



**INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC SYSTEM FOR
CERTIFICATION TO STANDARDS RELATING TO EQUIPMENT FOR USE
IN EXPLOSIVE ATMOSPHERES (IECEx SYSTEM)**

**TITLE: IECEx Assessment Report for the acceptance of Mining And Surface
Certification CC (MASC), South Africa, to participate as an Accepted IECEx
Test Laboratory, ExTL, in the IECEx System, Equipment Scheme, 02,**

Circulation to: ExMC – IECEx Management Committee

INTRODUCTION

This document contains the IECEx Assessment Report for the acceptance of Mining And Surface Certification CC (MASC) South Africa, to become an Accepted IECEx Test Laboratory (ExTL) within the IECEx Equipment Scheme, 02.

The report is hereby submitted for voting by the ExMC.

Please consider the assessment report and return the completed voting form to the Secretariat by **2014 08 06**.

Your speedy response to the voting process will be very much appreciated.

Chris Agius

IECEx Secretariat

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IECEx ASSESSMENT REPORT FOR Mining And Surface Certification CC (MASC), Centurion 0157, South Africa (IECEx TEST LABORATORY, ExTL)

Type of Assessment: (please mark)

Initial assessment for Candidate ExTL **X**

Re-Assessment of ExTL

Scope Extension of ExTL

Surveillance Audit

1. OBJECT AND FIELD OF APPLICATION

1.1. *Country:*

South Africa

1.2. *Name of Candidate TL*

Mining And Surface Certification CC (MASC)
Unit #5, Lelyta Park, 45 Jurg Avenue, Hennospark Ext 87
Centurion, 0157
South Africa

1.3. *Members of the Assessment Team*

Heinz Berger – IECEx Officer - IECEx Lead Assessor
Vijay Varma – IECEx Expert Assessor

1.4. *Place and Date of Assessment*

Unit #5, Lelyta Park, 45 Jurg Avenue, Hennospark Ext 87
Centurion, 0157
South Africa

March 4th – 7th, 2014 (3.5 days)

1.5. *Assessment References*

- i) IECEx 02 Equipment Scheme Rules (current version)
- ii) IECEx OD 003 Assessment Procedures (current version)



- iii) IECEx OD 005-1, -2 and -3; Manufacturer Assessment (current version)
- iv) IECEx OD 009 Equipment Scheme Procedures(current version)
- v) IECEx OD 018 Checklist 17025(current version)
- vi) IECEx OD 024 Witness Testing/manufacturer and users Facility
- vii) ISO/IEC 17025:2005
- viii) IECEx Technical Guidance Documents (TGDs)
- ix) ExTAG decision sheets (DSs)
- x) OD's related to technical issues
- xi) ExTL application documents dated 13.12.2013

1.6. Scope of Application

Number	Title	Acceptance
60079-0 Edition(s) - 2011 Ed 6 - 2007 Ed 5	Explosive atmospheres - Part 0: Equipment - General requirements	YES
60079-1 Edition(s) - 2007 Ed 6 - 2003 Ed 5	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures 'd'	YES
60079-5 Edition(s) - 2007 Ed 3 - 1997 Ed 2	Explosive atmospheres - Part 5: Equipment protection by powder filling 'q'	YES
60079-7 Edition(s) - 2006 Ed 4 - 2001 Ed 3	Explosive atmospheres - Part 7: Equipment protection by increased safety 'e'	YES
60079-11 Edition(s) - 2011 Ed 6 - 2006 Ed 5	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety 'i'	YES
60079-15 Edition(s) - 2010 Ed 4 2005 Ed 3	Explosive atmospheres - Part 15: Equipment protection by type of protection 'n'	YES
60079-18 Edition(s) - 2009 Ed 3 - 2004 Ed 2	Electrical apparatus for explosive gas atmospheres - Part 18: Construction, test and marking of type of protection encapsulation 'm' electrical apparatus	YES
60079-25 Edition(s) - 2010 Ed 2 - 2003 Ed 1	Explosive atmospheres - Part 25: Intrinsically safe systems	YES



