engineering and Technology	Manufacturing and Assembly		
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	5

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare for the task of faultfinding a plant.

SPECIFIC OUTCOME 2

Establish possible electrical faults causing the plant stoppage.

SPECIFIC OUTCOME 3

Establish possible control faults causing the plant stoppage.

SPECIFIC OUTCOME 4

Establish possible mechanical faults causing the plant stoppage.

SPECIFIC OUTCOME 5

Report back to supervisor or client.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

31

Fault find, repair and maintain AC motors, circuitry and controls as applied to air conditioning, refrigeration and ventilation installations

SAQA US ID	UNIT STANDARD TITLE		
116463	Fault find, repair and maintain AC motors, circuitry and controls as applied to air conditioning, refrigeration and ventilation installations		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION	SUBFIELD DESCRIPTION		
Manufacturing, Engineering and Technology	Manufacturing and Assembly		
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB ARV	Regular	Level 3	8

Specific Outcomes:

SPECIFIC OUTCOME 1

Plan to maintain electric motors, circuitry and controls.

SPECIFIC OUTCOME 2

Prepare to maintain electric motors, circuitry and controls.

SPECIFIC OUTCOME 3

Maintain AC motors, circuitry and controls.

SPECIFIC OUTCOME 4

Identify and repair faults on AC motors, circuitry and controls.

SPECIFIC OUTCOME 5

Replace any and all faulty components.

SPECIFIC OUTCOME 6

Complete the work task.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

32

Handle and place in position equipment used within the air-conditioning, refrigeration and ventilation industries

SAQA US ID	UNIT STANDARD TITLE		
116701	Handle and place in position equipment used within the air-conditioning, refrigeration and ventilation industries		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	4

Specific Outcomes:

SPECIFIC OUTCOME 1

Plan the moving or lifting of heavy equipment.

SPECIFIC OUTCOME 2

Prepare to move or lift heavy equipment.

SPECIFIC OUTCOME 3

Prepare the equipment to be moved or lifted.

SPECIFIC OUTCOME 4

Move or lift heavy equipment.

SPECIFIC OUTCOME 5

Provide information to a rigger to enable him to rig safely and without damage.

SPECIFIC OUTCOME 6

Complete the moving or rigging operation.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

33

Identify and apply insulation methods and materials for piping and flat surfaces as applicable to air-conditioning and refrigeration systems

SAQA US ID	UNIT STANDARD TITLE		
116707	Identify and apply insulation methods and materials for piping and flat surfaces as applicable to air-conditioning and refrigeration systems		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	8

Specific Outcomes:

SPECIFIC OUTCOME 1

Identify insulation methods and materials used for piping and flat surfaces.

SPECIFIC OUTCOME 2

Explain properties and applications of different materials.

SPECIFIC OUTCOME 3

Plan application of insulation and vapour barrier.

SPECIFIC OUTCOME 4

Apply insulation and vapour barrier material to piping and flat surfaces.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

34

Identify and commission modulating control systems as used in air conditioning and refrigeration systems

SAQA US ID	UNIT STANDARD TITLE		
116465	Identify and commission modulating control systems as used in air conditioning and refrigeration systems		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	6

Specific Outcomes:

SPECIFIC OUTCOME 1

List and discuss the types of modulating control systems and explain their function and operation.

SPECIFIC OUTCOME 2

State and describe the three categories of control devices used on air conditioning and refrigeration systems.

SPECIFIC OUTCOME 3

List the commonly used types of sensors and describe their application.

SPECIFIC OUTCOME 4

Connect and commission modulating control devices.

SPECIFIC OUTCOME 5

Commission modulating control systems.

SPECIFIC OUTCOME 6

Check system operating parameters.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

35

Identify water reticulation systems, its components, accessories and controls used in air-conditioning and refrigeration installations

SAQA US ID	UNIT STANDARD TITLE		
116718	Identify water reticulation systems, its components, accessories and controls used in air-conditioning and refrigeration installations		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	4

Specific Outcomes:**SPECIFIC OUTCOME 1**

Identify and state the purpose of various water reticulation systems.

SPECIFIC OUTCOME 2

Identify and state the purpose of the various components and accessories used in water piping system

SPECIFIC OUTCOME 3

Identify and state purpose of control of water flow in water piping systems.

SPECIFIC OUTCOME 4

Sketch and describe the layout and installation of the various water piping systems.



Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

36

Identify, handle and sample refrigeration oils for analysis, and demonstrate how oil can indicate the general condition of a refrigeration system

SAQA US ID	UNIT STANDARD TITLE		
116702	Identify, handle and sample refrigeration oils for analysis, and demonstrate how oil can indicate the general condition of a refrigeration system		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION	SUBFIELD DESCRIPTION		
Manufacturing, Engineering and Technology	Engineering and Related Design		
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB ARV	Regular	Level 3	2

Specific Outcomes:

SPECIFIC OUTCOME 1

Identify refrigeration oils.

