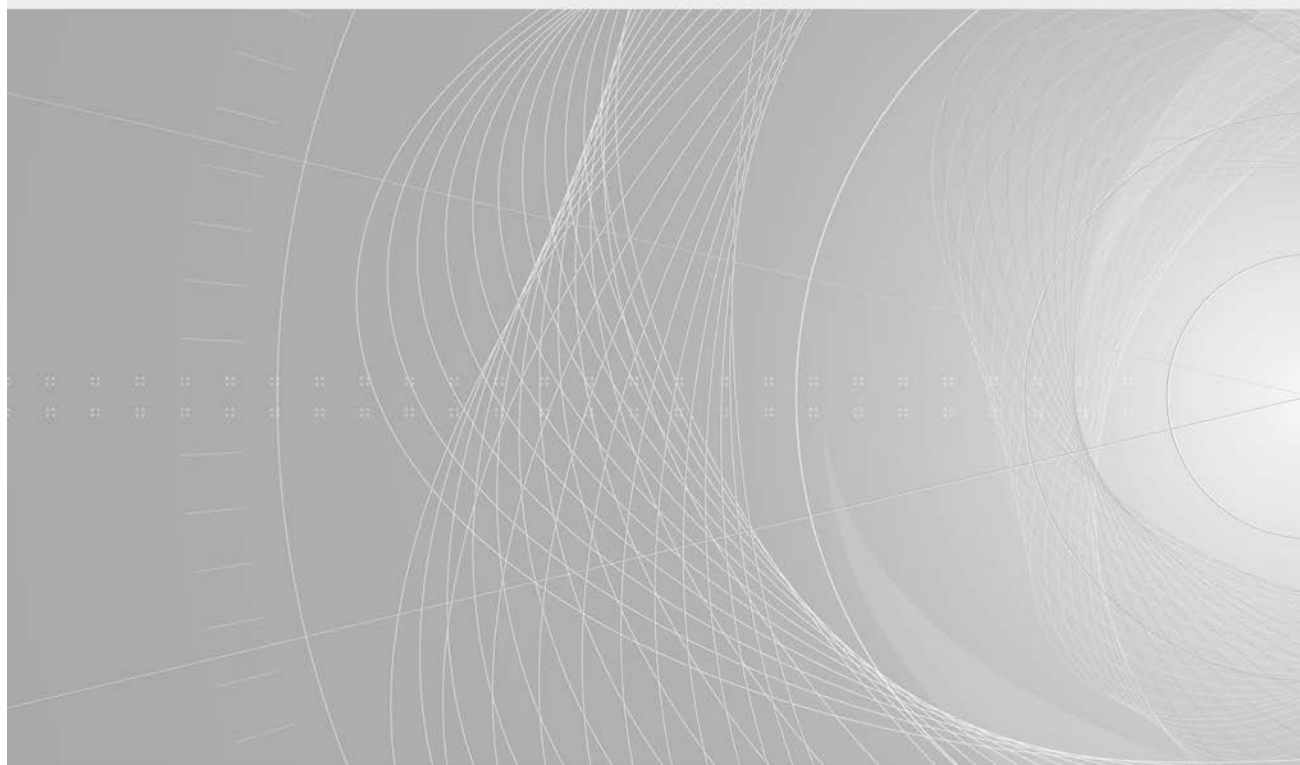


IECEX OPERATIONAL DOCUMENT

**IEC System for Certification to Standards relating to Equipment for use
in Explosive Atmospheres (IECEX System)**

IECEX Certified Equipment Scheme –

**IECEX Quality System Requirements for Manufacturers –
Part 3: Supplementary requirements for non-electrical equipment to ISO/IEC
80079-34 Edition 1**





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1 Scope

Pending publication of ISO/IEC 80079-34 Edition 2, this document provides supplementary requirements for ISO/IEC 80079-34 Edition 1 related to non-electrical equipment.

