EXMC/583/CD
January 2010

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

Title: Special site assessment visit re Baseefa test facilities in India

Circulation to: ExMC – IECEx Management Committee

INTRODUCTION

During 2009 the IECEx Secretariat received an application from BASEEFA, GB, to enable them to conduct partial IECEx testing at a location in India, using testing facilities at Karandikar Laboratories. Karandikar Laboratories will operate under the control and direction of BASEEFA, GB, and will work using BASEEFA's procedures.

The IECEx Secretariat arranged for a special site assessment to be performed by an IECEx Lead Assessor. This special site assessment was treated as an extension of scope to include a new location, in India, for the Accepted ExTL BASEEFA, GB.

This document provides a report of the special site assessment visit and includes follow up activities. It is issued to ExMC for information and comment.

Should Members have any objections to the assessor's recommendation in Item 14 of the report, please contact the IECEx Secretariat by **19th February 2010 at –**

chris.agius@iecex.com

Chris Agius

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IECEx Secretariat

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IECEx ASSESSMENT REPORT FOR BASEEFA ExTL (IECEx TEST LABORATORY)

Type of Assessment: (please mark)

Scope Extension of ExTL **X**

1. OBJECT AND FIELD OF APPLICATION

1.1. ***Country:***
United Kingdom (India is the location for this scope extension)

1.2. ***Name of Candidate TL***

BASEEFA Ltd
Head of Office:
Rockhead Business Park
Staden Lane
Buxton
Derbyshire
SK 17 9RZ
UNITED KINGDOM

1.3. ***Members of the Assessment Team***
Jim Munro – Lead Assessor

1.4. ***Place and Date of Assessment***

9-11 February 2009

Karandikar Laboratories Pvt. Ltd.
Village Betegaon, Boisar – Chilhar Road,
Taluka : Palghar, Dist Thane. India

1.5. ***Assessment References***

i) IECEx 02 Third Edition 2006-11 IECEx Scheme rules of procedure
ii) IECEx Operational Document OD/003 IECEx Assessment procedures
iii) IECEx Operational Document OD/009 Issuing of CoCs, ExTRs and QARs
iv) ISO/IEC 17025:2005
v) IECEx Technical Guidance Documents (TGDs)
vi) ExTAG decision sheets (DSs)
vii) ExTL application request dated 29 January 2009

1.6. Scope of Application

The scope of the application covers additional Baseefa testing facilities located at Village Betegaon Boisar India physical testing as shown below, plus measurement of flamepaths of Ex d enclosures, which will be under the full control of Baseefa in Buxton UK.

Number	Title	Covered
60079-0 Edition 4 and 5	Explosive atmospheres - Part 0: Equipment - General requirement	The following tests: 1. 26.5.2 Thermal shock test 2. 26.6 Torque test for bushings 3. 26.4.2 Resistance to impact 4. 26.11 Resistance of plastics to chemicals (Group I) 5. 26.4.5 Degree of protection (IP) by enclosures 6. 26.5.1 Temperature measurement 7. 26.7 Non-metallic enclosures or non-metallic parts of enclosures
60079-1 Edition 5 and 6	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures “d”	1. 15.1 Tests of ability of enclosure to withstand pressure (including determination of explosion pressure and overpressure test) 2. 15.2 Test for non-transmission of an internal transmission 3. 19.3.1.3 Test of erosion by flame 4. 19.3.2 Flammability (Edition 5 only) 5. C.3.1 Hydraulic sealing test
61241-0 Edition 1	Electrical apparatus for use in the presence of combustible dust - Part 0: General requirements	As for 60079-0
61241-1 Edition 1 60079-31 Edition 1	Electrical apparatus for use in the presence of combustible dust - Part 1: Protection by enclosures "tD" Explosive Atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"	1. 8.2.1 Type tests for dust exclusion by enclosures 2. 6.2.1 Type tests for dust exclusion by enclosures

1.7. *Persons Interviewed at the ExTL*

Name	Position
Ron Sinclair	Managing Director, Baseefa Ltd, UK
Ajit Karandikar	CEO, Karandikar Laboratories Pvt. Ltd.

