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INTERNATIONAL STANDARD

NORME INTERNATIONALE



Explosive atmospheres –
Part 30-1: Electrical resistance trace heating – General and testing requirements
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Atmosphères explosives –
Partie 30-1: Traçage par résistance électrique – Exigences générales et d'essais

IEC/IEEE 60079-30-1:2015
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

EXPLOSIVE ATMOSPHERES –

Part 30-1: Electrical resistance trace heating – General and testing requirements

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International Standard IEC/IEEE 60079-30-1 has been prepared by IEC technical committee 31: Equipment for explosive atmospheres, in cooperation with the Petroleum & Chemical Industry Committee of the IEEE Industrial Applications Society under the IEC/IEEE Dual Logo Agreement.

This publication is published as an IEC/IEEE Dual Logo standard.

NOTE A list of IEEE participants can be found at the following URL:
http://standards.ieee.org/downloads/60079/60079-30-1-2015/60079-30-1-2015_wg-participants.pdf.

This bilingual version (2018-04) corresponds to the English version, published in 2015-09.

This first edition of IEC/IEEE 60079-30-1 cancels and replaces the first edition of IEC 60079-30-1 published in 2007 and constitutes a technical revision.

This edition includes the following significant changes, apart from the general revision and updating of the first edition of IEC 60079-30-1 and harmonization with IEEE Std 515, with respect to the previous edition:

- the inclusion of a minimum temperature impact test;
- the addition of a mechanical procedure in the thermal stability test;
- the inclusion of a thermal performance test to replace the thermal safety requirements;
- the inclusion of a second procedure utilizing a plate fixture for sheath temperature determination;
- the inclusion of an ultraviolet and condensation test;
- the revision and significant expansion of documentation requirements;
- the addition of Annexes covering requirements for Divisions 1 and 2;
- the addition of a table covering the applicability of requirements from IEC 60079-0;
- the addition of an Annex covering trace heater product design verification methodology (formerly located in IEC 60079-30-2);
- the further harmonization of this edition with several national standards.

The significance of changes between IEC 60079-30-1, Edition 1.0 (2007) and IEC/IEEE 60079-30-1, Edition 1.0 (2015) is as listed below:

Changes	Clause	Type		
		Minor and editorial changes	Extension	Major technical changes
Addition of clarification for the exclusion of EPLs Ga and Da	1	X		
Addition of requirements for the Division method of area classification that may be applied by some users	1		X	
Addition of table specifying the application or exclusion of specific clauses of IEC 60079-0 Edition 6	1	X		
For stabilized designs, a clarification for the need for verification by testing and the addition of a table for the specific requirements	4.5.2	X		
For controlled designs, a clarification for the need for verification by testing and the addition of a table for the specific requirements	4.5.3	X		
For controlled designs, clarifications and additions on the separate requirements for Gb/Db and Gc/Dc	4.5.3		X	
The requirements for calibration of the flammability test fixture are replaced with equivalent requirements	5.1.4	X		

Changes	Clause	Type		
		Minor and editorial changes	Extension	Major technical changes
for the energy levels of the test gases				
Addition of a minimum temperature impact test	5.1.5			C1
For thermal stability, the addition of a bending requirement on a mandrel	5.1.11			C1
The replacement of the thermal safety procedure with a thermal performance procedure	5.1.12			C2
The addition of a second procedure utilizing a plate fixture for the systems method for maximum sheath temperature determination	5.1.13.2			C3
Addition of outdoor exposure test	5.1.16			C4
Requirement changed for the marking of the minimum installation temperature	6.1			C5
Addition of new markings requirements for field assembled components	6.2			C5
Additions and changes to the documentation requirements	7			C5
Addition of Annex	Annex A	X		
Addition of Annex	Annex B	X		
Addition of Annex specifying trace heating design verification methodology, moved from IEC 60079-30-2	Annex C			C6
Addition of Annex for the Division method of area classification that may be applied by some users	Annex D		X	
Addition of Annex for the Division method of area classification that may be applied by some users	Annex E		X	

NOTE The technical changes referred to include the significance of technical changes in the revised IEC Standard, but they do not form an exhaustive list of all modifications from the previous version.

Explanations:

A) Definitions

Minor and editorial changes

clarification
decrease of technical requirements
minor technical change
editorial corrections

These are changes which modify requirements in an editorial or a minor technical way. They include changes of the wording to clarify technical requirements without any technical change, or a reduction in level of existing requirement.

Extension addition of technical options

These are changes which add new or modify existing technical requirements, in a way that new options are given, but without increasing requirements for equipment that was fully compliant with the previous standard. Therefore, these will not have to be considered for products in conformity with the preceding edition.

