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

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

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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC/IEEE 60079-30-1:2015. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

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.

This second edition of IEC/IEEE 60079-30-1 cancels and replaces the first edition of IEC/IEEE 60079-30-1 published in 2015. This edition constitutes a technical revision.

Users of this document are advised that interpretation sheets clarifying the interpretation of this document can be published. Interpretation sheets are available from the IEC webstore and can be found in the "history" tab of the page for each document.

This edition includes the following significant technical changes with respect to the previous edition:

The significance of changes between IEC/IEEE 60079-30-1, Edition 1.0 (2015) and IEC/IEEE 60079-30-1, Edition 2.0 (this document) is as listed below:

		Type		
Changes	**Clause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
Redefined Maximum withstand temperature as it applies to the performance benchmark test.	3.20	X		
Separated maximum maintain temperature and maximum continuous operating temperature to clarify the meaning of both terms.	3.15 and 3.16	X		
Addition of requirements for controllers and high temperature limiters, added specific reference standards.	4.6.3			C1
Rewrite of the requirements for controlled design as it applies to the application of controllers and high temperature limiters as for use in EPL's.	4.6.3			C2
Addition of requirement for specifying various temperatures defined by the standard and including them in user documentation.	4.2 and 7			C3
Connection Integrity (integral components)	5.1.17		X	
Applications of Trace Heating in empty conduit	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 1 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 There are no additional requirements for temperature controllers and high temperature limiters beyond those of the general industrial standards.

C2 The application of temperature controllers and high temperature limiters shall be as specified.

C3 The documentation shall include the various temperatures specified in the standard.

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

Draft	Report on voting
31/1867/FDIS	31/1893/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with the rules given in the ISO/IEC Directives, Part 2, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications/.

This document is to be used in conjunction with IEC 60079-0, *Explosive atmospheres - Part 0: Equipment - General requirements* and IEC/IEEE 60079-30-2, *Explosive atmospheres - Part 30-2: Electrical resistance trace heating - Guidance on application 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 document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

– reconfirmed,

– withdrawn, or

– revised.

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 (EPLs) 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 document has collated much of this existing work and ~~considerably~~ added to it. This document also contains the minimum requirements for users applying the Division method of area classification.

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 Equipment Protection Levels (EPL) Ga, Da, Ma and Mb equipment. This document covers trace heaters that comprise either factory or field (worksite) assembled units, and which ~~may~~ can 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 document also includes requirements for termination assemblies and control methods used with trace heating systems. The explosive atmospheres referred to in this document are those defined in IEC 60079-10-1 and IEC 60079-10-2.

Annex F and Annex G outline the application of this document 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.~~

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 60050-151~~:2001~~, *International Electrotechnical Vocabulary (IEV) - Part 151: Electrical and magnetic devices*

~~IEC 60050-426:2008, *International Electrotechnical Vocabulary – Part 426: Equipment for explosive atmospheres*~~

IEC 60079-0~~:2011~~, *Explosive atmospheres - Part 0: Equipment - General requirements*

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

IEC/IEEE 60079-30-2, *Explosive atmospheres - Part 30-2: Electrical resistance trace heating - Guidance on application for design, installation and maintenance*

IEC 60695-11-3, *Fire hazard testing - Part 11-3: Test flames - 500 W flames - Apparatus and confirmational test methods*

~~ISO 4582, *Plastics – Determination of changes in colour and variations in properties after exposure to daylight under glass, natural weathering or laboratory light sources*~~

~~ISO 4892-1, *Plastics – Methods of exposure to laboratory light sources – Part 1: General guidance*~~

ISO 4892-2, *Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps*

~~ASTM D5025, *Standard specification for laboratory burner used for small-scale burning tests on plastic materials*~~

ASTM G155, *Standard practice for operating xenon arc light apparatus for exposure of non-metallic materials*

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

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This second edition of IEC/IEEE 60079-30-1 cancels and replaces the first edition of IEC/IEEE 60079-30-1 published in 2015. This edition constitutes a technical revision.

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This edition includes the following significant technical changes with respect to the previous edition:

The significance of changes between IEC/IEEE 60079-30-1, Edition 1.0 (2015) and IEC/IEEE 60079-30-1, Edition 2.0 (this document) is as listed below:

		Type		
Changes	**Clause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
Redefined Maximum withstand temperature as it applies to the performance benchmark test.	3.20	X		
Separated maximum maintain temperature and maximum continuous operating temperature to clarify the meaning of both terms.	3.15 and 3.16	X		
Addition of requirements for controllers and high temperature limiters, added specific reference standards.	4.6.3			C1
Rewrite of the requirements for controlled design as it applies to the application of controllers and high temperature limiters as for use in EPL's.	4.6.3			C2
Addition of requirement for specifying various temperatures defined by the standard and including them in user documentation.	4.2 and 7			C3
Connection Integrity (integral components)	5.1.17		X	
Applications of Trace Heating in empty conduit	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 1 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 There are no additional requirements for temperature controllers and high temperature limiters beyond those of the general industrial standards.

C2 The application of temperature controllers and high temperature limiters shall be as specified.

C3 The documentation shall include the various temperatures specified in the standard.

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

Draft	Report on voting
31/1867/FDIS	31/1893/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with the rules given in the ISO/IEC Directives, Part 2, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications/.

This document is to be used in conjunction with IEC 60079-0, *Explosive atmospheres - Part 0: Equipment - General requirements* and IEC/IEEE 60079-30-2, *Explosive atmospheres - Part 30-2: Electrical resistance trace heating - Guidance on application 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 document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

– reconfirmed,

– withdrawn, or

– revised.

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 (EPLs) 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 document has collated much of this existing work and added to it. This document also contains the minimum requirements for users applying the Division method of area classification.

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 Equipment Protection Levels (EPL) Ga, Da, Ma and Mb equipment. This document covers trace heaters that comprise either factory or field (worksite) assembled units, and which can 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 document also includes requirements for termination assemblies and control methods used with trace heating systems. The explosive atmospheres referred to in this document are those defined in IEC 60079-10-1 and IEC 60079-10-2.

Annex F and Annex G outline the application of this document for those users applying the Division method of area classification.

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 60050-151, *International Electrotechnical Vocabulary (IEV) - Part 151: Electrical and magnetic devices*

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

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

IEC/IEEE 60079-30-2, *Explosive atmospheres - Part 30-2: Electrical resistance trace heating - Guidance on application for design, installation and maintenance*

IEC 60695-11-3, *Fire hazard testing - Part 11-3: Test flames - 500 W flames - Apparatus and confirmational test methods*

ISO 4892-2, *Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps*

ASTM G155, *Standard practice for operating xenon arc light apparatus for exposure of non-metallic materials*