Number	Title	Acceptance
60079-26 Edition(s) - 2006 Ed 2 - 2004 Ed 1	Explosive atmospheres - Part 26: Equipment with equipment protection level (EPL) Ga	YES
60079-31 Edition(s) - 2013 Ed 2 - 2008 Ed 1	Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"	YES
61241-0 Edition(s) - 2004 Ed 1	Electrical apparatus for use in the presence of combustible dust - Part 0: General requirements	YES
61241-1 Edition 1 -2004	Electrical apparatus for use in the presence of combustible dust - Part 0: General requirements	YES
61241-11 Edition(s) - 2005 Ed 1	Electrical apparatus for use in the presence of combustible dust - Part 11: Protection by intrinsic safety 'iD'	YES
61241-18 Edition(s) - 2004 Ed 1	Electrical apparatus for use in the presence of combustible dust - Part 18: Protection by encapsulation 'mD'	YES

1.7. *Candidate TL Persons Interviewed*

Name	Position
Roelof Viljoen	Managing Member / Certification Authority
Francoius du Toit	Member
Terine Orsmond	Document Controller / Administrator

1.8. *Legal Entity of The Candidate TL*

Mining and Surface Certification CC (MASC) is a registered Corporation by the "Companies and Intellectual Property Commission" of South Africa. The Register No. is 2008/202081/23.

In addition MASC holds South African Department of Mineral Resources (DMR) and Department of Labour (DOL) approvals for the issuing of certificates and product certification.

All above mentioned documents were presented during the assessment and found to meet the requirements of the IECEx.

1.9. *Associated ExCB*

The ExCB is integral with the ExTL.



1.10. **Financial Support**

The individual applicants' fees fund MASC. This facility has been in existence since the year 2008 and intends to support the certification activities with funds from certification applicants and research and development. These funds will be adequate for covering all required activities to meet the procedures defined in the MASC Quality Manual.

1.11. **History**

Mining and Surface Certification (MASC) was founded more than 5 years ago as an Ex (Hazardous Locations) certification body, approved testing laboratory (ATL) and training provider specializing in Ex (explosion protection) equipment / installation certification and other hazardous locations services and support.

To date MASC has obtained SANAS Accreditation (T0444) (South African National Accreditation System) for the testing laboratory, as well as Department of Labour (DOL) and DMR (Department of Mineral Resources) approval for the Certification and Testing.

The primary standards applicable to Ex Equipment / Hazardous locations / Ex certification in South Africa are:

- SANS 10108: "The classification of hazardous locations and the selection of equipment for use in such locations."
- ARP 0108: "Regulatory requirements for explosion-protected equipment."

The members and personnel of MASC commit to professional conduct, effective and efficient test and assessment results, as well as a high level of quality in all activities.

Numerous projects are conducted / supported for the international markets, including ANZEx, ATEX and MSHA.

MASC has a BBBEE (Broad Based Black Economic Empowerment) level 4 rating.

2. ORGANISATION

2.1. Names, Titles and Experience of the Senior Executives

Name	Title	Experience
Roelof Viljoen	Managing Member	17 Years
Francoius du Toit	Member	8 Years

2.2. Name, Title and Experience of the Quality Management Representative

Name	Title	Experience
Roelof Viljoen	Managing Member / Quality Manager	17 Years
Terine Orsmond	Deputy Quality Manager	5 Years



2.3. Name and Title of Nominated Principal Contact

Name	Title	Comments
Roelof Viljoen	Managing Member	viljoenr@masc-ex.co.za

2.4. Employees

Name	Title	Experience in Ex
Andrew Dunckley	Technical / Quality	5.5 years
Gerrit Schepers	Technical	4.5 years
Adele Koekemoer	Administration	
Lee-Ann Truter	Administration	
Kim Bagarette	Administration	
Ronel Kotze	Financial	
Maryke Viljoen	Financial	

2.5. Organizational Structure

As of March 2014, the organization is changed as stated in the organization charts in **ANNEX 1**.

3. RESOURCES

The operation is well resourced with experienced staff and facilities in order to perform testing according to the scope of standards as indicated in clause 1.6 of this report.

The list below shows the subcontracted tests and mentions test equipment limitations.