NOTE The information in Annex A of this document was been provided by the convenor of IEC SC 31M MT80079-34 as the most current text being considered for the next edition of ISO/IEC 80079-34. This version is revised to take account of changes that occurred once this CD was issued as 31M_107e_CD. This OD may be updated if the proposed text for ISO/IEC 80079-34 Edition 2 changes, for example at the CDV stage

2 Normative references

ISO/IEC 80079-34 Edition 1.0 2011-04, *Explosive atmospheres – Part 34: Application of quality systems for equipment manufacture*

ISO/IEC 80079-36 Edition 1.0 *Explosive atmospheres – Part 36: Non-electrical equipment for explosive atmospheres – Basic method and requirements*

ISO/IEC 80079-37 Edition 1.0 *Explosive atmospheres – Part 37: Non-electrical equipment for explosive atmospheres – Non electrical type of protection constructional safety “c”, control of ignition source “b”, liquid immersion “k”*

ISO 16852:2008 *Flame arresters - Performance requirements, test methods and limits for use*

3 Requirements

In general all the requirements of ISO/IEC 80079-34 Edition 1.0 shall apply for non-electrical Ex equipment as well electrical Ex equipment.

In addition to the requirements in the above standard, the requirements for Annex A of this OD shall be considered for non-electrical equipment.

**Annex A
(informative)
Information relevant to particular types of protection for non-electrical
equipment**

A.1 General

This annex provides information on those aspects that the quality system should address with respect to non-electrical equipment. It does not add to or otherwise change the requirements of ISO/IEC 80079-34.

This annex provides examples of how to meet the requirements of this standard, recognizing that other methods which achieve the same objectives are equally acceptable; and draws attention to aspects of requirements that may not be readily apparent to those unfamiliar with quality systems for products intended for use in explosive atmospheres.

A.2 Flame arresters [A.12 of ISO/IEC 80079-34 CD]

Documented procedures should ensure that the following aspects are verified, if relevant:

- a) gap width measurement on the enclosure, between cage and enclosure, on thread openings into the enclosure and between flame arrester and enclosure;
- b) flow measurement;
- c) leak test of housing;
- d) pressure test of housing;
- e) assurance of material properties;
- f) tests of welded joints;
- g) determination of limits of use;
- h) measurement of the triangle's height or of the porosity of the flame arrester;
- i) marking of the pipe connection facilities to be protected.

A.3 Ex h Non-electrical Equipment (ISO 80079-36) [A.14 of ISO/IEC 80079-34 CD]

A.3.1 General

The following safety aspects as specified in the technical documentation should be realised by systematic production techniques and/or verifications and tests on the basis of written procedures.

For dust ignition protection the safety aspects laid down in A.10 of ISO/IEC 80079-34 Edition 1 may also apply.

A.3.2 Non metallic parts

Non metallic parts should be subject to verification that demonstrates conformity, e.g.:

- a) material characteristics;
- b) finish;
- c) surface resistance;
- d) surface area of non-conductive parts;
- e) limitation of thickness;
- f) measures for charge bonding (earthed frames).

A.3.3 Casing and external parts

Casing and external parts should be subject to verification that demonstrates conformity, e.g.:

- a) material of the casing and content of light metals;
- b) protection of removable parts against unintentional or inadvertent removal;
- c) materials used for cementing.

A.3.4 Earthing and equipotential bonding of conductive parts

The following parts should be subject to verification that demonstrates conformity, e.g.:

- a) earthing terminal;
- b) effective connection of conductive parts;
- c) voltage equalising cables.

A.3.5 Light transmitting parts

The following light transmitting parts should be subject to verification that demonstrates conformity, e.g.:

- a) material;
- b) integrity;
- c) guards and protective covers.

A.3.6 Ingress protection (IP)

The following parts should be subject to verification that demonstrates conformity, e.g.:

- a) weld continuity;
- b) fitting of gaskets and seals;
- c) continuity of moulded grooves and tongues;
- d) application of cements including a visual inspection after curing.

A.4 Non Electrical Equipment protected by constructional safety “c” (ISO 80079-37) [A.14 of ISO/IEC 80079-34 CD]

A.4.1 General

Additional to the safety aspects for non-electrical equipment defined in A.3 the following safety aspects are relevant.

A.4.2 Metal-based material

The following parts should be subject to verification that demonstrates conformity, e.g.:

- a) material name complies with the requirement;
- b) material properties (composition with regard to corrosion, thermal conduction and mechanical sparks, mass fraction of aluminium, titanium, magnesium, zirconium, flammability);
- c) cracks, inclusions, blow holes and porosity (either by a visual test or another suitable test method depending on exposure);
- d) heat treatment (e.g. hardening, tempering);

e) dimensional accuracy including all parts without machining.

