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

**Title: Technical Capability Document (TCD)**

**Circulation: IECEx Management Committee (ExMC)**

**INTRODUCTION**

In line with the report from ExMC Working Group, WG2 – Technical Capability Documents, WG2 have continued with its work to update the TCD covering IEC 60079 - 0, 1, 2, 5, 6, 7, 11, 13, 15, 16, 18, 26, 28, 29-1, 29-4, 30-1, 31, 32-1, 33, 35-1, 35-2.

While the WG2 Convener, Mr Steve Bentham will report at the 2015 Christchurch meeting of ExMC, this document represents work of WG2 since the 2014 ExMC Meeting in the Hague to include:

* Simplification of Assessor notes and comments
* Alignment with latest editions of Standards
* Addition of minimum t5esting capabilities

This document is now submitted for ExMC Approval to proceed for publication and immediate use.

Therefore, ExMC will be asked to approve this document for publication, during the 2015 ExMC Christchurch meeting as the revised version (Edition 3) of the TCD.

Chris Agius

**IECEx Executive Secretary**

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**Technical Capability Document**

**No. TCD – 60079 – Series**

**Edition 3**

Referenced Standards

**IEC 60079 – Explosive atmospheres**

**Parts included: 60079 - 0, 1, 2, 5, 6, 7, 11, 13, 15, 16, 18, 26, 28, 29-1, 29-4, 30-1, 31, 32-1, 33, 35-1, 35-2**

**Name of body:**

**Members of the assessment team**

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| **Name** | **Role** |
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**Place(s) of assessment:**

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**Assessment date(s):**

Documentation Control

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Version No. | Date | Changes | Prepared by | Approved by |
| 1 |  | Initial release (Conversion from TGD documents) | WG2 | ExMC |
| 2 |  | Correction to information for Ex d and Ex i | WG2 |  |
| 3 | May 2015 | Simplification of assessor comments section & explanatory note Additional standards and additional information for some standards Addition of missing tests from 79-0 And 79-1 and 79-11. Update to latest editions for 79-1, -2, -5, -6, -18, - 26. Addition of minimum testing capabilities. | WG2 | Draft |

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# Purpose

The purpose of this Technical Capability Document (TCD) is to provide documented evidence that applicant and accepted ExTLs have the capability to assess and test equipment according to their proposed or accepted scope of standards. It is may also be used as a tool to assess and document the capability of ExCBs.

Completion of the TCD will be a collaborative process between the assessment team and the body being assessed. This will occur both prior to and at the assessment visit. More details are given later.

Unless otherwise stated by the assessment team, it is also assumed that if an ExCB or ExTL meets the requirements of the respective sections of this TCD, the ExCB or ExTL it is also capable of meeting the requirements of older editions of standards.

This TCD is a replacement of the former Technical Guidance Documents (TGDs) which are now incorporated into this one document.

The TCD does not cover all requirements of the IEC 60079 series of Standards, but focuses on the most important requirements of the standards in order to establish that the necessary personnel knowledge and expertise, procedures, and the equipment are available. It is expected that ExCB or ExTL under assessment will have self assessed to the complete standard as the assessor may explore areas not covered by this TCD.

Sections within the TCD contain duplication of information from previous sections. To simplify use of the TCD, the user may put information in the first section/s and reference the section that has the full details.

# How to complete this TCD

Each part of IEC 60079 in this TCD is split into 3 sections as follows:

## Section 1 – Personnel:

This section is to identify the knowledge level of the ExCB's or ExTL's employees regarding the requirements and interpretations of the respective parts of the IEC 60079 series contained in this document.

Prior to the assessment the body being assessed, it should complete the first columns for each standard in its scope to show the personnel deemed competent for that standard.

The rest of this section will normally be completed by the assessment team during the site assessment visit. But the body being assessed might also like to use it as a self-assessment tool.

## Section 2 – Procedures:

This section is to identify the procedures used for carrying out the tasks related to IEC 60079 equipment series (assessment and testing). Knowledge these procedures may be assessed in Section 1.

This section should be initially completed by the ExCB/ExTL prior to the assessment.

## Section 3 – Equipment and tests:

This section is to identify the relevant tests for the part of the standard. For each test it then looks at the availability and adequacy of equipment, maintenance and calibration of the equipment, and capability to perform the test correctly. It also includes provision for comments and photos.

This section will normally be completed by the assessment team during the site visit, but the team may ask the ExCB/ExTL assist with the preparation. This might include provision of information about the relevant equipment and photos. Information and photos about tests witnessed will also normally be included in this section.

Note 1: To add photos - It is best to use the ‘insert’ function as the photos will automatically fit the width of the cell

Note 2: To make document smaller as a .docx file do the following

- select save as

- click 'tools' bottom middle

- choose 'Compress Pictures'

- click on 'Options'

- select both the top options under 'Compression options'

- selection 'email (96 ppi)' under Target output'

- Then click, 'OK', 'OK' and 'Save'

# IEC 60079-0 Explosive atmospheres – Part 0: Equipment – General requirements

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| --- |
| Edition(s) covered by this TCD |
| 6.0 |

**1. Personnel**

|  |  |  |
| --- | --- | --- |
| Names of personnel deemed competent by the IECEx body being assessed for this standard | Abbreviation (eg initials) used below (if needed) | Interviewed (Y/N) |
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| Check of competence (typical topics to cover include): | Comments by IECEx Assessor |
| --- | --- |
| * What is explosion protection? * What are the equipment groups? * What are EPLs? * What is meant by ambient temperature? * Temperature Classification * External heating or cooling * What is meant by service temperature? * Can parts exceed the temperature class? * Mechanical strength - materials and impact strength * Stored energy and cooling time * Circulating currents * Retention of gaskets * Various forms of energy - RF, Lasers, Ultrasonics etc * Non-metallic materials - plastics, Elastomers, glass etc * Electrostatic charge - Group I, Group II and Group III * Metallic parts - light alloys * Fasteners * Special fasteners * Interlocks * Bushings * Cements * Ex Components * Connection facility, including creepage and clearance if necessary * Earthing * Entries into enclosure - entry holes and cable entry devices etc * Rotating machines * Switchgear * Fuses * Plugs & sockets * Luminaires * Cells & batteries * Documentation - drawings, instructions etc * Compliance |  |