Name	Position
Ravindra Paranjpe	Operations Director
Ashok Abhyankar	Product Development
Atul Marathe	Sr laboratory engineer
Shishir Karandiar	Logistics / Project Manager

1.8. Legal Entity of The Candidate TL

Baseefa Ltd is a private limited company registered in the UK with all shares owned by staff.

Karandikar Laboratories Pvt. Ltd. have taken over the laboratory operations of M/s Karandikar & Associates, a proprietary SSI unit (Regd. No. # 112405438).

An agreement exists between Karandikar and Baseefa that enables Baseefa to establish additional test facilities at the Karandikar site. Baseefa procedures clearly state that ALL applications for testing MUST be submitted to the Baseefa Buxton Head Office site to enable Baseefa management to conduct contract review, allocate appropriate qualified persons and to maintain control over the entire project, including Baseefa Buxton deciding on the appropriate positions for both ignition and pressure measurement.

1.9. *Associated ExCB*

Baseefa Ltd.

1.10. *Financial Support*

Not covered for scope extension

1.11. History

The relationship between Baseefa and Karandikar Laboratories Pvt Ltd has developed over the past two years. Senior staff from Karandikar Laboratories has received training and assistance from Baseefa.

Throughout this development period, it has been clear that Karandikar Laboratories will be acting as the “directed hands” of Baseefa for all IECEx work, with all applications submitted to Baseefa Buxton and all testing directly controlled from that location.

2. ORGANISATION

See Annex 1 for the local organization of the operation in India. Procedures reviewed during the assessment show that the working with the Indian laboratory will be integrated with that in Buxton.

2.1. Names, Titles and Experience of the Senior Executives – UK

Name	Title	Experience
Ron Sinclair	Managing Director, Baseefa Ltd, UK	33 years in Ex

India

Name	Title	Experience
Ajit Karandikar	CEO	More than 35 years. Mainly in the field of R&D and Quality Assurance. Training in Ex related field for 2 weeks of which 1 week in Buxton and 1 in house at Boisar
Ravindra Paranjpe	Operations Director	More than 25 years Mainly in technical sales, marketing and management. Training in Ex related field for 2 weeks of which 1 week in Buxton and 1 in house at Boisar

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

Name	Title	Experience
Prakash Barave	Technical Manager	More than 40 years. Mainly related to quality Assurance. In charge of a Electronic / Magnetic material test laboratory for more than 25 years Responsible for matters related to technical aspects and quality assurance

2.3. Name and Title of Nominated Principal Contact

Name	Title	Comments
Ron Sinclair	Managing Director	As this is an extension of scope for Baseefa in the UK, the principle contact is with them.

2.4. Employees

The key staff are as follows:

Name	Title	Experience
Ashok Abhyankar	Product Development	More than 35 years. Mainly related to machine tools, machine development, automation and systems. Presently responsible for drawing / dimensional study, Product examination, preparation of sample for

Name	Title	Experience
		flame transmission tests
Atul Marathe	Sr laboratory engineer	Experience in Product developments in DC drives and. electronic instruments for 20 years
Shishir Karandiar	Logistics / Project Manager	Customer relations and liaisons. Erection and commissioning of flame lab at Boisar. Since past 2 years

There will also be a technician (Vikrant Raut) assisting with the testing.

Note that all the above have received training delivered by Baseefa following directly after the IECEx assessment visit. This related to the technical aspects of testing as well as the way in which such testing fits into IECEx Certification and how this is operated by Baseefa.

2.5. Organizational Structure

The organization structure for Karandikar Laboratories Pvt. Ltd. is shown in Annex 1.