A.4.3 Machining

The following parts should be subject to verification that demonstrates conformity, e.g.:

- a) compliance with tolerances for shape, position, concentricity, quality of finish;
- b) dimensional accuracy of functional surfaces (e.g. tolerances for diameters; especially for indicator units pre-adjustment and correct polarity);
- c) depth and configuration of cut-in to ensure the constructionally intended stress concentration.

A.4.4 Cemented joints and potted assemblies

The following parts should be subject to verification that demonstrates conformity, e.g.:

- a) shelf-life and storage of adhesives and casting compounds;
- b) mixing procedure;
- c) surface treatment (degreasing or equivalent measures are usually required immediately before the potting-process to ensure proper adhesion);
- d) curing process, which should include: curing time, any relevant environmental factors and all provisions made to ensure that the curing process will proceed without disturbance.
- e) after curing, 100 % visual inspection should be done on each potted assembly

A.4.5 Assembling

The following parts should be subject to verification that demonstrates conformity, e.g.:

- a) correct components and parts;
- b) distances between moving parts or between fixed and moving parts;
- c) equipotential bonding between subassemblies;
- d) mechanical seals;
- e) protective covers.

A.4.6 Routine tests

The following parts should be subject to verification that demonstrates conformity, e.g.:

- a) sealing systems (fit, lubrication, initial tension, primary pressure);
- b) dynamic vibrations (e.g. critical rotation speed, bearing at standstill or at transport)
- c) functional test of the complete assembly (distance between rotor/stator modules, clamping, clearance, free room of motion)

A.4.7 Power transmission systems

The following parts should be subject to verification that demonstrates conformity, e.g.:

- a) conditions of the lubrication;
- b) belt tension;
- c) equipotential bonding (especially couplings, belt drives, chain drives, gears, shafts)

A.5 Non Electrical Equipment protected by control of ignition sources “b” (ISO 80079-37) [A.16 of ISO/IEC 80079-34 CD]

A.5.1 General

Additional to the safety aspects for non-electrical equipment defined in A.10 of ISO/IEC 80079-34 Edition 1 the following safety aspects are relevant.

A.5.2 Ignition protection system

The following parts should be subject to verification that demonstrates conformity, e.g.:

- a) selection of appropriate sensors, actuators and other relevant parts (e.g. temperature range);
- b) indicating devices marked to indicate the maximum and minimum operating levels;
- c) specification of tests and all other necessary information in the instructions.

A.5.3 Installation

The following parts should be subject to verification that demonstrates conformity, e.g.:

- a) installation of sensors and actuators (fail safe characteristics, separate power supply);
- b) connection installation of sensors (e.g. offset)
- c) position of sensors;
- d) correct interfacing;
- e) avoidance of delay elements;
- f) avoidance of unintended modification of set values;
- g) independent power supply

A.5.4 Tests

Typically, the following tests and verifications should be done at the manufacturers site. If the ignition protection system is assembled during installation at the users site, the instruction should give specific guidance how to carry out these tests.

The following tests should be performed in order to demonstrate conformity, e.g.:

- a) tests before initial operation or specification of these tests in the instructions;
- b) functioning;
- c) accuracy;
- d) response behaviour;
- e) fail-safe;
- f) interlocking of settings;
- g) specification of tests in the course of maintenance in the instructions.

A.6 Non Electrical Equipment protected by liquid immersion “k” (ISO 80079-37) [A.17 of ISO/IEC 80079-34 CD]

A.6.1 General

Additional to the safety aspects for non-electrical equipment defined in A.10 of ISO/IEC 80079-34 Edition 1 the following safety aspects are relevant.

A.6.2 Protective liquid

The following features should be subject to verification that demonstrates conformity, e.g.:

- a) type of the liquid;
- b) liquid level or flow rate or pressure (depending on the system).

A.6.3 Casing

The following items should be subject to verification that demonstrates conformity, e.g.:

- a) leak tightness of the protective liquid closed loop;
- b) protections against unintentional or inadvertent of fastenings;
- c) measures against protective liquid impurity.

A.6.4 Measuring or indicating devices

The following features should be subject to verification that demonstrates conformity, e.g.:

- a) dipstick;
- b) marking of maximum/minimum criteria for the protective liquid level;
- c) marking of maximum permissible angle of inclination.