Standard(s)	Clause(s) for Subcontract
60079 – 7	* 6.3.1 - Mechanical tests for screw lamp holders other than E10 (IEC 60068-2-42)
60079 – 15	* 22.7 - Test for screw lamp holders (IEC 60238) (IEC 60061) * 22.8 - Test for starter holders for luminaires (IEC 60400) * 22.9.2 - Moisture resistance, insulation and electric strength test (IEC 61347-1) * 22.9.3 - Cut-out device test
60079 – 1	* 14 – Motor temperature rise test / Locked rotor (Above 3kW)
60079 – 7	* 6.2 – Motor temperature rise test / Locked rotor (Above 3kW)
60079 – 0	* 26.10 - Resistance to light (ANSI / UL 746C) (ISO 4892-2)
60079 – 0	* (ISO 179) Charpy impact resistance strength
60079 – 7	* 4.4 - CTI (Comparative Tracking Index) test
60079 – 11	* 6.3 - CTI (Comparative Tracking Index) test
60079 – 15	* 6.4.4 - CTI (Comparative Tracking Index) test
60079 – 7	* 6.3.2.3 – Power dissipation of cathodes of lamps supplied by electronic ballasts. * 6.3.3 - Sulphur dioxide test for the connection of bi-pin lamp caps to lamp holders * 6.3.4 - Vibration test for luminaires with bi-pin lamps * 6.4 – Measuring instruments and instrument transformers
60079 – 7	* 6.3.4 – Vibration test for luminaires with bi-pin lamps (IEC 60068-2-6) * 6.6.3 - Battery - Shock test (IEC 60068-2-27)
60079 – 15	* 12.6.2 – Battery - Mechanical shock test (IEC 60068-2-27) * 22.11 – Battery - Mechanical shock test for batteries



Standard(s)	Clause(s) for Subcontract
60079-11	* 10.8 - Type test for diode safety barrier and safety shunts
60079-0	* 26.14 - Charging test (Measurement of capacitance)

4. DOCUMENTATION

4.1. Quality Manual

MASC Test Laboratory (MASC ExTL) operates a Quality Management System in accordance with ISO/IEC 17025:2005 "General requirements for the competence of testing and calibration laboratories"

4.2. Procedures

Procedures are described in TL QM chapters 4.1 to 4.15 and 5.1. to 5.10. Various procedures were reviewed and found to meet the requirements of the IECEx.

There are a range of quality and operation policy and procedures, and test laboratory procedures. There is also a range of technical decisions, procedures, work Instructions etc, and were found to be consistent with IECEx Rules and ODs

4.3. Work Instructions

Various work instructions are available (document # MASC W.I. 001 to MASC W.I. 033) covering the range of standard as required.

During the technical assessment a number of work instructions were reviewed and found to meet the requirements of the IECEx.

4.4. Records

Record are described in the MASC ExTL QM, clause 4.13. The procedures were checked during the assessment and found to meet the requirements of the IECEx.

Records are kept by the MASC Testing Laboratory in locked offices. Certification Body documents are kept separate from the Test Laboratory's records.

Records are maintained indefinitely (although formally a 10 year retention is stated, which will be revisited when 10 years are reached).

All documentation used in the review process and work documents / reports are kept as records.

Records are maintained per project file / project number as allocated for each project according to a project number register.

Disposition of records are done by shredding / reputable recycling company.

All essential records are in soft copy and form part of the back-up system.



4.5. Document Change Control

Document control is described in TL QM clause 4.3.

The management of the MASC Certification Manual, related procedures and forms is by way of maintaining a secure master copy in electronic form on the MASC computer system. Only originals that have been approved for issue by the MASC Certification Manager shall be placed on the computer network system.

Personnel accessibility is controlled by allocating rights to different files / folders, as applicable.

The document controller is responsible for ensuring that any possible remote offices / contractors have up to date copies of all documentation (as required) as well as ensuring that MASC documents are in line with latest IECEx Rules and ODs and that ExTAG Decision Sheets are taken into account .

Certification Manuals and Certification Procedures also include a document history that outlines the changes from the previous version.