The laboratory addresses of M/s Karandikar Laboratories Pvt. Ltd. are as follows :

Laboratory :
(Calibration)

Karandikar Laboratories Pvt. Ltd.,
H.No.250, Main Road, Near Jain Temple,
Dahanu, Dist : Thane. PIN : 401 601.

Laboratory :
(Testing) :

Karandikar Laboratories Pvt. Ltd.,
Village Betegaon, Boisar – Chilhar Road,
Taluka : Palghar, Dist Thane.

All testing carried out as part of the extension of Baseefa scope is handled at Karandikar under the supervision of an allocated engineer at Buxton. The Karandikar laboratory uses some test equipment calibrated at Dahanu under calibration accreditation from NABL.

3. RESOURCES

The Baseefa operation in the UK is a well resourced and capable operation that has been an accepted ExCB and ExTL for over five years.

The resources of Karandikar Laboratories are well placed to provide the services according to the agreement between Baseefa and Karandikar to enable Baseefa to

conduct testing operations according to this scope extension.. Over the previous two years Baseefa has been training the staff, assisting with development of the new facilities and providing their technical procedures as the basis for developing local procedures. These technical procedures are approved by Baseefa before being implemented as defined in Baseefa procedure GP53, which requires that compatibility between both sets of procedures is maintained should it be necessary to update either set..

The new laboratory was found to be well resourced. There were some areas where development work was proceeding at the time of the assessment visit. This was completed prior to finalisation of this report.

4. DOCUMENTATION

4.1. Quality Manual

The quality manual for Baseefa was reviewed at its re-assessment visit.

There is also a comprehensive quality manual for Karandikar Laboratories Pvt. Ltd.

Procedures have been developed to address how the two operations will work together and the extent to which control is exercised by the Baseefa staff in Buxton on any projects.

There are a comprehensive set of testing procedures for the tests sought in the scope.

4.2. Procedures

There are calibration procedures.
There are a number of testing procedures addressing testing to IEC 60079-1 and some tests from IEC 60079-0.

4.3. Work Instructions

There are no work instructions additional to the above.

4.4. Records

All records used are in hardcopy form but in some cases there are also electronic copies made. Baseefa will retain all records in Buxton according to existing procedures for all information supporting ATEX and IECEx work. But in addition Karandikar Laboratories location will retain a copy of records locally in accordance with requirements of NABL and Baseefa procedures GP53 and GP001.

4.5. Document Change Control

Document control is addressed on Section 3 of the Quality Manual. All document control is on hardcopy documents. Controlled extracts of documents are used where appropriate, for example tables in the control room of the flameproof testing area.

4.6. Test Records

Test records are kept on file in hardcopy. However, electronic copies will be sent to Baseefa in the UK for use in the production of the ExTR. Some data from flameproof testing is in electronic form but it cannot be changed and will end up as hardcopy records on the Baseefa files.

5. TEST REPORTS

5.1. Test Reports Issued

Number of test reports issued under the IECEx, national or regional schemes in the preceding four years for each type of protection:

There have been no reports issued for the testing to date as the operation is in its development stage for Ex testing. Several trial projects have been done to enable staff to develop their expertise in this field. One commercial project (Job 08/0001) to be done with Baseefa and the data produced to date was reviewed. Some of this work was done under the supervision of Baseefa staff.

6. CALIBRATION

Karandikar Laboratories also operate a calibration laboratory that has been operating for 15 years. It has been accredited by NABL for electrotechnical measurement, thermal calibration and mechanical calibration (pressure measurement) for eight years. The respective certificates are C-0149, C-0150 and C-0151. A visit was made to view of operation of the calibration laboratory and reports from an NABL audit were reviewed. It was found to be an excellent and professional operation.