SPECIFIC OUTCOME 2

List and explain the precautions to take when handling and storing new refrigeration oil to prevent

SPECIFIC OUTCOME 3

Demonstrate the handling and storing of refrigeration oil to prevent it from becoming contaminated a

SPECIFIC OUTCOME 4

Assess and report on the general condition of the refrigeration system from observing the oil in the

SPECIFIC OUTCOME 5

Demonstrate how to obtain an oil sample for analysis.



Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY**UNIT STANDARD:****37**

Identify, use and maintain power tools used in the air-conditioning, refrigeration and ventilation trades

SAQA US ID	UNIT STANDARD TITLE		
116696	Identify, use and maintain power tools used in the air-conditioning, refrigeration and ventilation trades		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION	SUBFIELD DESCRIPTION		
Manufacturing, Engineering and Technology	Manufacturing and Assembly		
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	8

Specific Outcomes:**SPECIFIC OUTCOME 1**

Identify power tools used in the air conditioning, refrigeration and ventilation trades.

SPECIFIC OUTCOME 2

Use power tools.

SPECIFIC OUTCOME 3

Maintain power tools.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

38

Inspect and maintain electrical control panels and circuitry as used for air-conditioning, refrigeration and ventilation installations

SAQA US ID	UNIT STANDARD TITLE		
116466	Inspect and maintain electrical control panels and circuitry as used for air-conditioning, refrigeration and ventilation installations		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	6

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare to inspect and maintain electrical panels.

SPECIFIC OUTCOME 2

Inspect and maintain electrical control panel.

SPECIFIC OUTCOME 3

Inspect and maintain electrical circuitry in electrical control panels.

SPECIFIC OUTCOME 4

Conclude the inspection and maintenance of electrical panels.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

39

Install and service power transmission systems for air-conditioning, refrigeration and ventilation equipment

SAQA US ID	UNIT STANDARD TITLE		
116713	Install and service power transmission systems for air-conditioning, refrigeration and ventilation equipment		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	6

Specific Outcomes:**SPECIFIC OUTCOME 1**

Install and align belt drives.

SPECIFIC OUTCOME 2

Install and align couplings.

SPECIFIC OUTCOME 3

Service belt and couplings drives.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

40

Install direct driven transport refrigeration systems

SAQA US ID	UNIT STANDARD TITLE		
116711	Install direct driven transport refrigeration systems		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	6

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare to install the equipment.

SPECIFIC OUTCOME 2

Install the equipment.

SPECIFIC OUTCOME 3

Connect the unit electrically.

SPECIFIC OUTCOME 4

Carry out post-installation work.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

41

Install eutectic and multi compartment transport refrigeration systems

SAQA US ID	UNIT STANDARD TITLE		
116716	Install eutectic and multi compartment transport refrigeration systems		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	6

Specific Outcomes:**SPECIFIC OUTCOME 1**

Explain and discuss the operation of the eutectic refrigeration system as applied to transport refri

SPECIFIC OUTCOME 2

Prepare to install the equipment.

SPECIFIC OUTCOME 3

Install the equipment.

SPECIFIC OUTCOME 4

Test the unit for operation.

SPECIFIC OUTCOME 5

Carry out post-installation work.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

42

Interpret air-conditioning, refrigeration and ventilation plant layout and component drawings, sketches and specifications

SAQA US ID	UNIT STANDARD TITLE		
116717	Interpret air-conditioning, refrigeration and ventilation plant layout and component drawings, sketches and specifications		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	6

Specific Outcomes:

SPECIFIC OUTCOME 1

State the purpose of technical drawings and specifications.

SPECIFIC OUTCOME 2

List the methods of communicating technical information on drawings and in specifications.

SPECIFIC OUTCOME 3

Interpret technical drawing.

SPECIFIC OUTCOME 4

Identify components and manufacturing/assembly procedures from drawings.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

43

Join and install refrigerant piping

SAQA US ID	UNIT STANDARD TITLE		
116229	Join and install refrigerant piping		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION	SUBFIELD DESCRIPTION		
Manufacturing, Engineering and Technology	Manufacturing and Assembly		
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	9

Specific Outcomes:**SPECIFIC OUTCOME 1**

Prepare to install refrigerant piping.

SPECIFIC OUTCOME 2

Plan the installation of refrigerant piping.

SPECIFIC OUTCOME 3

Prepare to install refrigerant piping.

SPECIFIC OUTCOME 4

Form brazed joints.

SPECIFIC OUTCOME 5

Form non-brazed joints.

SPECIFIC OUTCOME 6

Install piping and accessories.

SPECIFIC OUTCOME 7

Test installation for leaks.

SPECIFIC OUTCOME 8

Clear site and hand over the installation.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

44

Lead a team, plan, allocate and assess their work

SAQA US ID	UNIT STANDARD TITLE		
116714	Lead a team, plan, allocate and assess their work		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION	SUBFIELD DESCRIPTION		
Manufacturing, Engineering and Technology	Manufacturing and Assembly		
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	4

Specific Outcomes:

SPECIFIC OUTCOME 1

Plan the work activities of a team.

SPECIFIC OUTCOME 2

Assess and report on team member performance and issues within the team.