Major technical changes

addition of technical requirements
increase of technical requirements

These are changes to technical requirements (addition, increase of the level or removal) made in a way that a product in conformity with the preceding edition will not always be able to fulfil the requirements given in the later edition. These changes have to be considered for products in conformity with the preceding edition. For these changes additional information is provided in clause B) below.

NOTE These changes represent current technological knowledge. However, these changes should not normally have an influence on equipment already placed on the market.

B) Information about the background of ‘Major Technical Changes’

C1 – The requirements for additional mechanical testing have been included for harmonization and for added safety.

C2 – The requirements for thermal performance have been included to recognize the necessity for thermal stability of products in explosive atmospheres.

C3 – A second procedure utilizing a plate fixture has been included for sheath temperature determination, which may be used in lieu of the sheath temperature verification part of 5.1.13.4.2.

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C4 – An outdoor exposure test has been added to cover products that may be exposed to sunlight and moisture in the intended application.

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C5 – Additional marking and documentation requirements have been added to provide additional information to the end user

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https://standards.iec.ch/catalog/standards/sls/60079-30-7115-2014-021d-
4a5cd596411/iec-ieee-60079-30-1-2015

C6 – The trace heating design verification methodology has been added to align with the evaluation requirements for the stabilized design and the controlled design methods of maximum sheath temperature determination.

This bilingual version (2018-03) corresponds to the English version, published in 2015-09.

The text of this standard is based on the following IEC documents:

FDIS	Report on voting
31/1191/FDIS	31/1201/RVD

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

The French version of this standard has not been voted upon.

International standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

This standard is intended to be used in conjunction with IEC/IEEE 60079-30-2:2015, *Explosive atmospheres – Part 30-2: Electrical resistance trace heating – Application guide for design, installation and maintenance.*

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

The IEC Technical Committee and IEEE Technical Committee have 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

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INTRODUCTION

IEC/IEEE 60079-30-1 is intended to provide a comprehensive overview of the essential requirements and testing appropriate to electric surface heating equipment used in explosive atmospheres. The requirements of this part of IEC 60079 are considered to be the minimum requirements for equipment protection levels Gb, Gc, Db, and Dc in explosive atmospheres for gases, dusts, and fibres/flyings. While some of this work already exists in national standards or international standards, this standard has collated much of this existing work and considerably added to it. This standard also contains the minimum requirements for users applying the Division method of area classification.

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EXPLOSIVE ATMOSPHERES –

Part 30-1: Electrical resistance trace heating – General and testing requirements

1 Scope

This part of IEC 60079 specifies general and testing requirements for electrical resistance trace heaters for application in explosive atmospheres with the exclusion of those for EPL Ga and Da. This standard covers trace heaters that comprise either factory or field (work-site) assembled units, and which may be series trace heaters, parallel trace heaters, trace heater pads, or trace heater panels that have been assembled and/or terminated in accordance with the manufacturer's instructions.

This standard also includes requirements for termination assemblies and control methods used with trace heating systems. The explosive atmospheres referred to in this standard are those defined in IEC 60079-10-1 and IEC 60079-10-2.

Annexes D and E outline the application of this standard for those users applying the Division method of area classification.

This standard supplements and modifies the general requirements of IEC 60079-0, except as indicated in Table 1. Where a requirement of this standard conflicts with a requirement of IEC 60079-0, the requirement of this standard takes precedence.

Table 1 – Application or exclusion of specific clauses of IEC 60079-0

IEC 60079-0		Electrical resistance trace heaters and integral components		Terminations as separate components
Ed. 6.0 (2011) (informative)	Clause / Subclause title (normative)	Group I and Group II	Group III	
1	Scope	Applies	Applies	Applies
2	Normative references	Applies	Applies	Applies
3	Terms and definitions	Applies, except ambient temperature, see 3.1	Applies, except ambient temperature, see 3.1	Applies, except ambient temperature, see 3.1
4	Equipment grouping	Applies	Applies	Applies
4.1	Group I	Applies	Excluded	Applies
4.2	Group II	Applies, always IIC	Excluded	Applies
4.3	Group III	Excluded	Applies, outside of thermal insulation only, always IIIC	Applies, outside of thermal insulation only
4.4	Equipment for a particular explosive atmosphere	Excluded	Excluded	Applies
5.1	Environmental influences	Applies	Applies	Applies
5.1.1	Ambient temperature	Replaced by 6.1e)	Replaced by 6.1e)	Applies, see 3.1
5.1.2	External source of heating or cooling	Applies	Applies	Applies
5.2	Service temperature	Modified	Modified	Applies