**2: Procedures**

Relevant procedures (to be listed by body under assessment):

|  |  |  |
| --- | --- | --- |
| Procedure title | No | Clause(s) covered |
|  |  |  |
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**3: Equipment and Tests**

| Standard: IEC 60079-0 General Requirements | | |
| --- | --- | --- |
| Clause | Requirement – Test | Result – Remark |
| **6.3** | **Opening time test \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **6.3** | **Capacitance discharge timing test \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| **17.1** | **Ingress Protection – IP Code 1X-2X – Protected Against Solid foreign objects \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **25** | **Compliance of prototype or sample with documents \*** | |
|  | Availability and adequacy of equipment | Relevant equipment may be needed by the concept standard – e.g. measuring equipment for creepage and clearance in Ex i and Ex e, or measurement of flamepaths in Ex d.  Also can include CTI test equipment when required by the concept standard. |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **26.4.2** | **Resistance to impact \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **26.4.3** | **Drop test \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **26.4.5** | **Degree of protection (IP) by enclosures – dust test \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **26.4.5** | **Degree of protection (IP) by enclosures – water test \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **26.5.1** | **Thermal tests \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **26.5.2** | **Thermal shock test \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **26.5.3** | **Small component ignition test (Group I and Group II)** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **26.6** | **Torque test for bushings \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **26.8** | **Thermal endurance to heat \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **26.9** | **Thermal endurance to cold \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **26.10** | **Resistance to light** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **26.11** | **Resistance to chemical agents for Group I electrical equipment \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **26.12** | **Earth continuity \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **26.13** | **Surface resistance test of parts of parts of enclosures of non-metallic materials \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **26.14** | **Measurement of capacitance \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **26.15** | **Verification of ratings of ventilating fans** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **26.16** | **Alternative qualification of elastomeric sealing O-rings** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **A.3.1** | **Tests of clamping of non-armoured and braided cables \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **A.3.2** | **Tests of clamping of armoured cables \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |

**Minimum testing capability**

The tests marked with an asterisk are considered to be the minimum testing capability that should be available in-house at an ExTL.

Where none of the concept standards included in the scope of the ExTL requires the capability for any particular test above, the ExTL does not need to demonstrate the capability for that test.

# IEC 60079-1 Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"

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| Edition(s) covered by this TCD |
| 7.0 |

**1. Personnel**

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| --- | --- | --- |
| Names of personnel deemed competent by the IECEx body being assessed for this standard | Abbreviation (eg initials) used below (if needed) | Interviewed (Y/N) |
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| Check of competence (typical topics to cover include): | Comments by IECEx Assessor |
| --- | --- |
| * What is a flameproof enclosure? * EPLs * Joints - gap and width Groups I, IIA, IIB and IIC * Stationary joints * Moving joints * Sealed (cemented) joints * Breathing and draining devices * Fasteners and materials of construction * Entry devices and the holes for them * Temperature considerations * Testing - mechanical measurements * Testing - reference pressure * Testing - pressure test * Testing - flame transmission test * Testing - breathing and draining devices * Testing - flame erosion * Testing - cable entry devices * Empty flameproof enclosures - testing * Empty flameproof enclosures - utilisation * Cells and batteries * Containment systems |  |

**2: Procedures**

Relevant procedures (to be listed by body under assessment):

|  |  |  |
| --- | --- | --- |
| Procedure title | No | Clause(s) covered |
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**3: Equipment and Tests**

| Standard: IEC 60079-1 Flameproof enclosure "d" | | |
| --- | --- | --- |
| Clause | Requirement – Test | Result – Remark |
| **4.2** | **Requirement for level of protection "da"** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5** | **Verification and tests \***  **e.g. Measurement of flamepaths and enclosure dimensions** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| **15.2.2** | **Determination of Reference Pressure \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **15.2.3** | **Overpressure test \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **15.3** | **Test for non-transmission of an internal ignition \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **15.4** | **Tests of flameproof enclosures with breathing and draining devices** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **15.5** | **Tests for "dc" devices \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **B.1.2** | **Sintered metal elements - bubble test pore size** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **B.1.3** | **Sintered metal elements - Density** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **B.1.4** | **Sintered metal elements - Open porosity and/or fluid permeability** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **C.3.1** | **Cable glands - Sealing test \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **C.3.3.1**  **C.3.4.1** | **Type tests for Ex blanking elements - Torque test \*** | |
| **Availability and adequacy of equipment** |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **C.3.4.2** | **Impact test for thread adapters \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |

**Minimum testing capability**

The tests marked with an asterisk are considered to be the minimum testing capability that should be available in-house at an ExTL.

Test gases should be appropriate for the particular scope of the ExTL.

e.g. for Group II the 85/15 hydrogen /methane mixture should be available or be capable of being generated

# IEC 60079-2 Explosive atmospheres - Part 2: Equipment protection by pressurized enclosure "p"

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| --- |
| Edition(s) covered by this TCD |
| 6.0 |

**1. Personnel**

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| --- | --- | --- |
| Names of personnel deemed competent by the IECEx body being assessed for this standard | Abbreviation (eg initials) used below (if needed) | Interviewed (Y/N) |
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|  |  |  |

| Check of competence (typical topics to cover include): | Comments by IECEx Assessor |
| --- | --- |
| * What is the type of protection p? |  |