SPECIFIC OUTCOME 3

Allocate work to team members.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

45

List the commonly applied air-conditioning systems, state their application and explain their operation

SAQA US ID	UNIT STANDARD TITLE		
116710	List the commonly applied air-conditioning systems, state their application and explain their operation		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	8

Specific Outcomes:

SPECIFIC OUTCOME 1

Define air-conditioning, explain its function and name and describe the commonly applied types of ai

SPECIFIC OUTCOME 2

Name the commonly applied categories of air conditioning systems and sub systems, explain their oper

SPECIFIC OUTCOME 3

Explain the operation and control of the economy cycle as applied to the all-air systems of air-cond



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

46

Maintain safety in the handling group 1 and 2 refrigerants

SAQA US ID	UNIT STANDARD TITLE		
116700	Maintain safety in the handling group 1 and 2 refrigerants		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION	SUBFIELD DESCRIPTION		
Manufacturing, Engineering and Technology	Manufacturing and Assembly		
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	9

Specific Outcomes:

SPECIFIC OUTCOME 1

Transfer refrigerant from a container to a service cylinder or a dial-a-charge.

SPECIFIC OUTCOME 2

Recover refrigerant from a charged system and transfer it into a service cylinder.

SPECIFIC OUTCOME 3

Leak test a system.

SPECIFIC OUTCOME 4

Evacuate a system.

SPECIFIC OUTCOME 5

Charge an evacuated system with refrigerant.

SPECIFIC OUTCOME 6

Handle, check and store recovered compressor oil and refrigerant.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

47

Maintain safety in the handling of ammonia refrigerant

SAQA US ID	UNIT STANDARD TITLE		
116704	Maintain safety in the handling of ammonia refrigerant		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	9

Specific Outcomes:**SPECIFIC OUTCOME 1**

Explain and discuss the use of ammonia in refrigerating systems.

SPECIFIC OUTCOME 2

Identify safe procedures in the handling of ammonia.

SPECIFIC OUTCOME 3

Practice safe procedures in the handling of ammonia.

SPECIFIC OUTCOME 4

Charge a system with ammonia refrigerant.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

48

Operate water treatment systems used in air-conditioning and refrigeration installations

SAQA US ID	UNIT STANDARD TITLE		
116706	Operate water treatment systems used in air-conditioning and refrigeration installations		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION	SUBFIELD DESCRIPTION		
Manufacturing, Engineering and Technology	Manufacturing and Assembly		
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	3

Specific Outcomes:

SPECIFIC OUTCOME 1

Explain the reasons for water treatment.

SPECIFIC OUTCOME 2

Explain the effect of non-treatment of the water.

SPECIFIC OUTCOME 3

Obtain water samples from each of the circuits.

SPECIFIC OUTCOME 4

Explain and demonstrate the safety precautions to take and the personal protective equipment (PPE) to

SPECIFIC OUTCOME 5

Dose each circuit with the correct chemical(s) and in the amount prescribed in the analyst's report.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

49

Remove, install and service bearings used on air-conditioning, refrigeration and ventilation equipment

SAQA US ID	UNIT STANDARD TITLE		
116715	Remove, install and service bearings used on air-conditioning, refrigeration and ventilation equipment		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	6

Specific Outcomes:**SPECIFIC OUTCOME 1**

State the principle of operation and identify the various types of bearings.

SPECIFIC OUTCOME 2

State and explain typical applications of the various types of bearings.

SPECIFIC OUTCOME 3

State the purpose of removing, installing and servicing bearings.

SPECIFIC OUTCOME 4

Carry out removal, installation and servicing of bearings.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

50

Show understanding of diversity in the workplace

SAQA US ID	UNIT STANDARD TITLE		
116720	Show understanding of diversity in the workplace		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION	SUBFIELD DESCRIPTION		
Manufacturing, Engineering and Technology	Manufacturing and Assembly		
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	3

Specific Outcomes:

SPECIFIC OUTCOME 1

Demonstrate an understanding of cultural and other differences in the workplace.

SPECIFIC OUTCOME 2

List and understand the concept stereotypes in the workplace.

SPECIFIC OUTCOME 3

Demonstrate a basic understanding of the role of change in the workplace.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

51

Sketch and construct three-phase circuits as used in air-conditioning, refrigeration and ventilation installations

SAQA US ID	UNIT STANDARD TITLE		
116464	Sketch and construct three-phase circuits as used in air-conditioning, refrigeration and ventilation installations		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	8

Specific Outcomes:

SPECIFIC OUTCOME 1

Identify symbols, components and loads.

SPECIFIC OUTCOME 2

Sketch and interpret typical basic three-phase circuit diagrams.

SPECIFIC OUTCOME 3

Construct typical basic three-phase circuit diagrams.

SPECIFIC OUTCOME 4

Convert any electrical line diagram to a drawing complying with international standards.

SPECIFIC OUTCOME 5

Complete the task.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

52

Supply and fit air conditioners to vehicles

SAQA US ID		UNIT STANDARD TITLE	
116705		Supply and fit air conditioners to vehicles	
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 3	3

Specific Outcomes:

SPECIFIC OUTCOME 1

Select air-conditioning kit.