Instruments and equipment used for Ex testing are calibrated as follows:

- Instruments falling within the scope of the Karandikar Laboratories calibration laboratory scope are calibrated there.
- The pressure transducers for pressure determination testing are calibrated using a dynamic arrangement using a calibrated pressure gauge to established pressures used for the calibration points.
- The environmental chamber is calibrated using a probe that measures temperature and humidity. The calibration can be done at all conditions of temperature and humidity required by IEC 60079-0. The probe has local calibration by the manufacturer indicating traceability to national standards. However it is proposed to institute a comparison program with Baseefa's laboratory in the UK using their chamber and probe with UKAS calibration.
- All other instruments are calibrated by external laboratories accredited by NABL.
- There is a comprehensive regular calibration check of the oxygen analyser. In addition as a result of the assessment there has been introduced a periodic full calibration that will include a mid-point check to prove the linearity of the output.

All equipment checked had current calibration except for new equipment that had just been purchased for physical measurement and torque. These were subsequently calibrated.

7. CONFIDENTIALITY

In 2.8.for Quality Manual for responsibility of Chief Executive Officer.

All employees sign confidentiality agreements that are kept on their personal files. Samples of these where sighted at the assessment visit.

All employees involved in the Baseefa testing work also sign the standard Baseefa confidentiality form, copies of which are held at both Karandikar and Buxton

8. NATIONAL ACCREDITATION

Karandikar Laboratories are accredited by the National Accreditation Board for Testing and Calibration Laboratories for three areas associated with their calibration activities and they have separate certificates for each of these. The certificate of accreditation and scope showing accreditation, valid until 16 July 2011, are included as Annexes 2 and 3. They have also received approval from the Government of India, Petroleum and Explosives Safety Organisation for their testing to IEC 60079-0 and 60079-1.

NABL is a full member the International Laboratory Accreditation Co-operation (ILAC) and Asia Pacific Laboratory Accreditation Co-operation (APLAC). NABL is a signatory to ILAC as well as APLAC Mutual Recognition Arrangements (MRA).

9. RECOGNITION AND AGREEMENTS

The only agreement that Karandikar Laboratories has is the one they have been developing with Baseefa. This was signed on 18 April 2008. A copy is retained by the IECEx Secretariat.

10. INTERNAL AUDIT AND PERIODIC REVIEW

Internal audit and periodic review is covered in Section 15 of the Quality Manual. At the time of the assessment visit, the most recent management review was on 22 April 2008. The meeting incorporated a comprehensive review of the operation. The audit report from the last internal audit was reviewed and was found to be satisfactory. It took place on 10 April 2008. The procedure developed by Baseefa covers auditing of the operation by Baseefa.

11. COMPLAINTS AND APPEALS (Including appeals to IECEx)

Complaints are covered in Section 9 of the Quality Manual. For any IECEx work complaints and appeals will be dealt with through Baseefa. As the contract will be with Baseefa, customers will be advised of this through their registration of the job.

12. SPECIAL FACTS TO BE NOTED

12.1. *Supporting Documentation*

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

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

12.2. Tests Witnessed

The tests or demonstrations were witnessed:

- Ex d - Calibration of pressure transducers
- Ex d - Pressure determination with hydrogen/methane
- Ex d - Measurement of flamepaths

- Ex d - Non-transmission tests with hydrogen
- Ex d - Overpressure test with water
- Dust tests for IP54
- Impact test
- Temperature rise test on a luminaire

13. COMMENTS (Including issues found during assessment)

There were a number of issues raised during the assessment that were subsequently resolved to the satisfaction of the assessor. Details are included in Annex A of the site assessment report. In general the issues covered were:

- Ensuring the linkage between Baseefa in the UK and the Karandikar laboratory was clearly defined and documented.
- The need for calibration of new equipment.
- Appropriate training of staff to carry out activities such as measurement of flamepaths.
- Ensuring all test equipment was appropriate for the task.
- The provision of test procedures appropriate for all the standards tests sought in the scope.
- The need for improvements in documentation control, in particular for IEC standards.
- Clearer definition of and control of their subcontractor.
- Some improvement to the quality system to ensure compliance with ISO/IEC 17025, for example in relation to confidentiality.