4.6. Test Records

See records (4.4) above

5. TEST REPORTS

5.1. Test Reports Issued

Number of test reports issued by MASC according to South African rules in the preceding four years for each type of protection:

Standards	Title	Number of test reports				Total
		2010	2011	2012	2013	
60079-0	Explosive atmospheres - Part 0: Equipment - General requirements					Part 0 included in numbers below
60079-1	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures 'd'	15	20	32	45	112
60079-5	Explosive atmospheres - Part 5: Equipment protection by powder filling 'q'	1	2	1	2	6
60079-7	Explosive atmospheres - Part 7: Equipment protection by increased safety 'e'	5	5	10	3	23
60079-11	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety 'i'	35	46	32	25	138



Standards	Title	Number of test reports				
60079-15	Explosive atmospheres - Part 15: Equipment protection by type of protection 'n'	3	6	3	3	15
60079-18	Electrical apparatus for explosive gas atmospheres - Part 18: Construction, test and marking of type of protection encapsulation 'm' electrical apparatus	4	2	3	0	9
60079-25	Explosive atmospheres - Part 25: Intrinsically safe systems	Numerous to SANS 10086-1 standard				
60079-26	Explosive atmospheres - Part 26: Equipment with equipment protection level (EPL) Ga	2	2	2	3	9
60079-31	Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"	2	2	3	3	10
61241-0	Electrical apparatus for use in the presence of combustible dust - Part 0: General requirements					Part 0 included in numbers below
61241-1	Electrical apparatus for use in the presence of combustible dust - Part 1: Protection by enclosures 'tD'	3	2	1	-	6
61241-11	Electrical apparatus for use in the presence of combustible dust - Part 11: Protection by intrinsic safety 'iD'	No Certificates Issued				
61241-18	Electrical apparatus for use in the presence of combustible dust - Part 18: Protection by encapsulation 'mD'	No Certificates Issued				

6. CALIBRATION

The calibration database, a selection of calibration certificates as well as calibration tags on the equipment were reviewed during the assessment and found to meet the requirements of the IECEx. MASC calibrate some of the equipment in house and send others out to SANAS accredited calibration labs.

7. CONFIDENTIALITY

All personnel of MASC as well as contractors signed a Confidentiality, Impartiality, Disclosure and Conflict of Interest Statement as described in the Quality Management System (QMS).



All agreements were checked during the assessment and found to meet the requirements of the IECEx.

8. NATIONAL ACCREDITATION

MASC holds SANAS (South African National Accreditation System) Accreditation (T0444) as a Testing Laboratory according to ISO/IEC 17025. The scope of standards as in clause 1.6 of this report is fully covered by the SANAS accredited scope of standards. See **ANNEX 2** for the certificate.

9. RECOGNITION AND AGREEMENTS

- MASC is recognised by several bodies / schemes including:
 - ATEX (SIRA & CML)
 - ANZEx (TUV Rheinland Australia)
 - MSHA (USA)
 - IECEx (Staff of MASC in support role)
- SAFA (South African Flameproof Association) Member / Steering Committee.
- Working groups for standards writing - SABS (South African Bureau of Standards).
- National Committee for Explosion Protection (TC65)

10. INTERNAL AUDIT AND PERIODIC REVIEW

Up to date no internal audit was performed concerning IECEx. However, a full IECEx document review was conducted prior to this assessment. The internal audit schedule for 2014 covers the IECEx operations. Audits are scheduled to cover at least all aspects per annum.

MASC Certification Body management reviews cover MASC's quality system on an annual basis. MASC management follows a formal agenda to conduct this management review. Management review ensures continuing suitability and effectiveness in satisfying the requirements of MASC's stated quality policy and objectives and its effectiveness and its adherence to ISO/IEC 17065, ISO/IEC 17025 as well as certification schemes related issues. The last management review was held on 28.2.2014. The minutes were reviewed during the assessment and found to meet the requirements of the IECEx.

11. COMPLAINTS AND APPEALS (Including appeals to IECEx)

Complaints and appeals are described in the CB QM procedure CB_QMS-07, clause 7.13 and ExTL QM clause 4.8., procedure CB_QMS_SD-01. The procedure was reviewed during the assessment and found to meet the requirement of the IECEx.