SPECIFIC OUTCOME 2

Fit air-conditioning kit to vehicle.

SPECIFIC OUTCOME 3

Charge system.

SPECIFIC OUTCOME 4

Test installation.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

53

Commission air-conditioning and ventilation systems

SAQA US ID	UNIT STANDARD TITLE		
116375	Commission air-conditioning and ventilation systems		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 4	8

Specific Outcomes:**SPECIFIC OUTCOME 1**

Plan and organise the commissioning of the air-conditioning plant

SPECIFIC OUTCOME 2

Carry out pre-start up checks.

SPECIFIC OUTCOME 3

Set plant in operation.

SPECIFIC OUTCOME 4

Check and verify operation of plant.

SPECIFIC OUTCOME 5

Hand over plant and complete commissioning documentation.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

54

Commission and maintain transport refrigeration systems

SAQA US ID	UNIT STANDARD TITLE		
116396	Commission and maintain transport refrigeration systems		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION	SUBFIELD DESCRIPTION		
Manufacturing, Engineering and Technology	Manufacturing and Assembly		
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 4	8

Specific Outcomes:

SPECIFIC OUTCOME 1

Plan the commissioning of a transport refrigeration system.

SPECIFIC OUTCOME 2

Organize the commissioning of a transport refrigeration system.

SPECIFIC OUTCOME 3

Commission a transport refrigeration system.

SPECIFIC OUTCOME 4

Observe and record all operating parameters.

SPECIFIC OUTCOME 5

Complete commissioning documentation.

SPECIFIC OUTCOME 6

Service a transport refrigeration system.

SPECIFIC OUTCOME 7

Check and explain the purpose and operation of a defrost system.

SPECIFIC OUTCOME 8

Set a transport refrigeration system in operation.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

55

Commission refrigeration systems

SAQA US ID	UNIT STANDARD TITLE		
116415	Commission refrigeration systems		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 4	8

Specific Outcomes:**SPECIFIC OUTCOME 1**

Plan and organise the commissioning of the refrigeration plant.

SPECIFIC OUTCOME 2

Carry out pre-start up checks.

SPECIFIC OUTCOME 3

Charge plant and confirm operation of systems.

SPECIFIC OUTCOME 4

Check and verify operation of plant.

SPECIFIC OUTCOME 5

Hand over plant and complete commissioning documentation.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

56

Demonstrate an understanding of logic controllers as used in air conditioning, refrigeration and ventilation applications

SAQA US ID	UNIT STANDARD TITLE		
116460	Demonstrate an understanding of logic controllers as used in air conditioning, refrigeration and ventilation applications		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 4	7

Specific Outcomes:

SPECIFIC OUTCOME 1

List and discuss the functions and applications of logic controllers.

SPECIFIC OUTCOME 2

Explain the purpose and application of pre-programmed logic controllers as fitted to air conditioning

SPECIFIC OUTCOME 3

Explain the purpose and application of programmable logic controllers as used in air conditioning, r

SPECIFIC OUTCOME 4

Demonstrate an understanding of the input/output peripherals for a programmable logic controller.

SPECIFIC OUTCOME 5

Demonstrate an understanding of field devices interfaced to programmable logic controllers.

SPECIFIC OUTCOME 6

Demonstrate an understanding of the processor in a logic controller.

SPECIFIC OUTCOME 7

Demonstrate an understanding of the programming terminal (the interface).



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

57

Demonstrate knowledge of the OHS Act applicable to technicians employed in the air-conditioning, refrigeration and ventilation industries

SAQA US ID	UNIT STANDARD TITLE		
116379	Demonstrate knowledge of the OHS Act applicable to technicians employed in the air-conditioning, refrigeration and ventilation industries		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 4	4

Specific Outcomes:

SPECIFIC OUTCOME 1

Interpret section 17 of the OHS ACT.

SPECIFIC OUTCOME 2

Interpret section 18 of the OHS ACT.

SPECIFIC OUTCOME 3

Interpret section 37 of the OHS ACT.

SPECIFIC OUTCOME 4

Interpret the applicable sections of the "driven machine regulations".

SPECIFIC OUTCOME 5

Interpret the applicable sections of the "electrical installation regulations".

SPECIFIC OUTCOME 6

Interpret the applicable sections of the "electrical machinery regulations".



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

58

Determine if refrigeration plants operating with a group 1 refrigerant conform to the regulations in SANS 10147

SAQA US ID	UNIT STANDARD TITLE		
116397	Determine if refrigeration plants operating with a group 1 refrigerant conform to the regulations in SANS 10147		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 4	8

Specific Outcomes:

SPECIFIC OUTCOME 1

Briefly describe the objectives and requirements of SANS 10147 (SABS 0147).