14. RECOMMENDATION

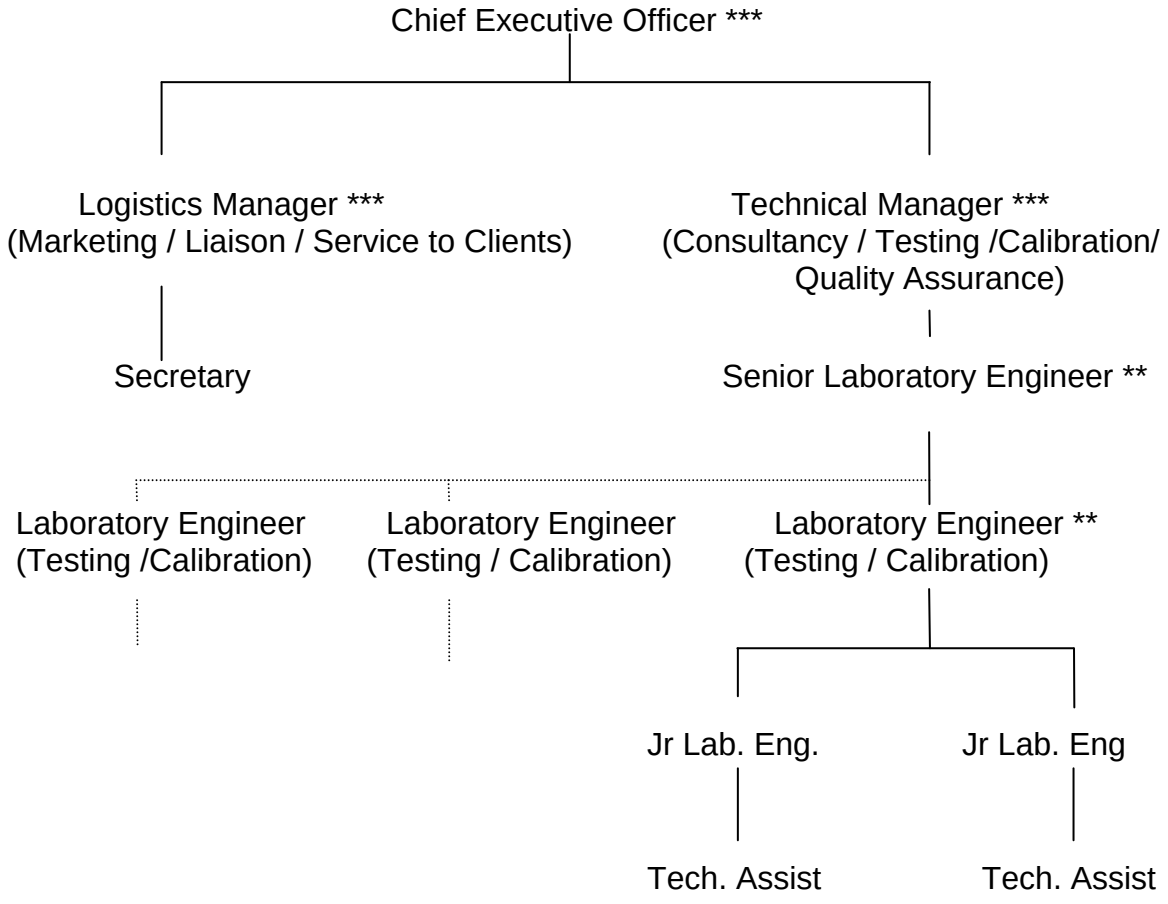
Based on the special site assessment performed on 9-11 February 2009, Baseefa is recommended for scope acceptance in the IECEx Equipment Certification Scheme as a IECEx Testing Laboratory (ExTL) for the location in India, according to the scope of the standards and tests listed in item 1.6 of this document.