**2: Procedures**

Relevant procedures (to be listed by body under assessment):

|  |  |  |
| --- | --- | --- |
| Procedure title | No | Clause(s) covered |
|  |  |  |
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**3: Equipment and Tests**

| Standard: IEC 60079-2 Pressurized enclosure "p" | | |
| --- | --- | --- |
| Clause | Requirement – Test | Result – Remark |
| **16.1** | **Determining the maximum overpressure rating** | |
| Availability and adequacy of equipment |  |
| Maintenance and calibration |  |
| Capable of being performed correctly |  |
| Comments |  |
| Photos |  |  |
| **16.2** | **Maximum overpressure test** | |
| Availability and adequacy of equipment |  |
| Maintenance and calibration |  |
| Capable of being performed correctly |  |
| Comments |  |
| Photos |  |  |
| **16.3**  **16.3.1**  **16.3.2** | **Leakage test** | |
| Availability and adequacy of equipment |  |
| Maintenance and calibration |  |
| Capable of being performed correctly |  |
| Comments |  |
| Photos |  |  |
| **16.4**  **16.4.1**  **16.4.3**  **16.4.4**  **16.4.5** | **Purging test for pressurized enclosures with no internal source of release**  **and filling procedure test for static pressurization** | |
| Availability and adequacy of equipment |  |
| Maintenance and calibration |  |
| Capable of being performed correctly |  |
| Comments |  |
| Photos |  |  |
| **16.5**  **16.5.1**  **16.5.2**  **16.5.3**  **16.5.4** | **Pressurized enclosure where the flammable substance is not a liquid,**  **pressurization by continuous flow and the protective gas is air** | |
| Availability and adequacy of equipment |  |
| Maintenance and calibration |  |
| Capable of being performed correctly |  |
| Comments |  |
| Photos |  |  |
| **16.6** | **Verification of minimum overpressure** | |
| Availability and adequacy of equipment |  |
| Maintenance and calibration |  |
| Capable of being performed correctly |  |
| Comments |  |
| Photos |  |  |
| **16.7**  **16.7.1**  **16.7.2** | **Tests for an infallible containment system** | |
| Availability and adequacy of equipment |  |
| Maintenance and calibration |  |
| Capable of being performed correctly |  |
| Comments |  |
| Photos |  |  |
| **16.8** | **Overpressure test for a containment system with a limited release** | |
| Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |

**Minimum testing capability**

All tests should be capable of being performed by the ExTL.

# IEC 60079-5 Explosive atmospheres - Part 5: Equipment protection by powdered filling "q"

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| --- |
| Edition(s) covered by this TCD |
| 4.0 |

**1. Personnel**

|  |  |  |
| --- | --- | --- |
| Names of personnel deemed competent by the IECEx body being assessed for this standard | Abbreviation (eg initials) used below (if needed) | Interviewed (Y/N) |
|  |  |  |
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| Check of competence (typical topics to cover include): | Comments by IECEx Assessor |
| --- | --- |
| * What is the type of protection q? |  |

**2: Procedures**

Relevant procedures (to be listed by body under assessment):

| Procedure title | No | Clause(s) covered |
| --- | --- | --- |
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**3: Equipment and Testing**

| Standard: IEC 60079-5 Powder filling "q" | | |
| --- | --- | --- |
| Clause | Requirement – Test | Result – Remark |
| **5.1.1** | **Pressure type test of enclosure** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.1.2** | **Verification of the degree of protection of the enclosure** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.1.3** | **Dielectric strength of the filling material** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.1.4** | **Maximum temperatures** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |

**Minimum testing capability**

Noting that Ex q certification is rarely required, it is acceptable for the ExTL to demonstrate that they have the capability to source the equipment in the event of these test being required.

# IEC 60079-6 Explosive atmospheres - Part 6: Equipment protection by oil immersion "o"

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| Edition(s) covered by this TCD |
| 4.0 |

**1. Personnel**

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| Names of personnel deemed competent by the IECEx body being assessed for this standard | Abbreviation (eg initials) used below (if needed) | Interviewed (Y/N) |
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**1: Personnel knowledge**

To be completed by assessor

| Check of competence (typical topics to cover include): | Comments by IECEx Assessor |
| --- | --- |
| What is the type of protection o? |  |

**2: Procedures**

Relevant procedures (to be listed by body under assessment):

| Procedure title | No | Clause(s) covered |
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**3: Equipment and Testing**

| Standard: IEC 60079-6 Oil immersion "o" | | | |
| --- | --- | --- | --- |
| Clause | Requirement – Test | | Result – Remark |
| **6.1.1** | **Overpressure test on sealed enclosures** | | |
|  | Availability and adequacy of equipment | |  |
|  | Maintenance and calibration | |  |
|  | Capable of being performed correctly | |  |
|  | Comments | |  |
| Photos |  | |  |
| **6.1.2** | **Reduced pressure test on sealed enclosures** | | |
|  | Availability and adequacy of equipment | |  |
|  | Maintenance and calibration | |  |
|  | Capable of being performed correctly | |  |
|  | Comments | |  |
| Photos |  | |  |
| **6.1.3** | **Overpressure test on unsealed enclosures** | | |
|  | Availability and adequacy of equipment |  | |
|  | Maintenance and calibration |  | |
|  | Capable of being performed correctly |  | |
|  | Comments |  | |
| Photos |  |  | |
| **6.1.4** | **Maximum temperature** | | |
|  | Availability and adequacy of equipment |  | |
|  | Maintenance and calibration |  | |
|  | Capable of being performed correctly |  | |
|  | Comments |  | |
| Photos |  |  | |
| **6.1.5** | **Switching Tests** | | |
|  | Availability and adequacy of equipment |  | |
|  | Maintenance and calibration |  | |
|  | Capable of being performed correctly |  | |
|  | Comments |  | |
| Photos |  |  | |

**Minimum testing capability**

Noting that Ex o certification is rarely required, it is acceptable for the ExTL to demonstrate that they have the capability to source the equipment in the event of these test being required

# IEC 60079-7 Explosive atmospheres - Part 7: Equipment protection by increased safety "e"

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| Edition(s) covered by this TCD |
| 4.0 |

**1. Personnel**

|  |  |  |
| --- | --- | --- |
| Names of personnel deemed competent by the IECEx body being assessed for this standard | Abbreviation (eg initials) used below (if needed) | Interviewed (Y/N) |
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| Check of competence (typical topics to cover include): | Comments by IECEx Assessor |
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| What is the type of protection e? |  |