IEC 60079-0		Electrical resistance trace heaters and integral components		Terminations as separate components
Ed. 6.0 (2011) (informative)	Clause / Subclause title (normative)	Group I and Group II	Group III	
5.3.1	Determination of maximum surface temperature	Replaced by 4.5 in conjunction with 5.1.13	Replaced by 4.5 in conjunction with 5.1.13 only when tested in accordance with 5.1.13.3.	Applies
5.3.2.1	Group I electrical equipment	Applies	Excluded	Applies
5.3.2.2	Group II electrical equipment	Applies	Excluded	Applies
5.3.2.3.1	Group III electrical equipment, Maximum surface temperature determined without a dust layer	Excluded	Applies, where the maximum sheath temperatures determined by IEC/IEEE 60079-30-1 are used in place of the method for temperature determination from IEC 60079-0.	Applies
5.3.2.3.2	Group III electrical equipment Maximum surface temperature with respect to dust layers	Excluded	Applies, where the maximum sheath temperature is determined only for those surfaces that are specified to be exposed to layers of combustible dust. Does not apply for trace heaters specified to be covered by thermal insulation.	Applies
5.3.3	Small component temperature for Group I and Group II electrical equipment	Excluded	Excluded	Applies
6.1	Requirements for all electrical equipment – General	Applies	Applies	Applies
6.2	Mechanical strength	Replaced by 4.2	Replaced by 4.2	When in direct contact with the trace heater, may be substituted by 4.2
6.3	Opening times	Excluded	Excluded	Applies
6.4	Circulating currents in enclosures (e.g. of large electrical machines)	Excluded	Excluded	Excluded
6.5	Gasket retention	Excluded	Excluded	Applies
6.6	Electromagnetic and ultrasonic radiating equipment	Excluded	Excluded	Applies
7.1.1	Non-metallic enclosures and non-metallic parts of enclosures – Applicability	Replaced by the last paragraph of 4.1	Replaced by the last paragraph of 4.1	Applies
7.1.2.1	Specification of materials, General	Replaced by the last paragraph of 4.1	Replaced by the last paragraph of 4.1	Applies
7.1.2.2	Specification of materials, plastic materials	Replaced by the last paragraph of 4.1	Replaced by the last paragraph of 4.1	Applies
7.1.2.3	Elastomers	Replaced by the last paragraph of 4.1	Replaced by the last paragraph of 4.1	Applies
7.2	Thermal endurance	Replaced by requirements and tests	Replaced by requirements and	Applies

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IEC 60079-0		Electrical resistance trace heaters and integral components		Terminations as separate components
Ed. 6.0 (2011) (informative)	Clause / Subclause title (normative)	Group I and Group II	Group III	
		of this standard	tests of this standard	
7.3	Resistance to light	Replaced by 5.1.16 for trace heaters and integral components specified for outdoor exposure	Replaced by 5.1.16 for trace heaters and integral components specified for outdoor exposure	Applies
7.4.1	Electrostatic charges on external non-metallic materials, Applicability	Excluded	Excluded	Applies
7.4.2	Avoidance of a build-up of electrostatic charge on Group I or Group II electrical equipment	Excluded	Excluded	Applies
7.4.3	Avoidance of a build-up of electrostatic charge on equipment for Group III	Excluded	Excluded	Applies
7.5	Accessible metal parts	Excluded	Excluded	Applies
8.1	Material composition	Excluded	Excluded	Applies
8.2	Group I	Excluded	Excluded	Applies
8.3	Group II	Excluded	Excluded	Applies
8.4	Group III	Excluded	Excluded	Applies
9	Fasteners	Excluded	Excluded	Applies
10	Interlocking devices	Excluded	Excluded	Applies
11	Bushings	Excluded	Excluded	Applies
12	Materials used for cementing	Replaced by the last paragraph of 4.1	Replaced by the last paragraph of 4.1	Applies
13	Ex Components	Applies	Applies	Applies
14	Connection facilities and termination compartments	Covered by the requirements of this standard	Covered by the requirements of this standard	Applies
15	Connection facilities for earthing and bonding conductors	Replaced by 5.1.15	Replaced by 5.1.15	Applies
16	Entries into enclosures	Excluded	Excluded	Applies
17	Supplementary requirements for rotating electrical machines	Excluded	Excluded	Excluded
18	Supplementary requirements for switchgear	Excluded	Excluded	Excluded
19	Supplementary requirements for fuses	Excluded	Excluded	Applies
20	Supplementary requirements for plugs and sockets	Excluded	Excluded	Applies
21	Supplementary requirements for luminaires	Excluded	Excluded	Excluded
22	Supplementary requirements for caplights and handlights	Excluded	Excluded	Excluded
23	Equipment incorporating cells and batteries	Excluded	Excluded	Applies
24	Documentation	Applies	Applies	Applies
25	Compliance of prototype or	Applies	Applies	Applies