Jim Munro
Lead Assessor
Date: 9 October 2009

List of Annexes:

1. Organizational Structure
2. Certificate of Accreditation to ISO/IEC 17025, NABL
3. Scope of accreditation to ISO/IEC 17025 by accreditation body, NABL

Annex 1
Organisational Structure



Notes: 1. One functional head viz. "Technical Manager" handles Technical Managerial functions and Quality Managerial functions.

2. Interface with the Baseefa Laboratory at Buxton is:

*** The CEO, Logistics Manager and Technical Manager have direct access to the Baseefa Managing Director. They may also interface with the Project Manager for specific projects

** The Senior Laboratory Engineer and the Laboratory Engineer have direct access to the relevant Baseefa Project Manager and Project Engineer for technical decisions and specifying particular tests.

NABL

National Accreditation Board for Testing and Calibration Laboratories

Department of Science & Technology, India

CERTIFICATE OF ACCREDITATION

KARANDIKAR LABORATORIES PVT. LTD.

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2005

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

BETEGAON, TALUKA PALGHAR, MAHARASHTRA

in the field of

ELECTRICAL TESTING

Certificate Number T-1641

Issue Date 17/07/2009 Valid Until 16/07/2011

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the additional requirements of NABL.

Signed for and on behalf of NABL

Alok Jain	Dr B. Hari Gopal	Dr T. Ramasami
Convenor	Director	Chairman

ANNEX 3

Laboratory	**Karandikar Laboratories Pvt. Ltd., Betegaon, Taluka Palghar, Maharashtra**		
Accreditation Standard	**ISO/IEC 17025: 2005**		
Field	**Electrical Testing**	**Issue Date**	**17.07.2009**
Certificate Number	**T-1641**	**Valid Until**	**16.07.2011**
Last Amended on	**-**	**Page**	**1 of 5**

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Operation / Limits of Detection
1.	**ELECTRICAL APPARATUS IN EXPLOSIVE GAS ATMOSPHERES.**	Resistance to Impact Test	IS / IEC 60079-0: 2004 Clause No 26.4.2 and A 3.4 and IS 13346: 2004 Cl 23.4. 3.1	2m to 0.1 m drop of 1 kg mass on a base of 20kg.
		Drop Test	IS / IEC 60079-0: 2004 Clause 26.4.3and IS 13346: 2004 Cl 23.4.3.2	Drop from 1 Mtr height on Concrete surface
		IP test for degree of protection for non rotating machines	IS / IEC 60079-0: 2004 Clause 26.4.5 & A 3.5 IEC 60529: 2001 and IS 13346: 2004 Cl 23.4.4	IP 1 to 6 X and IP X1 to X7
		IP test for degree of protection for for rotating machines	IS / IEC 60079-0: 2004 Clause 26.4.5 & IEC 60034-5 and IS 13346 : 2004 Cl 23.4.4	As above
		Temperature Measurement	IS/IEC 60079-0: 2004 Clause 26.5.1 and IS 13346: 2004 Cl 26.4.6.1	Temperature Rise up to 500 deg C
		Thermal Shock Test for Glass parts	IS/IEC 60079-0: 2004 Clause 26.5.2and IS 13346: 2004 Cl 26.4.6.2	1mm Jet of water at 10± 5^{0}C
		Small Component Ignition Test	IS/IEC 60079-0: 2004 Clause 26.5.3.2	Power supply capable of sourcingupto 240 V and mixture of diethyl ether and air.
		Torque Test for bushings	IS/IEC 60079-0: 2004 Clause 26.6.1and IS 13346: 2004 Cl 23.4.5	Torque 1 to 200Nm
		Thermal Endurance to heat (non metallic)	IS/IEC 60079-0: 2004 Clause 26.8and IS 13346: 2004 Cl 23.4.7.3	Relative Humidity of (90±5) % and temperature of 95^{0}C ±2
		Thermal Endurance to cold (Non metallic)	IS/IEC 60079-0: 2004 Clause 26.9 and IS 13346: 2004 Cl 23.4.7.4	Cold chamber going down to minus 50^{0}C
		Resistance to chemicals plastics	IS/IEC 60079-0: 2004	Oil no 2 and fire resistant