**2: Procedures**

Relevant procedures (to be listed by body under assessment):

| Procedure title | No | Clause(s) covered |
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**3: Equipment and Testing**

| Standard: IEC 60079-7 Increased safety "e" | | |
| --- | --- | --- |
| Clause | Requirement – Test | Result – Remark |
| **6.1** | **Dielectric Tests \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **6.2.1** | **t*E* of cage rotor machines** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **6.2.3** | **Additional tests for machines liable to ‘sparking’** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **6.3.1** | **Mechanical tests for screw lampholders other than E10 \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **6.3.2** | **Abnormal operation of luminaires with tubular fluorescent lamps** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **6.3.3** | **Sulphur dioxide test for the connection of bi-pin lamp caps to lampholders** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **6.3.4** | **Vibration test for luminaires with bi-pin lamps** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **6.4** | **Measuring instruments and instrument transformers – thermal and inter-turn test \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **6.5** | **Transformers other than instrument transformers - thermal tests \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **6.6.2** | **Batteries – insulation test \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **6.6.3** | **Batteries – mechanical shock test** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **6.6.4** | **Ventilation of battery container** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly | a |
|  | Comments |  |
| Photos |  |  |
| **6.7** | **General purpose junction boxes – heating test \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **6.8** | **Resistance heating devices (not trace heating) \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **6.9** | **Terminal insulating material tests – thermal conditioning then pull test \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **6.10** | **Terminal Dielectric Test \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |

**Minimum testing capability**

The tests marked with an asterisk are considered to be the minimum testing capability that should be available in-house at an ExTL.

# IEC 60079-11 Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"

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| --- |
| Edition(s) covered by this TCD |
| 6.0 |

**1. Personnel**

|  |  |  |
| --- | --- | --- |
| Names of personnel deemed competent by the IECEx body being assessed for this standard | Abbreviation (eg initials) used below (if needed) | Interviewed (Y/N) |
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| Check of competence (typical topics to cover include): | Comments by IECEx Assessor |
| --- | --- |
| * What is intrinsic safety? * Relevance of faults * Infallibility, including infallible components * Levels of protection * Temperature assessment of wiring and trackwork * Methods of establishing temperature classification * Creepage and clearance * Earthing * Encapsulation * Rating of components * Batteries |  |

2: Procedures

Relevant procedures (to be listed by body under assessment):

| Procedure title | No | Clause(s) covered |
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**3: Equipment and Tests**

| Standard: IEC 60079-11 Intrinsic safety "I" | | | |
| --- | --- | --- | --- |
| Clause | Requirement – Test | Result – Remark | |
| **10.1** | **Spark ignition test** | | |
|  | Availability and adequacy of equipment |  | |
|  | Maintenance and calibration |  | |
|  | Capable of being performed correctly |  | |
|  | Comments |  | |
| Photos |  |  | |
| **10.2** | **Temperature tests** | | |
|  | Availability and adequacy of equipment |  | |
|  | Maintenance and calibration |  | |
|  | Capable of being performed correctly |  | |
|  | Comments |  | |
| Photos |  |  | |
| **10.3** | **Dielectric strength tests** | | |
| (and 6.5.13) | Availability and adequacy of equipment |  | |
|  | Maintenance and calibration |  | |
|  | Capable of being performed correctly |  | |
|  | Comments |  | |
| Photos |  |  | |
| **10.4** | **Determination of parameters of loosely specified components** | | |
|  | Availability and adequacy of equipment -Ok | | |
|  | Maintenance and calibration | | |
|  | Capable of being performed correctly | | |
|  | Comments | | |
| **Photos** |  | |  |
| **10.5** | **Tests for cells and batteries** | | |
|  | Availability and adequacy of equipment |  | |
|  | Maintenance and calibration |  | |
|  | Capable of being performed correctly |  | |
|  | Comments |  | |
| Photos |  |  | |
| **10.6** | **Mechanical tests** | | |
|  | Availability and adequacy of equipment |  | |
|  | Maintenance and calibration |  | |
|  | Capable of being performed correctly |  | |
|  | Comments |  | |
| Photos |  |  | |
| **10.7** | **Tests for apparatus containing piezoelectric devices** | | |
|  | Availability and adequacy of equipment |  | |
|  | Maintenance and calibration |  | |
|  | Capable of being performed correctly |  | |
|  | Comments |  | |
| Photos |  |  | |
| **10.8** | **Type tests for diode safety barriers and safety shunts** | | |
|  | Availability and adequacy of equipment |  | |
|  | Maintenance and calibration |  | |
|  | Capable of being performed correctly |  | |
|  | Comments |  | |
| Photos |  |  | |
| **10.9** | **Cable pull tests** | | |
|  | Availability and adequacy of equipment |  | |
|  | Maintenance and calibration |  | |
|  | Capable of being performed correctly |  | |
|  | Comments |  | |
| Photos |  |  | |
| **10.10** | **Transformer tests** | | |
|  | Availability and adequacy of equipment |  | |
|  | Maintenance and calibration |  | |
|  | Capable of being performed correctly |  | |
|  | Comments |  | |
| Photos |  |  | |
| **10.11** | **Optical isolators tests** | | |
|  | Availability and adequacy of equipment |  | |
|  | Maintenance and calibration |  | |
|  | Capable of being performed correctly |  | |
|  | Comments |  | |
| Photos |  |  | |

**Minimum testing capability**

The following is regarded as the minimum testing capability that should be available in-house at an ExTL;

* Equipment for all the above tests, clauses 10.1 to 10.11
* The following are specific requirements related to the spark test apparatus (STA):
  + 3 A STA
  + 10 A STA if testing to higher currents may be necessary.
  + Range of capacitors having low inductance
  + Range of air-cored inductors having low resistance
  + Current probe for measuring transient conditions
  + Ability to test with gas mixture giving factor of safety for Group IIC (oxygen-hydrogen-air mixture or oxygen-hydrogen mixture, according to Table 8).

