IEC TS 60079-46

Edition 1.0 2017-08

TECHNICAL SPECIFICATION

SPECIFICATION TECHNIQUE

Explosive atmospheres –
Part 46: Equipment assemblies

Atmosphères explosives –
Partie 46: Assemblages d'appareils

IEC TS 60079-46:2017-08 (en-fr)

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FOREWORD

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- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 60079-46, which is a technical specification, has been prepared by IEC technical committee TC 31: Equipment for explosive atmospheres.

This bilingual version (2018-10) corresponds to the monolingual English version, published in 2017-08.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
31/1312/DTS	31/1327/RVDTS

Full information on the voting for the approval of this technical specification can be found in the report on voting indicated in the above table.

The French version of this technical specification has not been voted upon.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 60079 series, published under the general title *Explosive atmospheres*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

The provision of products into end markets for installation by end users may take the form of either individual items of equipment or pre-manufactured assemblies comprising many items of equipment. Pre-manufactured equipment assemblies may be as either subsystems requiring integration as part of an installation at a site or complete functional machines which require little or no additional reassembly on site.

This document is applied when assembly of Ex Equipment(s) results in an assembly that creates a need for additional assessment that is not already completely covered by the individual equipment certificates. Additional assessment might include (but is not limited to) evaluation of wiring methods used to connect the equipment(s) or temperature rise within the assembly.

This document provides requirements for the design, construction, assembly, testing, inspection, marking, documenting and assessment of equipment assemblies such that the items of Ex Equipment and the interconnection of the items of equipment form an assembly that also meets other parts of the ISO 80079 and IEC 60079 series.

This document is intended to be used for verification of assemblies to assist in ensuring products are in compliance with the requirements of the ISO 80079 and IEC 60079 series at the time of initial installation at the end user site.

After the initial installation, the assembly is considered as part of the site installation in accordance with other parts of the ISO 80079 and IEC 60079 series.

EXPLOSIVE ATMOSPHERES –

Part 46: Equipment assemblies

1 Scope

This part of IEC 60079, which is a technical specification, specifies requirements for the design, construction, assembly, testing, inspection, marking, documenting and assessment of equipment assemblies for use in explosive atmospheres under the responsibility of the manufacturer of the equipment assembly.

The requirements of this document apply to individual items according to the IEC 60079 series or ISO 80079 series that comprise the assembly and that have individual certificates. These individual items are then integrated as part of the equipment assembly. Also included are requirements to address aspects for the assembly which may be beyond the certificates of the individual items forming the assembly.

The scope of this document includes assessment of the additional requirements for assemblies for hazardous areas and does not include requirements for non-hazardous areas. It is assumed that compliance with other electrical or mechanical requirements that are applicable for non-hazardous areas will be verified by either the same or different party in addition to the requirements of this document.

This document does not apply to:

– equipment which is covered, in its entirety, by one or more IEC 60079 and ISO 80079 equipment types of protection;
– pressurized rooms, “p”, in accordance with IEC 60079-13, artificial ventilation for the protection of analyzer(s) houses in accordance with IEC TR 60079-16, and other standards addressing specific Ex assemblies;
– installation at the end-user site under the scope of IEC 60079-14;
– classification of the hazardous area;
– equipment assemblies for mines susceptible to firedamp (Group I applications);
– inherently explosive situations and dust from explosives or pyrophoric substances (for example explosives manufacturing and processing);
– rooms used for medical purposes;
– electrical installations in areas where the hazard is due to flammable mist.

The specification is only intended to provide validation for the initial supply of an assembly.

NOTE 1 Additional guidance on the requirements for hazards due to hybrid mixtures of dust or flyings and flammable gas or vapour is provided in IEC 60079-14.

Where a requirement of this document conflicts with a requirement of either IEC 60079-0 or ISO 80079-36, the requirement of this document takes precedence.

NOTE 2 For this first edition, the only requirements of this document that take precedence over IEC 60079-0 or ISO 80079-36 are the markings for equipment assemblies.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60079 (all parts), *Explosive atmospheres*

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

IEC 60079-10-1, *Explosive atmospheres – Part 10-1: Classification of areas – Explosive gas atmospheres*

IEC 60079-10-2, *Explosive atmospheres – Part 10-2: Classification of areas – Explosive dust atmospheres*

IEC 60079-14, *Explosive atmospheres – Part 14: Electrical installations design, selection and erection*

IEC 60079-25, *Explosive atmospheres – Part 25: Intrinsically safe electrical systems*

ISO 80079 (all parts), *Explosive atmospheres*

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

ISO 80079-36, *Explosive atmospheres – Part 36: Non-electrical equipment for explosive atmospheres – Basic method and requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60079-0, IEC 60079-14, ISO 80079-36 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
equipment assembly
pre-manufactured combination of Ex Equipment, together with other parts as necessary, that are electrically or mechanically interconnected that are pre-assembled prior to being placed into service at the end-user site, and that can be disassembled and then re-assembled at the end-user site

3.2
equipment assembly certificate
document that conveys the assurance of the conformity of an equipment assembly with specified requirements

Note 1 to entry: The certificate is either the supplier's declaration of conformity or the purchaser's recognition of conformity or certification (as a result of action by a third party) as defined in ISO/IEC 17000:2004, definition 2.

3.3
pre-manufactured
equipment assembly produced at any location(s) other than the end-user site

4 General requirements for equipment assemblies

4.1 General specifications

The equipment assembly shall be verified for suitability against the requirements of this document, IEC 60079-0, IEC 60079-14 and ISO 80079-36 as applicable.