SPECIFIC OUTCOME 2

Name and briefly describe the different types of refrigeration systems listed in SANS 10147 (SABS 0147)

SPECIFIC OUTCOME 3

Define some of the definitions used in SANS 10147 (SABS 0147) and state the requirements for persons

SPECIFIC OUTCOME 4

List and discuss the regulations regarding pressure-relief devices, pressure limiting devices, pressure

SPECIFIC OUTCOME 5

List and discuss the regulations regarding machinery areas, plant rooms and cold rooms.

SPECIFIC OUTCOME 6

List and discuss the requirements regarding the operation, maintenance and the provision for service

SPECIFIC OUTCOME 7

List and discuss the regulations regarding charging, discharging or substituting refrigerants.

SPECIFIC OUTCOME 8

List and discuss the regulations regarding field tests on refrigerating systems.

SPECIFIC OUTCOME 9

Generate a report on an installation subject to SANS 10147 (SABS 0147) which states where the instal



Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY**UNIT STANDARD:**

59

Diagnose operational faults in refrigeration systems and take remedial action or propose corrective action

SAQA US ID	UNIT STANDARD TITLE		
116406	Diagnose operational faults in refrigeration systems and take remedial action or propose corrective action		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 4	6

Specific Outcomes:**SPECIFIC OUTCOME 1**

Establish the extent of the problem.

SPECIFIC OUTCOME 2

Diagnose the problem.

SPECIFIC OUTCOME 3

Demonstrate the use of trouble shooting procedures.

SPECIFIC OUTCOME 4

Faults are corrected if possible.

SPECIFIC OUTCOME 5

Correct faults or propose remedial action.



Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY**UNIT STANDARD:**

60

Explain function and operation of refrigeration circuits as applied to air-conditioning or refrigeration systems and select and explain the function of components, accessories and controls

SAQA US ID	UNIT STANDARD TITLE		
116418	Explain function and operation of refrigeration circuits as applied to air-conditioning or refrigeration systems and select and explain the function of components, accessories and controls		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION	SUBFIELD DESCRIPTION		
Manufacturing, Engineering and Technology	Manufacturing and Assembly		
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 4	8

Specific Outcomes:**SPECIFIC OUTCOME 1**

Explain the function and operation of various types of refrigeration systems.

SPECIFIC OUTCOME 2

Explain the function and principles of operation of various refrigeration system components and accessories.

SPECIFIC OUTCOME 3

Explain the function and operation of various refrigeration system controls.

SPECIFIC OUTCOME 4

Prepare for selecting components and accessories.

SPECIFIC OUTCOME 5

Select components and accessories.

SPECIFIC OUTCOME 6

Record results of selection of components and accessories.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

61

Explain the need for water treatment and the methods and equipment used

SAQA US ID	UNIT STANDARD TITLE		
116377	Explain the need for water treatment and the methods and equipment used		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 4	4

Specific Outcomes:**SPECIFIC OUTCOME 1**

Explain the long-term effects untreated water has on chilled water circuits and the consequent effect

SPECIFIC OUTCOME 2

Explain the long-term effects untreated water has on condenser water circuits and the consequent effect

SPECIFIC OUTCOME 3

Explain the long-term effects untreated water has on hot water circuits and the consequent effect on

SPECIFIC OUTCOME 4

Explain the long-term effects untreated spray water has on closed circuit water coolers or on evaporator

SPECIFIC OUTCOME 5

Describe what methods are available to counteract the adverse effects that untreated water has on the



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

62

List, define and discuss the characteristics of commonly used refrigerants used in the refrigeration industry

SAQA US ID	UNIT STANDARD TITLE		
116408	List, define and discuss the characteristics of commonly used refrigerants used in the refrigeration industry		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION	SUBFIELD DESCRIPTION		
Manufacturing, Engineering and Technology	Manufacturing and Assembly		
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 4	4

Specific Outcomes:

SPECIFIC OUTCOME 1

List the commonly used refrigerants and name and discuss their desirable and undesirable physical ch

SPECIFIC OUTCOME 2

Name and define the thermodynamic properties of commonly used refrigerants.

SPECIFIC OUTCOME 3

Plot the refrigeration cycle on the Pressure-Enthalpy diagram and determine the refrigerant properti

SPECIFIC OUTCOME 4

Motivate the selection of a refrigerant.

SPECIFIC OUTCOME 5

State and discuss typical applications for the commonly used refrigerants.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

63

Monitor an air-conditioning, refrigeration or ventilation system through the building management system

SAQA US ID	UNIT STANDARD TITLE		
116413	Monitor an air-conditioning, refrigeration or ventilation system through the building management system		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 4	8

Specific Outcomes:

SPECIFIC OUTCOME 1

Log on to and log off from the computerised BMS system.

SPECIFIC OUTCOME 2

Observe the system operating parameters.

SPECIFIC OUTCOME 3

Determine deviations from the normal design operating set points.

SPECIFIC OUTCOME 4

Identify undesirable or unsuitable operating parameters and trends.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

64

Plot air-conditioning processes on the psychrometric chart and determine plant operating parameters

SAQA US ID	UNIT STANDARD TITLE		
116411	Plot air-conditioning processes on the psychrometric chart and determine plant operating parameters		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION	SUBFIELD DESCRIPTION		
Manufacturing, Engineering and Technology	Manufacturing and Assembly		
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 4	7

Specific Outcomes:

SPECIFIC OUTCOME 1

Plot the processes occurring in the plants on the psychrometric chart.