Where it is necessary to establish the CTI by test, then that may be done through a subcontract arrangement.

ExTLs must have the capability to accurately measure distances on circuit boards to check widths, and creepage and clearance distance. Vernier/digital callipers are not generally appropriate for this purpose.

# IEC 60079-13 Explosive atmospheres - Part 13: Equipment protection by pressurized room "p"

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| Edition(s) covered by this TCD |
| 1.0 |

**1. Personnel**

|  |  |  |
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| Names of personnel deemed competent by the IECEx body being assessed for this standard | Abbreviation (eg initials) used below (if needed) | Interviewed (Y/N) |
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| Check of competence (typical topics to cover include): | Comments by IECEx Assessor |
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| What is the scope of this standard? |  |

**2: Procedures**

Relevant procedures (to be listed by body under assessment):

| Procedure title | No | Clause(s) covered |
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**3: Equipment and Testing**

| Standard: IEC 60079-13 Pressurized room "p" | | |
| --- | --- | --- |
| Clause | Requirement – Test | Result – Remark |
| **12.3** | **Mechanical strength test** |  |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **12.4** | **Overpressure test** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **12.5** | **Purging test** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **12.6** | **Minimum pressure differential test for types of protection px, py and pz** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **12.7** | **Minimum flow rate test** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **12.8** | **Overpressure test for containment systems with limited release** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |

**Minimum testing capability**

ExTLs having testing capability for IEC 60079-2 are assumed to have capability for the tests in this standard.

# IEC 60079-15 Explosive atmospheres - Part 15: Equipment protection by type of protection "n"

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| Edition(s) covered by this TCD |
| 4.0 |

**1. Personnel**

|  |  |  |
| --- | --- | --- |
| Names of personnel deemed competent by the IECEx body being assessed for this standard | Abbreviation (eg initials) used below (if needed) | Interviewed (Y/N) |
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| Check of competence (typical topics to cover include): | Comments by IECEx Assessor |
| --- | --- |
| What is type "n" – what is its purpose  Surface temperature  Degree of protection  Creepage and clearance  Coatings / compounds / potting / CTI  Wiring and connections – internal and user  Rotating machines – air gap and construction  HV motors – potential sparking(?)  Fuses / plugs and sockets  Luminaires  Cells & batteries  Non sparking low power  Enclosed break devices  Hermetically sealed devices  Sealed devices  Restricted breathing devices |  |

**2: Procedures**

Relevant procedures (to be listed by body under assessment):

| Procedure title | No | Clause(s) covered |
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**3: Equipment and Testing**

| Standard: IEC 60079-15 Type of protection "n" | | | |
| --- | --- | --- | --- |
| Clause | Requirement – Test | Result – Remark |
| **22.3.1** | **Thermal endurance** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **22.4** | **Enclosed break tests** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **22.5** | **Sealed devices test \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **22.6** | **Restricted breathing test \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **22.7** | **Screw lampholder tests** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **22.8** | **Starter holder test (for luminaires)** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **22.9** | **Electronic starter tests** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **22.10** | **Test for wiring of luminaries subject to high-voltage impulses from ignitors** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **22.11** | **Mechanical shock test for batteries** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos | Shock rig |  |
| **22.12** | **Insulation resistance test for batteries** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **22.13** | **Ignition tests for large or high-voltage machines** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |

**Minimum testing capability**

Most requirements and tests in this standard have now been (or are in the process of being transferred to other standards.

It is anticipated that those tests shown with an asterisk will be retained in the next edition of this standard and so there should be in-house testing capability for these tests.

# IEC 60079-16 Electrical apparatus for explosive atmospheres - Part 16: Artificial ventilation for analyzer(s) houses

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| Edition(s) covered by this TCD |
| 1 |

**1. Personnel**

|  |  |  |
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| Names of personnel deemed competent by the IECEx body being assessed for this standard | Abbreviation (eg initials) used below (if needed) | Interviewed (Y/N) |
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| Check of competence (typical topics to cover include): | Comments by IECEx Assessor |
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| What is the scope of this standard? |  |

**2: Procedures**

Relevant procedures (to be listed by body under assessment):

| Procedure title | No | Clause(s) covered |
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**3: Equipment and Testing**

| Standard: IEC 60079-16 Artificial ventilation for analyzer(s) houses | | |
| --- | --- | --- |
| Clause | Requirement – Test | Result – Remark |
| **7. 3)** | **Airflow and purging test** |  |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **7. 4)** | **Pressure test** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **7. 5)** | **Safeguarding system test** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **7. 6)** | **Flow restrictor test** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |

**Minimum testing capability**

ExTLs having testing capability for IEC 60079-2 are assumed to have capability for the tests in this standard.

# IEC 60079-18 Explosive atmospheres - Part 18: Equipment protection by encapsulation "m"

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| Edition(s) covered by this TCD |
| 4.0 |

**1. Personnel**

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| Names of personnel deemed competent by the IECEx body being assessed for this standard | Abbreviation (eg initials) used below (if needed) | Interviewed (Y/N) |
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| Check of competence (typical topics to cover include): | Comments by IECEx Assessor |
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| What is the type of protection m? |  |

**2: Procedures**

Relevant procedures (to be listed by body under assessment):

| Procedure title | No | Clause(s) covered |
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**3: Equipment and Testing**

| Standard: IEC 60079-18 Type of protection "m" | | |
| --- | --- | --- |
| Clause | Requirement – Test | Result – Remark |
| **8.1.1** | **Water absorption test \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **8.1.2** | **Dielectric strength tests on compound \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **8.2.2** | **Maximum temperature \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **8.2.3.1** | **Thermal endurance to heat \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **8.2.3.2** | **Thermal endurance to cold \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **8.2.4** | **Dielectric strength tests - circuits \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **8.2.5** | **Cable pull tests \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **8.2.6** | **Pressure tests \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **8.2.7** | **Endurance test for resettable devices with contacts** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **8.2.7** | **Endurance test for resettable devices without contacts** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **8.2.8** | **Sealing tests \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |

**Minimum testing capability**

The tests marked with an asterisk are considered to be the minimum testing capability that should be available in-house at an ExTL.