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Operation / Limits of Detection
			Clause 26.11 and IS 13346: 2004 Cl 23.4.7.6	Hydraulic fluid. Oven for temperature upto max. 250 degree centigrade.
		Earth Continuity	IS/IEC 60079-0:2004 Clause 26.12	Oven Volume One meter cube at 250 degree max temperature. and a 25 Amps dc supply and a milli volt meter .
		Surface resistance test of non metallic materials	IS/IEC 60079-0:2004 Clause 26.13 and IS 13346: 2004 Cl 23.4.7.8	A 1000 mega-ohm meter and Stensil and conducting paint
		Test of Clamping of cables	IS/IEC 60079-0:2004 Clause A.3 and IS 13346: 2004 Cl B 3.	Max pull force of 1 to 1000N
		Aging Test – Elastomeric Sealing Rings	IS/IEC 60079-0: 2004 Clause A.3.3 and IS 13346: 2004 Cl B 3.3	Cold chamber temp. range of minus 50 degree centigrade. Oven temp. range of 250 degree centigrade.
		Impact Test On Cable Gland	IS / IEC 60079 -0 : 2004 Cl A 3.4 and IS 13346: 2004 Cl B 3.4	2m to 0.1 m drop of 1 kg mass on a base of 20kg.
		IP Test On Glands	IS / IEC 60079-0: 2004 Cl A 3.5 and IS 13346: 2004 Cl B 3.5	-
		Pressure Determination Test	IS/IEC 60079-1: 2007 Clause 15.1.2 , IS 2148 : 2004 Cl 15.1.2	50 bars max dynamic pressure (Restriction because of connectors)
		Over Pressure Test – 1.5 X Ref Pressure	IS/IEC 60079-1: 2007 Clause 15.1.3.1 IS 2148 : 2004 Cl 15.1.3.1	50 bars max static pressure (Restriction because of connectors)
		.Do. But 4 X Ref Pressure	IS/IEC 60079-1:2007 Clause 15.1.3.1	50 bars max static pressure (Restriction

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Operation / Limits of Detection
			IS 2148: 2004 Cl 15.1.3.1	because of connectors)
		Flame Non Transmission Test	IS/IEC 60079-1: 2007 Clause 15.2, IS 2148:2004 Cl 15.2	
	ELECTRICAL APPARATUS IN EXPLOSIVE GAS	Flame Erosion Test – Non Metallic Parts	IS/IEC 60079-1: 2007 Clause 19.3.1.3, IS 2148 : 2004 Cl 19.3.1.3	
		Flame Non Transmision Test – Non Metallic Parts	IS/IEC 60079-1: 2007 Clause 19.3.1.4 IS 2148: 2004 19.3.1.4	
		Flammability Test – Non Metallic Parts	IS/IEC 60079-1: 2007 Clause 19.3.2 & IEC 60695-11-10 and IS 2148 19.3.2	-
		Sealing Test – Cable Glands	IS/IEC 60079-1: 2007 and IS 2148 : 2004 Clause C.3.1	50 bars max static pressure (Restriction because of connectors)
		Mechanical Strength Test for Cable Glands	IS/IEC 60079-1: 2007, IS 2148:2004 Clause C.3.2	2Nm to 200 Nm
		Torque Test for Ex Blanking Elements	IS/IEC 60079-1: 2007 Clause C.3.3.1	2Nm to 200 Nm
		Torque Test for Ex thread adapters	IS/IEC 60079-1: 2007 Clause C.3.4.1	2Nm to 200 Nm
		Impact Test for Ex thread adapters	IS/IEC 60079-1: 2007 Clause C.3.4.2	upto 20 Joules impact
		Over pressure test for Ex thread adaptors	IS/IEC 60079-1: 2007 Clause C.3.4.3	50 bars max static pressure (Restriction because of connectors)
		Pressure Determination with	IS/IEC 60079-1: 2007	50 bars max dynamic