SPECIFIC OUTCOME 2

Calculate the amount of sensible and latent heat added or removed.

SPECIFIC OUTCOME 3

Calculate the amount of moisture added or removed.

SPECIFIC OUTCOME 4

Calculate the air volume required for the various processes for a particular load.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

65

Repair and overhaul air-conditioning, refrigeration and ventilation equipment

SAQA US ID	UNIT STANDARD TITLE		
116421	Repair and overhaul air-conditioning, refrigeration and ventilation equipment		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 4	8

Specific Outcomes:

SPECIFIC OUTCOME 1

State the purpose of component overhaul and repair.

SPECIFIC OUTCOME 2

Plan the overhaul and repair operation.

SPECIFIC OUTCOME 3

Carry-out overhaul and repair activities.

SPECIFIC OUTCOME 4

Carry out post-repair and overhaul activities.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

66

Select control systems and instruments for air conditioning, refrigeration and ventilation plants, determine control parameters and draw control sequence and electrical wiring diagrams

SAQA US ID	UNIT STANDARD TITLE		
116458	Select control systems and instruments for air conditioning, refrigeration and ventilation plants, determine control parameters and draw control sequence and electrical wiring diagrams		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Air-conditioning Refrigeration and Ventilation	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 4	7

Specific Outcomes:

SPECIFIC OUTCOME 1

List, explain and discuss the principles of the different types of modulating control systems.

SPECIFIC OUTCOME 2

Interpret the operation of the plant to be controlled.

SPECIFIC OUTCOME 3

Select an appropriate control system.

SPECIFIC OUTCOME 4

Determine the control parameters for all control instruments.

SPECIFIC OUTCOME 5

Select the control instruments.

SPECIFIC OUTCOME 6

Draw the control sequence diagram.

SPECIFIC OUTCOME 7

Draw the wiring diagram for the plant.

SPECIFIC OUTCOME 8

Write the specification for the control system.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

67

Service a refrigeration system and set it in operation

SAQA US ID	UNIT STANDARD TITLE		
116403	Service a refrigeration system and set it in operation		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 4	8

Specific Outcomes:**SPECIFIC OUTCOME 1**

Service a refrigeration system.

SPECIFIC OUTCOME 2

Bench-set pressure switches.

SPECIFIC OUTCOME 3

Check and explain the purpose and operation of a defrost system.

SPECIFIC OUTCOME 4

Set a refrigeration system in operation.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

68

Supervise workers at levels 2 and 3

SAQA US ID		UNIT STANDARD TITLE	
116380		Supervise workers at levels 2 and 3	
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 4	6

Specific Outcomes:

SPECIFIC OUTCOME 1

Plan the work methods and organize resources with individuals and teams.

SPECIFIC OUTCOME 2

Update and achieve work objectives, delegate, control and organize individuals and teams.

SPECIFIC OUTCOME 3

Supervise and manage production, work and services of individuals and teams.

SPECIFIC OUTCOME 4

Evaluate performance of individuals and teams.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

69

Understand basic electrical and mechanical engineering principles as applicable to air conditioning, refrigeration and ventilation

SAQA US ID	UNIT STANDARD TITLE		
116461	Understand basic electrical and mechanical engineering principles as applicable to air conditioning, refrigeration and ventilation		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 4	9

Specific Outcomes:**SPECIFIC OUTCOME 1**

Explain and apply basic concepts of thermodynamics.

SPECIFIC OUTCOME 2

Explain and apply basic concepts of fluid mechanics.

SPECIFIC OUTCOME 3

Explain and apply basic electrical-magnetic fundamentals.

SPECIFIC OUTCOME 4

Explain and apply basic concepts of engineering mechanics and strength of materials.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

70

Understand, implement, maintain and monitor general quality standards within the air-conditioning, refrigeration and ventilation industries

SAQA US ID	UNIT STANDARD TITLE		
116392	Understand, implement, maintain and monitor general quality standards within the air-conditioning, refrigeration and ventilation industries		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 4	8

Specific Outcomes:

SPECIFIC OUTCOME 1

Understand the general quality standards as recommended by the ISO.

SPECIFIC OUTCOME 2

Implement the general quality standards as recommended by the ISO.

SPECIFIC OUTCOME 3

Maintain the general quality standards as recommended by the ISO.

SPECIFIC OUTCOME 4

Monitor the general quality standards as recommended by the ISO.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

71

Write a technical report

SAQA US ID	UNIT STANDARD TITLE		
116389	Write a technical report		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Air-conditioning Refrigeration and Ventilation		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB ARV	Regular	Level 4	4

Specific Outcomes:

SPECIFIC OUTCOME 1

Collect information for writing the report.

SPECIFIC OUTCOME 2

Plan the writing of the report.

SPECIFIC OUTCOME 3

Write the report.