# IEC 60079-26 Explosive atmospheres - Part 26: Equipment with equipment protection level (EPL) Ga

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| Edition(s) covered by this TCD |
| 3.0 |

**1. Personnel**

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| Names of personnel deemed competent by the IECEx body being assessed for this standard | Abbreviation (eg initials) used below (if needed) | Interviewed (Y/N) |
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| Check of competence (typical topics to cover include): | Comments by IECEx Assessor |
| --- | --- |
| **What is the basic meaning of this standard?** |  |

**2: Procedures**

Relevant procedures (to be listed by body under assessment):

| Procedure title | No | Clause(s) covered |
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**3: Equipment and Testing**

| Standard: IEC 60079-26 Equipment with equipment protection level (EPL) Ga | | |
| --- | --- | --- |
| Clause | Requirement – Test | Result – Remark |
| **5.2** | **Separation elements** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.3** | **Temperature evaluation** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |

**Minimum testing capability**

All tests should be capable of being performed by the ExTL

# IEC 60079-28 Explosive atmospheres - Part 28: Protection of equipment and transmission systems using optical radiation

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| Edition(s) covered by this TCD |
| 1.0 |

Regarding possible restriction of scope, the following approach should be followed:

* It is reasonable to exclude the ignition testing from scopes as no one seems to have had to do this.
* Where a scope is restricted to “op is”, the laboratory should be able to perform the tests for measurement of optical power and optical irradiance or have a subcontract arrangement with a body that could do these tests. In this case the subcontract will required an assessment by IECEx. We still need take a decision whether all subcontracting bodies for these tests should be assessed by IECEx. It should be noted that not only is the actual test important, but the faults that must be applied are also critical. These may be electrical or mechanical faults depending on what will produce the worst case situation and require a good appreciation of optical radiation.

**1. Personnel**

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| Names of personnel deemed competent by the IECEx body being assessed for this standard | Abbreviation (eg initials) used below (if needed) | Interviewed (Y/N) |
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| Typical topics to cover include: | Comments by IECEx Assessor |
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| **Most likely ignition mechanisms**  **Terms and definitions (see below)**  Absorption  Beam diameter (or beam width)  Beam strength  Fibre optic terminal device  Inherently safe optical radiation  Irradiance  Minimum ignition energy  Optical fibre communication system  Free space optical communication system  Optical (or radiant) power  Optical radiation  Radiant energy  Radiant exposure  **General Requirements -**  What are the equipment protection levels (EPLs) that apply and their relationship to an ignition source?  **Types of protection -**  There are three types of protection that can be applied (see below)  **Inherently safe optical radiation “op is” -**  Summarise the requirements for inherently safe optical radiation covering such areas as:  Continuous wave radiation  Pulsed radiation  Ignition tests  Optical devices incorporating the inherently safe concept  **Protected optical radiation “op pr” -** Summarise the requirements for protected optical radiation, including:  Radiation inside fibre etc  Radiation inside enclosures  **Optical radiation interlock with optical fibre breakage “op sh” -** Summarise the requirements for optical radiation interlock with optical fibre breakage  **Suitability of types of protection -** Discuss the use of Annex C and the principles of using the types of protection |  |

**2: Procedures**

Relevant procedures (to be listed by body under assessment):

| Procedure title | No | Clause(s) covered |
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**3: Equipment and Testing**

| Standard: IEC 60079-28 Part 28: Protection of equipment and transmission systems using optical radiation | | |
| --- | --- | --- |
| Clause | Requirement – Test | Result – Remark |
| **5.2.2 and 5.2.3** | **Tests for optical power and optical irradiance for compliance with Table 2.** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
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| **5.2.4 and 6** | **Ignitions tests** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |

**Minimum testing capability**

See the introduction for this standard regarding minimum testing capability.

# IEC 60079-29-1 Explosive atmospheres – Part 29-1: Gas detectors – Performance requirements of detectors for flammable gases

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| Edition(s) covered by this TCD |
| 1.0 |

**1. Personnel**

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| Names of personnel deemed competent by the IECEx body being assessed for this standard | Abbreviation (eg initials) used below (if needed) | Interviewed (Y/N) |
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| Check of competence (typical topics to cover include): | Comments by IECEx Assessor |
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| Gas properties  Types of instruments  Sensors  Supply of gas to instrument  Signals and alarms  Times  Resolution  Measurement range  Selectable range  Indicating light  Indicator light marking  Alarm or output functions  Continuous duty apparatus  Group I portable apparatus indicating up to 5% v/v  Group II portable apparatus indicating up to 100% LFL  Fault signals  Adjustments  Battery powered apparatus  Stand alone gas detection apparatus for use with separate control units  Separate control units for use with stand-alone gas detection apparatus  Software controlled apparatus  Conversion errors  Special state indication  Software  Data transmission  Self-test routines  Tests repeat?  Functional concept  Labelling and marking  Instruction manual  General requirements for tests  Samples and sequence of tests  General  Sequence  Stand alone gas detection apparatus  Stand alone control units  Preparation of apparatus before testing  Mask for calibration and tests  Normal conditions for test  Test gas(es)  Standard test gas  Flow rate for test gases  Voltage  Temperature  Pressure  Humidity  Stabilization time  Orientation  Communication options  Gas detection apparatus as part of systems |  |

**2: Procedures**

Relevant procedures (to be listed by body under assessment):