The general specifications may be provided by the end-user or by the manufacturer for the intended use of the equipment assembly and shall cover the following as a minimum:

– manufacturer’s unique equipment assembly identifier (e.g. serial number);
– input and output ratings;
– intended environmental conditions, including ambient temperature range and ingress protection;
– applicable explosion protection codes, standards and regulations;
– utility-related issues, including power supply;
– any requirements for items to be used in the equipment assembly;
– process conditions, including fluids, pressures, duty;
– external sources of heating and cooling;
– external interface parameters (e.g. for intrinsic safety, controls, shutdowns and interlocks, including details regarding failure modes).

These general specifications related to the application of the equipment assembly shall be documented by the manufacturer.

4.2 Explosion protection specifications

In addition to the general specifications of 4.1, if not specified as part of them, the manufacturer shall document the following specifications related to the installation of the equipment assembly by the end-user:

– default equipment protection level (EPL) as defined in IEC 60079-14, as a minimum requirement;
– equipment Group;
– temperature classification or maximum surface temperature;
– allowances for dust layers as applicable;
– Specific Conditions of Use (“X” conditions).

4.3 Hazardous area classification related to the equipment assembly

4.3.1 General

There are two aspects of area classification that can impact equipment assemblies. The first is due to the area in which the equipment assembly is to be installed, and the second is due to any source of release from the equipment assembly.

It is not a requirement of this document to verify either of these area classifications.

The manufacturer shall document the suitability of the equipment assembly for the intended end-site hazardous area classification and for the defined installation conditions.

4.3.2 Equipment assembly with its own source of release

If the equipment assembly has its own source of release, the manufacturer shall also document:

– the hazardous area classification identifying any source of release, factors relevant to the sources of release (e.g. release rate, orifice size, operating mode, failure mode, recommendation for management of the hazard) and any other information relevant to quantifying the hazard and the methodology and any references used to arrive at the classification;
– any conditions defined by the manufacturer such that the suitability of the equipment assembly for the hazardous area classification remains valid.

The classification of hazardous areas shall be in accordance with IEC 60079-10-1 or IEC 60079-10-2 as applicable. This classification may be provided by the end-user.

4.4 Competencies

For equipment assemblies subjected to type verification, the manufacturing process and the competency of the related personnel shall conform to ISO/IEC 80079-34.

For equipment assemblies subjected to unit verification, competency of the personnel performing the production processes is verified by conformity of the equipment assembly with this document. The verifying party shall be competent in the explosion protection aspects of the assembly being verified.

When equipment assemblies are subjected to unit verification, the verifying party shall have evidence of competency through an independent party or system.

Documentation regarding the above shall be included with each equipment assembly.

NOTE An example of suitable documentation to demonstrate the competency required for type verification would be a record of current assessment to ISO/IEC 80079-34 by a competent third-party assessor, and for unit verification it could be a current certificate issued by a competent third-party assessor.

5 Design of equipment assemblies

5.1 General

The selection, installation and inspection of the electrical equipment in an assembly shall be in accordance with IEC 60079-14, except as modified by this document.

5.2 Ex Equipment

5.2.1 Individual items

Individual items that comprise the equipment assembly shall conform to the IEC 60079 series or ISO 80079 series standards based on the associated ignition risks, and shall have individual Ex Equipment certificates or be assessed as part of the assembly.

All individual items shall be suitably rated for the application and be utilized in accordance with the manufacturer's instructions.

Where items other than suitably rated Ex Equipment were not separately assessed as part of Ex Equipment, an assessment, including further tests according IEC 60079 series or ISO 80079 series standards if necessary, shall be made as part of the equipment assembly evaluation.

NOTE Items other than Ex Equipment can include, for example, Ex Components, simple apparatus, general industrial products within an Ex "d" or Ex "p" enclosure, Group I equipment used in a Group II application.

5.2.2 Specific Conditions of Use as specified on certificates

All Specific Conditions of Use as specified on equipment certificates shall be considered and their application documented by the manufacturer as follows:

– If directly related to the equipment assembly, how they were satisfied in the equipment assembly.

– If directly related to the equipment assembly, but not satisfied in the equipment assembly, how they will be able to be satisfied in the end-user site installation.

– If not directly related to the equipment assembly, why they were not directly related.

Specific Conditions of Use that are related to items of equipment forming the equipment assembly, that are not satisfied in the equipment assembly, but able to be satisfied in the end-user site installation, shall be included or addressed, on the equipment assembly certificate.

5.2.3 Item list

An item list shall be prepared by the manufacturer of the equipment assembly and included as part of each equipment assembly certificate.

This list shall include an inventory of all Ex Equipment, including Ex Components that were assessed as part of this equipment assembly, incorporated into the equipment assembly.

Regarding each item on this list, details shall be provided that indicate the:

– description (type of device);

– manufacturer's name and model or part number (type designation);

– identification number of each item (e.g. tag number);

– Ex Equipment certificate number, including issue number;

– Ex Component certificate number, including issue number, for Ex Components that were assessed as part of this equipment assembly;

– type of protection, Group and temperature classification (which may be provided as the complete Ex marking string);

– ambient temperature range;

– ingress protection (IP Code), if applicable.

5.3 Other items

Regarding other items that may be relevant to explosion protection for the equipment assembly (e.g. non-metallic parts such as housings, handles, cable trays, rollers, fluid tubing), details shall be provided that indicate the:

– description (type of device);

– manufacturer's name and model or part number (type designation);

– description of any explosion risk involved and how the risks are mitigated.

NOTE ISO 80079-36 provides guidance regarding ignition risk assessments applicable to both non-electrical and electrical ignition risks.

5.4 Wiring system

Design of the wiring system for the equipment assembly that interconnects the Ex Equipment shall incorporate wiring methods that conform to IEC 60079-14.

Information shall be provided by the manufacturer for each wiring method, including termination means, used as part of each equipment assembly.