SPECIFIC OUTCOME 4

Revise the report.

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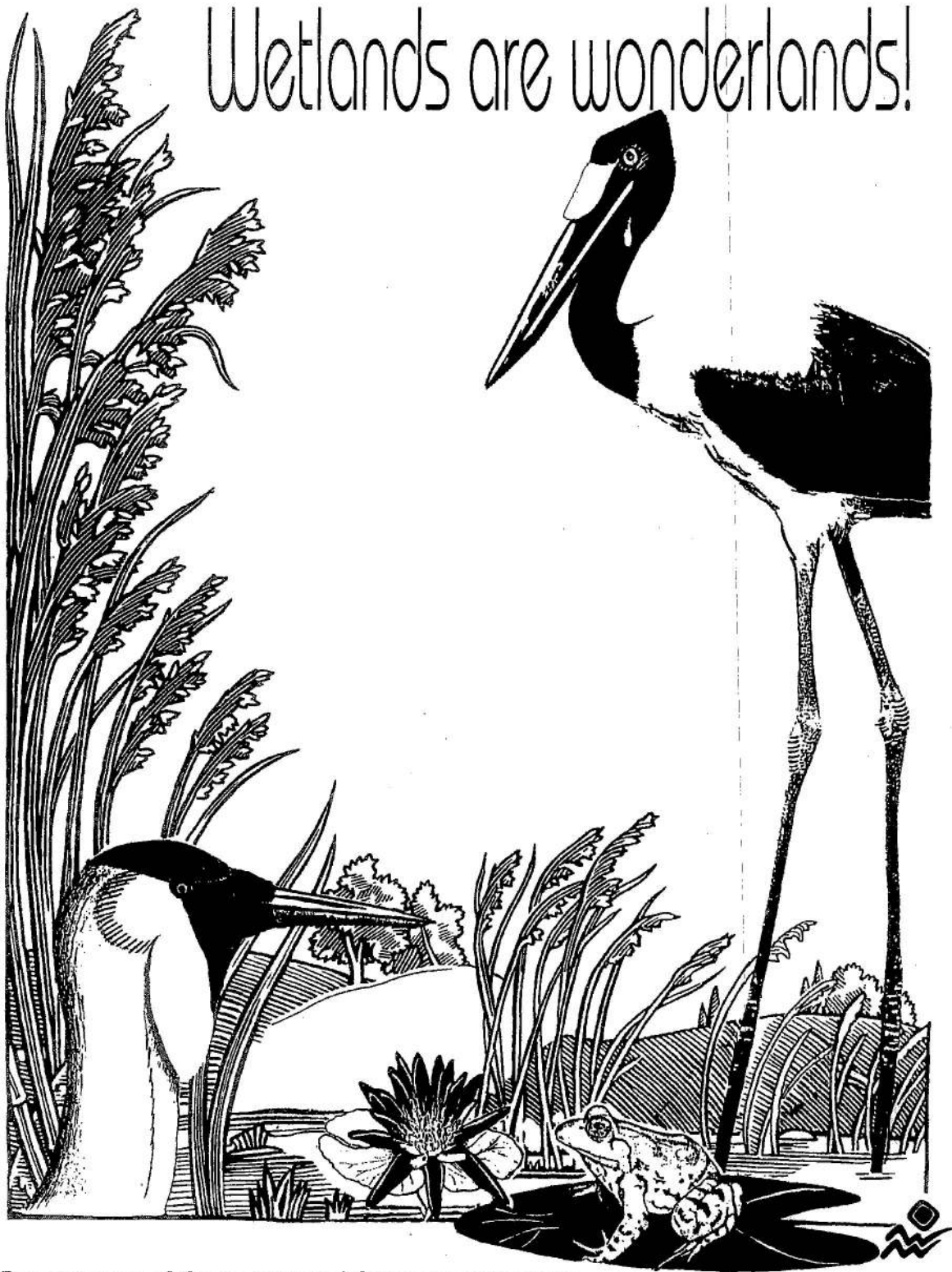
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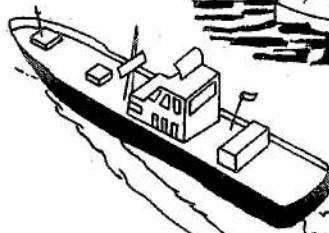
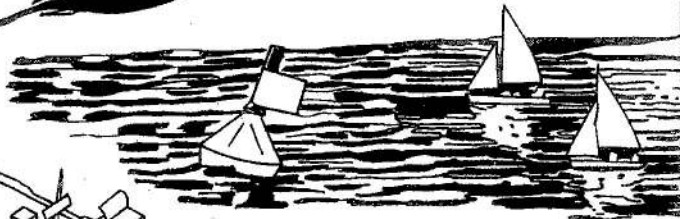