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| Procedure title | No | Clause(s) covered |
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**3: Equipment and Tests**

| Standard: IEC 60079-29-1 Gas detectors – Performance requirements of detectors for flammable  gases | | | |
| --- | --- | --- | --- |
| Clause | Requirement – Test | Result – Remark |
| **5.4** | **Test Methods** | |
| **5.4.1** | **General** | |
| **5.4.2** | **Unpowered storage** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.3** | **Calibration and adjustment** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.4** | **Stability (continuous duty)** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.4.1** | **Short-term stability** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.4.2** | **Long-term stability (fixed and transportable apparatus –  Group I only)** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.4.3** | **Long-term stability (portable apparatus – Group I only)** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.4.4** | **Long-term stability (fixed and transportable apparatus –  Group II only)** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.4.5** | **Long-term stability (portable apparatus – Group II only)** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.5** | **Stability (spot-reading apparatus only)** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.6** | **Alarm set point(s)** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.7** | **Temperature** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.7** | **Temperature** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.8** | **Pressure** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.9** | **Humidity** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.10** | **Air velocity** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.11** | **Flow rate for aspired apparatus** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.12** | **Orientation** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.13** | **Vibration** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.14** | **Drop test for portable and transportable apparatus** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.15** | **Warm-up time** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.16** | **Time of response** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.17** | **Minimum time to operate (spot-reading apparatus)** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.18** | **High gas concentration operation above the measuring range** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.19** | **Battery capacity** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.20** | **Power supply variations** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.21** | **Power supply interruptions, voltage transients and step changes of voltage \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.22** | **Addition of sample probe** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.23** | **Dust (for apparatus where air is sampled by natural diffusion)** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.24** | **Poisons and other gases** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.25** | **Electromagnetic immunity \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.26** | **Field calibration kit** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.27** | **Software verification** | |

**Minimum testing capability**

The ExTL should have the capability to carry out all tests, but for those tests marked with an asterisk there may be a subcontract arrangement to create the test conditions.

# IEC 60079-29-4 Explosive atmospheres - Part 29.4: Gas detectors—Performance requirements of open path detectors for flammable gases

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| Edition(s) covered by this TCD |
| 1.0 |

Regarding testing capabilities, the following approach should be followed.

* It is common for this testing to be done at the manufacturer's premises.
* Because of this, it may not be necessary for the ExTL to have all equipment necessary to do the tests.
* But this approach is only acceptable where the ExTL is demonstrating its expertise through having the capability to test at its own laboratories with its own test equipment for IEC 60079-29-1.

**1. Personnel**

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| Names of personnel deemed competent by the IECEx body being assessed for this standard | Abbreviation (eg initials) used below (if needed) | Interviewed (Y/N) |
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| Check of competence (typical topics to cover include): | Comments by IECEx Assessor |
| --- | --- |
| **What is the scope of this standard?**  **What is the fundamental difference between the equipment required to meet this standard and equipment required to meet IEC 60079-29-1?** |  |

**2: Procedures**

Relevant procedures (to be listed by body under assessment):

| Procedure title | No | Clause(s) covered |
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**3: Equipment and Testing**

| Standard: IEC 60079-29-4  Part 29-4: Gas detectors—Performance requirements  of open path detectors for flammable gases | | | |
| --- | --- | --- | --- |
| Clause | Requirement – Test | Result – Remark |
| **5.4** | **Test Methods** | |
| **5.4.1** | **Initial preparation and procedure** | |
| **5.4.2** | **Unpowered storage** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.3** | **Calibration curve** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.4** | **Stability** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.4.1** | **Slow release of gas volume (Equipment with automatic drift compensation only)** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.4.2** | **Long-term stability (continuous-duty a.c. or d.c. powered)** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.4.3** | **Long-term stability (continuous-duty battery powered)** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.4.4** | **Stability (sport-reading equipment only** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.5** | **Alarm reliability** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.6** | **Temperature variation** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.7** | **Water vapour interference** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| **5.4.7** | **Temperature** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.8** | **Vibration \*** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.9** | **Drop test for portable and transportable equipment** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.10** | **Alignment** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.11** | **Time of response** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.12** | **Minimum time to operate (spot-reading equipment** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.13** | **Battery capacity** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.14** | **Power supply variations (externally powered equipment)** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.15** | **Power supply interruptions and transients** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.16** | **Recovery from power supply interruption** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.17** | **Electromagnetic compatibility (EMC)** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.18** | **Beam block fault** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.19** | **Partial obscuration** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.20** | **Long term operation** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.4.21** | **Direct solar radiation (applicable for equipment intended for outdoor use)** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |

**Minimum testing capability**

See the introduction for this standard regarding minimum testing capability.

# IEC 60079-30-1 Explosive atmospheres - Part 30.1: Electrical resistance trace heating—General and testing requirements

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| Edition(s) covered by this TCD |
| 1.0 |

**1. Personnel**

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| Names of personnel deemed competent by the IECEx body being assessed for this standard | Abbreviation (eg initials) used below (if needed) | Interviewed (Y/N) |
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| Check of competence (typical topics to cover include): | Comments by IECEx Assessor |
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| **What is the scope of this standard?** |  |

**2: Procedures**

Relevant procedures (to be listed by body under assessment):

| Procedure title | No | Clause(s) covered |
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**3: Equipment and Testing**

| Standard: IEC 60079-30-1  Part 30.1: Electrical resistance trace heating—General and testing requirements | | |
| --- | --- | --- |
| Clause | Requirement – Test | Result – Remark |
| **5.1.2** | **Dielectric Test** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.1.3** | **Electrical insulation resistance test** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.1.4** | **Flammability test** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.1.5** | **Impact test** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
| Photos |  |  |
| **5.1.6** | **Deformation test.** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.1.7** | **Cold bend tests** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **5.1.8** | **Water resistance test** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| 5.1.9 | **Integral components resistance to water test** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| 5.1.10 | **Verification of rated output** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| 5.1.11 | **Thermal stability of electrical insulating material** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| 5.1.13 | **Determination of maximum sheath temperature** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| 5.1.14 | **Verification of start-up current** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| 5.1.15 | **Verification of the electrical resistance of metallic covering** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |

**Minimum testing capability**

All tests should be capable of being performed by the ExTL.