12. SPECIAL FACTS TO BE NOTED

12.1. *Supporting Documentation*

Copies of additional supporting information for this assessment have been provided to the audited organization and the IECEx Secretariat. These include:

- Details of issues raised and how these have been resolved
- Checklist for ISO/IEC 17025
- Completed technical guidance notes (TGDs/TCDs)
- Photos of the facilities

12.2. **Tests Witnessed**

IEC 60079-0:

- a) 26.4.5: Degree of Protection (IP) by enclosures- Dust & water tests (IP54)
- b) 26.5.1: Temperature measurements of a luminaire
- c) 26.13: Surface resistance test of non-metallic parts

IEC 60079-1:

- a) 15.1.2: Determination of explosion pressure (reference pressure)- Group I
- b) 15.1.3: Overpressure test

IEC 60079-11:

- a) 10.1: Use of spark ignition apparatus
- b) 10.5.3: Surface temperature of cells & batteries

IEC 60079-31:

6.1.2: Thermal tests

13. COMMENTS (Including issues found during assessment)

The managing member of MASC, Mr. Roelof Viljoen, is familiar with the IECEx procedures since many years in his function as contractor for several IECEx Certification Bodies.

During the assessment some issues were found in the area of intrinsic safety, relating to measurement of creepage and clearance distances and the use of Gerber files. These were addressed and resolved to the satisfaction of the assessment team.

14. RECOMMENDATION

Based on the initial assessment performed from March 4th to 7th, 2014 the ExTL of Mining And Surface Certification CC (MASC) is recommended for acceptance in the IECEx Scheme as an IECEx Testing Laboratory (ExTL) according to the scope of the standards listed in this document.

Lead Assessor
Heinz Berger

Expert Assessor
Vijay Varma

Date: March 7th, 2014

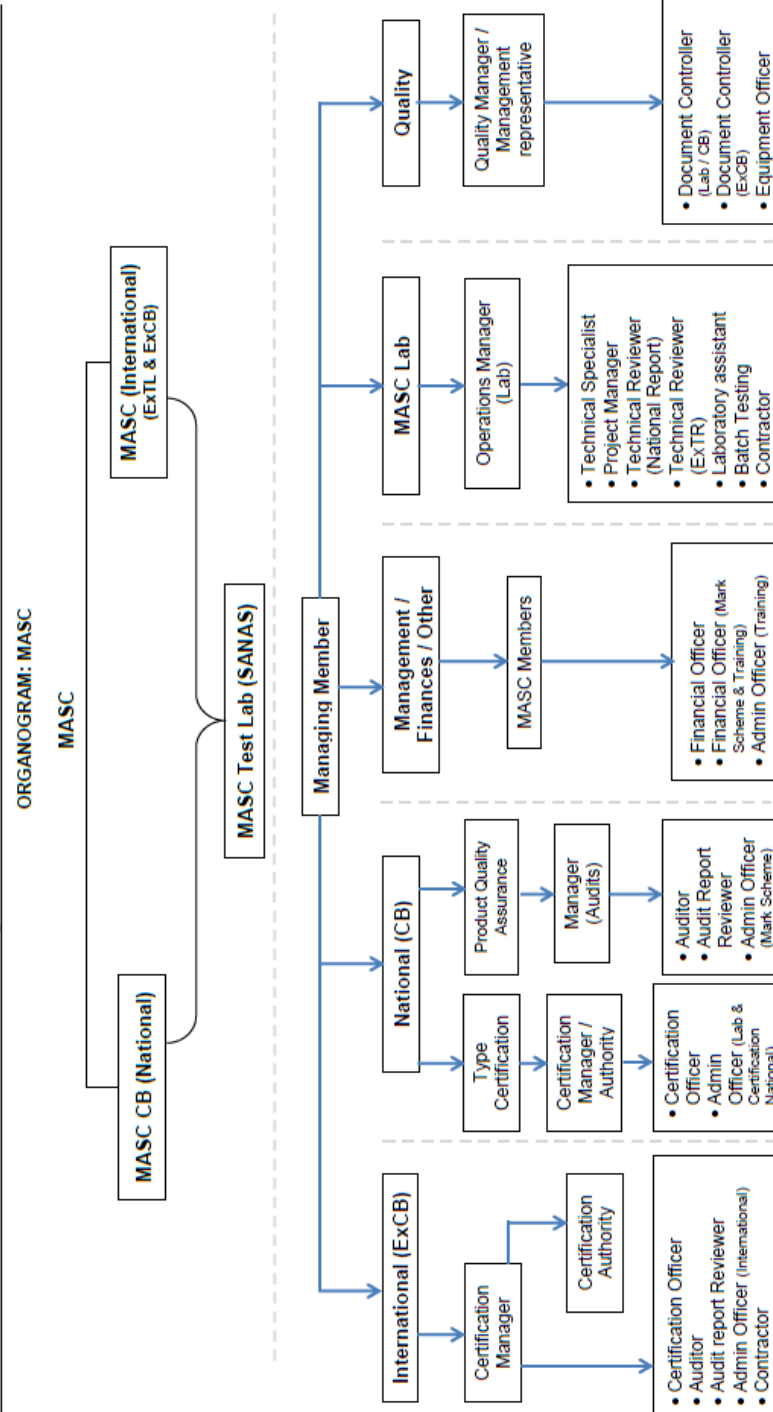


List of Annexes:

Annex 1: Organization Chart of ExCB and ExTL

Annex 2: SANAS Accreditation Certificate according to ISO/IEC 17025

Mining And Surface Certification



Note: * Responsibilities / authorities are defined in MASC Job Descriptions.

Legend: D = Deputy

Department	Functions	Personnel																									
		Roelof Viljoen	Deputy	Francois du Toit	Deputy	Maryke Viljoen	Deputy	Ronel Kotze	Deputy	Terne Orsmond	Deputy	Andrew Duncley	Deputy	Gerit Schepers	Deputy	Adele Koekemoer	Deputy	Kim Bagarette	Deputy	Lee-Ann Truter	Deputy	PJ van Oudshoorn	Deputy	David Walker	Deputy	Peter Collins	Deputy
Management / Finances / Other	MASC Managing Member	X				D																					
	MASC Members	X		X																							
	Financial officer				D	X																					
	Financial Officer (Markscheme & Training)						X			D								X									
	Administrative officer (Training)										D																
International Certification Body (ExCB):	Certification Manager	X				D																					
	Certification Authority	X				D																					
	Certification Officer	X		X																					X		
	Auditor	X		X																				X			
	Audit Report Reviewer	X		X																					X		
National Certification Body (CB):	Administrative officer (International)									D	X																
	Contractor																										
	Certification Manager / Authority			X																							
	Certification Officer	X		X																							
	Administrative officer (Lab & Certification National)											X						X		X							
Product Quality Assurance	Manager (Audits)	X				D												X									
	Auditor	X		X																							
	Audit Report Reviewer	X		X																							
	Administrative officer (Mark Scheme)									D	X											D					
MASC Lab	Operations Manager (Lab)			X																							
	Technical Specialist	X		X																				X		X	
	Project manager	X		X																				X		X	



Mining And Surface Certification

Department	Functions	Personnel	Rooft Viljoen	Deputy	Francois du Toit	Deputy	Maryke Viljoen	Deputy	Ronel Kotze	Deputy	Terine Ormond	Deputy	Andrew Duncley	Deputy	Gerrit Schepers	Adele Koekemoer	Deputy	Kim Bagarete	Deputy	Lee-Ann Tinter	Deputy	PJ van Oudshoorn	Deputy	David Walker	Deputy	Peter Collins	Deputy
	Technical reviewer (National Report)		X		X								X									X					
	Technical reviewer (ExTR)		X		X								X														
	Laboratory Assistant												X														
	Batch testing												X														
	Contractor																										
Quality	Quality Manager / Management representative		X																								
	Document Controller (Lab / CB))												X														
	Document Controller (ExCB)											X															
	Equipment officer																										



ANNEX 2



CERTIFICATE OF ACCREDITATION

In terms of section 22(2) (b) of the Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice Act, 2006 (Act 19 of 2006), read with sections 23(1), (2) and (3) of the said Act, I hereby certify that:-

MINING AND SURFACE CERTIFICATION CC
Co. reg no: 2008/202081/23

Facility Accreditation Number: **T0444**

is a South African National Accreditation System accredited Testing Laboratory
provided that all SANAS conditions and requirements are complied with

This certificate is valid as per the scope as stated in the accompanying schedule of accreditation,
Annexure "A", bearing the above accreditation number for

PERFORMANCE AND SAFETY TESTING

The facility is accredited in accordance with the recognised International Standard

ISO/IEC 17025:2005

*The accreditation demonstrates technical competency for a defined scope and the operation of a
laboratory quality management system*

While this certificate remains valid, the Accredited Facility named above is authorised to
use the relevant SANAS accreditation symbol to issue facility reports and/or certificates

Mr R Josias
Acting Chief Executive Officer

Effective Date: 22 February 2010
Certificate Expires: 22 February 2015