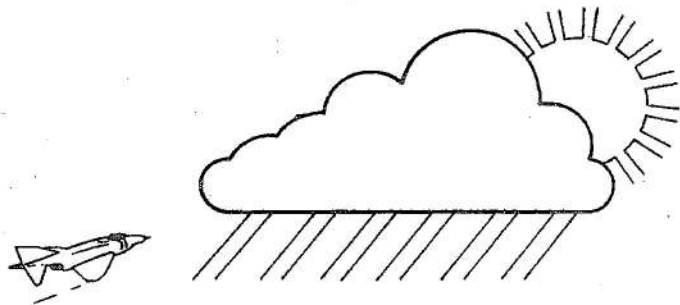
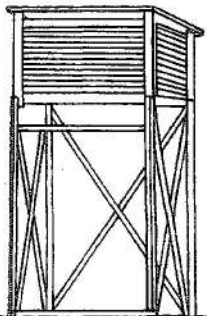
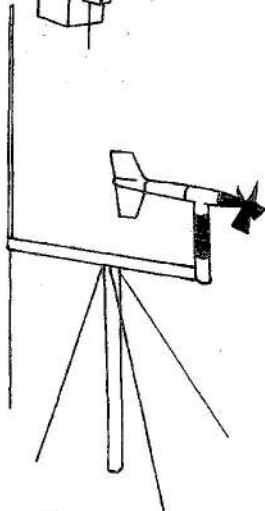
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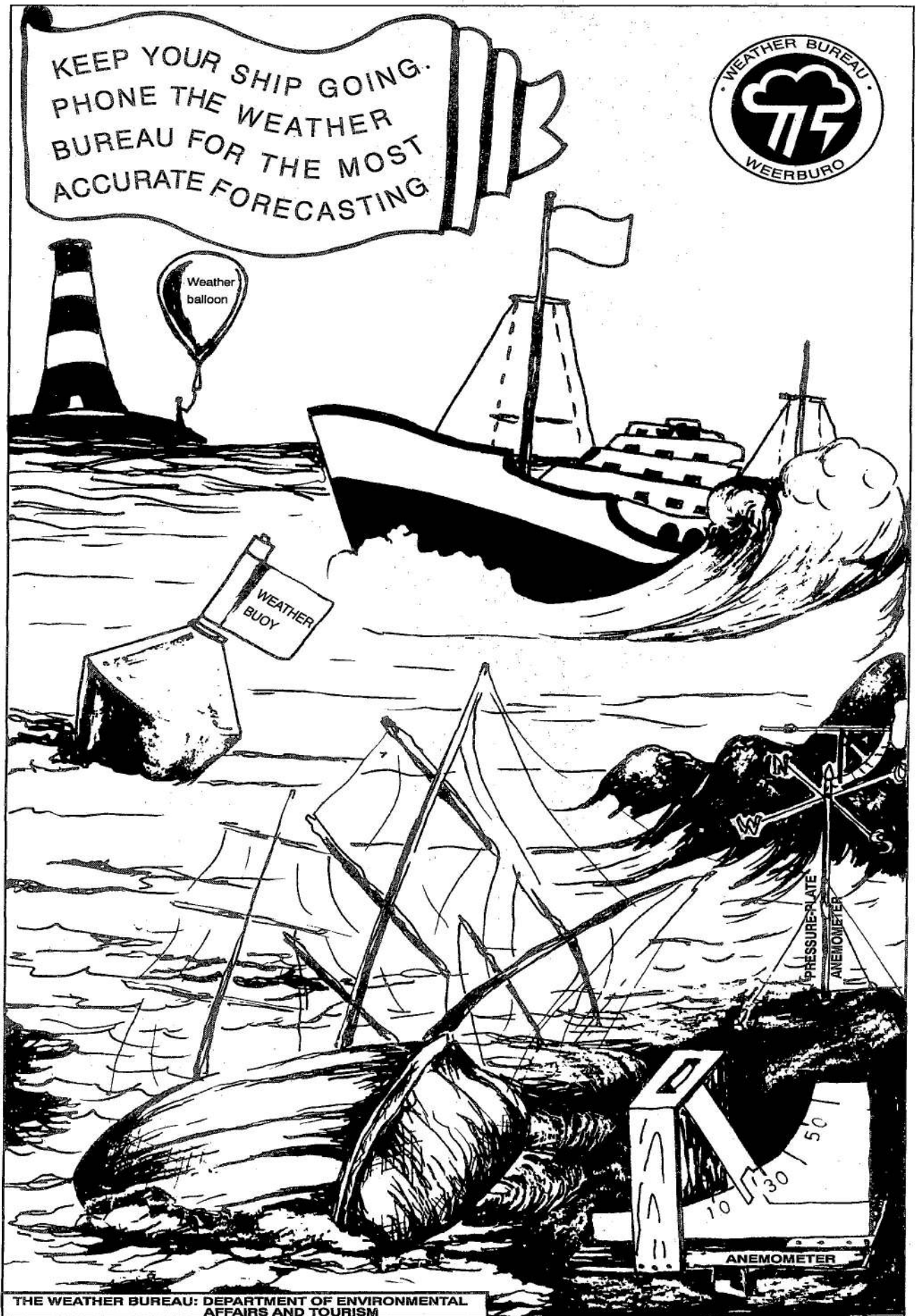
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