# IEC 60079-31 Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"

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| Edition(s) covered by this TCD |
| 2.0 |

**1. Personnel**

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| Names of personnel deemed competent by the IECEx body being assessed for this standard | Abbreviation (eg initials) used below (if needed) | Interviewed (Y/N) |
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| Check of competence (typical topics to cover include): | Comments by IECEx Assessor |
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| What is the type of protection t |  |

**2: Procedures**

Relevant procedures (to be listed by body under assessment):

| Procedure title | No | Clause(s) covered |
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**3: Equipment and Testing**

| Standard: IEC 60079-31 Equipment dust ignition protection by enclosure "t" | | |
| --- | --- | --- |
| Clause | Requirement – Test | Result – Remark |
| **6.1.1** | **Dust exclusion by enclosures (IP 5X or 6X) with 2kPa or 4kPa depression** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **6.1.2** | **Thermal tests (including dust layer for ta)** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **6.1.3** | **Pressure test (4kPa or 2kPa)** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |

**Minimum testing capability**

All tests should be capable of being performed by the ExTL

Where the thermal tests including dust layer is required it shall be sufficient for the ExTL to demonstrate that it has a source of dust that complies with IEC 60079-0

# IEC 60079-32-1 Explosive atmospheres - Part 32-1: Electrostatic hazards, guidance

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| Edition(s) covered by this TCD |
| 1.0 |

**1. Personnel**

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| Names of personnel deemed competent by the IECEx body being assessed for this standard | Abbreviation (eg initials) used below (if needed) | Interviewed (Y/N) |
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| Check of competence (typical topics to cover include): | Comments by IECEx Assessor |
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| What is the scope of this standard |  |

**2: Procedures**

Relevant procedures (to be listed by body under assessment):

| Procedure title | No | Clause(s) covered |
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**3: Equipment and Testing**

| Standard: IEC 60079-32 Explosive atmospheres - Part 32-1: Electrostatic hazards, guidance | | |
| --- | --- | --- |
| Clause | Requirement – Test | Result – Remark |
| **G2** | **Surface resistance** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **G3** | **Surface resistivity** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **G4** | **Leakage resistance** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **G5** | **In-use testing of footwear** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **G6** | **In-use testing of gloves** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **G7** | **Powder resistivity** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **G8** | **Liquid conductivity** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **G9** | **Capacitance** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **G10** | **Transferred charge** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **G11** | **Ignition test** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **G12** | **Measuring of charge decay** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **G13** | **Breakthrough voltage** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |

**Minimum testing capability**

All tests included include in the ExTL scope should be capable of being performed by the ExTL

# IEC 60079-33 Explosive atmospheres – Part 33: Equipment protection by special protection “s”

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| Edition(s) covered by this TCD |
| 1.0 |

**1. Personnel**

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| Names of personnel deemed competent by the IECEx body being assessed for this standard | Abbreviation (eg initials) used below (if needed) | Interviewed (Y/N) |
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| Check of competence (typical topics to cover include): | Comments by IECEx Assessor |
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| What is the scope of this standard? |  |

**2: Procedures**

Relevant procedures (to be listed by body under assessment):

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| Procedure title | No | Clause(s) covered |
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**3: Equipment and Tests**

**Minimum testing capability**

There are no tests specified by this standard.

# IEC 60079-35-1 Explosive atmospheres - Part 35-1: Caplights for use in mines susceptible to firedamp – General requirements – Construction and testing in relation to the risk of explosion

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| Edition(s) covered by this TCD |
| 1.0 |

**1. Personnel**

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| Names of personnel deemed competent by the IECEx body being assessed for this standard | Abbreviation (eg initials) used below (if needed) | Interviewed (Y/N) |
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| Check of competence (typical topics to cover include): | Comments by IECEx Assessor |
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| What is the scope of this standard? |  |

**2: Procedures**

Relevant procedures (to be listed by body under assessment):

| Procedure title | No | Clause(s) covered |
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**3: Equipment and Testing**

| Standard: IEC 60079-35-1  Part 35-1: Caplights for use in mines susceptible to firedamp – General requirements – Construction and testing in relation to the risk of explosion | | |
| --- | --- | --- |
| **Clause** | **Requirement – Test** | **Result – Remark** |
| **8.1** | **Impact test** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **8.2** | **Drop tests** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **8.3** | **Degree of protection (IP) by enclosures** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **8.4** | **Test to verify the non-ignition of a representative electrolytic gas mixture or**  **firedamp by fuse or thermal circuit-breaker** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **8.5** | **Test to verify the non-ignition of a gas mixture by one strand of the cable**  **between the headpiece and the battery by thermal ignition** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **8.6** | **Test to verify the resistance of the cable sheath to fatty acids** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **8.7** | **Test to verify the resistance of the cable sheath to fire** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **8.8** | **Test to verify the strength of cable entries, anchoring devices and cable** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **8.9** | **Electrolyte leakage test for cells and batteries** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |
| **8.10** | **Current-limiting resistor test** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |

**Minimum testing capability**

All tests should be capable of being performed by the ExTL.

# IEC 60079-35-2 Explosive atmospheres - Part 35–2: Caplights for use in mines susceptible to firedamp – Performance and other safety-related matters

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| --- |
| Edition(s) covered by this TCD |
| 1.0 |

**1. Personnel**

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| Names of personnel deemed competent by the IECEx body being assessed for this standard | Abbreviation (eg initials) used below (if needed) | Interviewed (Y/N) |
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| Check of competence (typical topics to cover include): | Comments by IECEx Assessor |
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| What is the scope of this standard? |  |

**2: Procedures**

Relevant procedures (to be listed by body under assessment):

| Procedure title | No | Clause(s) covered |
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**3: Equipment and Testing**

| Standard: IEC 60079-35-2  Part 35–2: Caplights for use in mines susceptible to firedamp –  Performance and other safety-related matters | | |
| --- | --- | --- |
| **Clause** | **Requirement – Test** | **Result – Remark** |
| **7** | **Type tests - Illumination throughout the useful working period** | |
|  | Availability and adequacy of equipment |  |
|  | Maintenance and calibration |  |
|  | Capable of being performed correctly |  |
|  | Comments |  |
| Photos |  |  |

**Minimum testing capability**

All tests should be capable of being performed by the ExTL