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Operation / Limits of Detection
		Obstruction Plate	Clause D.3.6	pressure (Restriction because of connectors)
3	**ELECTRICAL APPARATUS FOR EXPLOSIVE GAS ATMOSPHERES INCREASED SAFETY "E"**	Dielectric Strength Test	IS 6381: 2004 / IEC 60079-7 (2001) Clause 6.1	Upto 5kV voltage with short circuit protection.
	LUMINAIRES FOR MAINS SUPPLY	Torque test for screw lamp holders other than E 10	IS 6381: 2004 / IEC 60079-7 (2001) Clause 6.3.1	Max Insertion torque of 5Nm & minimum removal torque 0.2Nm.
		Thermal Test for flouroscent tube light	IS 6381: 2004 / IEC 60079-7 (2001) Clause 6.3.2	Upto 500^0 C
	GENERAL PURPOSE CONNECTION & JUNCTION BOXES	Max dissipated Power	IS 6381:2004 / IEC 60079-7 (2001) Clause 6.7	Upto 500^0 C
	RESISTANCE HEATERS	a) Insulation resistnace measurement b) Thermal stability of Insualtion c) Resistance to impact d) Cold start current	IS 6381: 2004 / IEC 60079-7 (2001) Clause 6.8	Ac Power supply of 415V / 100 Amps AC. 2m to 0.1 m drop of 1 kg mass on base of 20kg. Upto 5kV voltage with short circuit protection. Relative Humidity of (90±5) % and temp. of 90^0C
4.	**ELECTRICAL APPARATUS FOR EXPLOSIVE GAS MIXTURES**	Water Absorption Test	IS/IEC 60079-18: 2004 Cl 8.1	300 gm with 10 mg resolution
		Max temp.	.do. but cl. 8.2.2	Upto 500^0 C
		Thermal endurance to heat	IS / IEC 60079 - 18 But cl 8.2.3.1	250 ^{0} C
		Thermal endurance to cold	..do.. But cl 8.2.3.2	-50 ^{0} C
		Thermal Cycling	..do.. But cl 8.2.3.3	250 to -50 ^{0} C
		Di electric strength test	..do.. But Cl 8.2.4	0 to 5 kV Poweer supply with short cct protection
		Cable Pull Test	..do..but Cl 8.2.5	Max pulling force of 1000 N or 100 kg

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Operation / Limits of Detection
		Pressure Test	..do..but Cl 8.2.6	50 bar Air Pressure
5.	**ENVIRONMENTAL CONDITIONING ON ELECTRO-TECHNICAL EQUIPMENTS AND COMPONENTS**	Dry Heat Test	IS 9000 part III	50 to 250^{0}C
		Cold Test	IS 9000 part II	-50 to + 50 ^{0}C
		Humidity Steady Test	IS 9000 part IV	20 to 95^{0}C and 30 to 95% RH
		Humidity Cyclic	IS 9000 part V	20 to 55 ^{0}C and 30 to 95% RH
		Composite temeprature and humidity test	IS 9000 part VI	15 to 65 ^{0}C & RH 20 to 95%
		Temperature Cycling	IS 9000 part XXIV	-50 to +250 ^{0} C
6.	**SAFETY TESTING**	Sigle Fault conditions	IEC 61010 Cl 4.4	-
		Mains Supply Input	IEC 61010 Cl 5.1.3 And Similar	-
		Durability of Marking	IEC 61010 Cl 5.3 And Similar	-
		Bonding Impedance	IEC 61010 Cl 6.5.1	25 A DC / AC
		Dielectric Strength Test	IEC 61010 Cl 6.8	Upto 5 kV with short cct protection

-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-X-