

Explosive atmospheres —

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

ICS 29.260.20

National foreword

This British Standard is the UK implementation of EN 60079-30-1:2007. It is identical to IEC 60079-30-1:2007. It supersedes BS EN 62086-1:2005 which is withdrawn. Together with BS EN 62395-1:2006, it supersedes BS 6351-1:1983 which is withdrawn.

The design and installation of electrical resistance trace heating systems previously contained in BS 6351-2:1983, BS 6351-3:1983 and BS EN 62086-2:2005 are now contained in BS EN 60079-30-2:2007 and DD IEC/TS 62395-2:2008.

The UK participation in its preparation was entrusted by Technical Committee GEL/31, Equipment for explosive atmospheres, to Subcommittee GEL/31/14, Types of protection “e” and “n”.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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**Explosive atmospheres -
Part 30-1: Electrical resistance trace heating -
General and testing requirements
(IEC 60079-30-1:2007)**

Atmosphères explosives -
Partie 30-1: Traçage
par résistance électrique -
Exigences générales et d'essais
(CEI 60079-30-1:2007)

Explosionsfähige Atmosphäre -
Teil 30-1: Elektrische
Widerstands-Begleitheizungen -
Allgemeine Anforderungen
und Prüfanforderungen
(IEC 60079-30-1:2007)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
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Foreword

The text of document 31/661/FDIS, future edition 1 of IEC 60079-30-1, prepared by IEC TC 31, Equipment for explosive atmospheres, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60079-30-1 on 2007-03-01.

This European Standard supersedes EN 62086-1:2005.

The general revisions and updating to produce EN 60079-30-1:2007, with respect to EN 62086-1:2005, are a result of national comments received.

The main technical differences, apart from the general revision and updating of EN 62086-1:2005, are as follows:

- the inclusion of thermal safety requirements for the manufacturer's quality programme;
- the inclusion of a 14 day water resistance test;
- the further harmonization of this standard with several national standards.

This standard is to be used in conjunction with EN 60079-30-2:2007, *Explosive atmospheres – Part 30-2: Electrical resistance trace heating – Application guide for design, installation and maintenance*.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2007-12-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2010-03-01

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directive ATEX (94/9/EC). See Annex ZZ.

Annexes ZA and ZZ have been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60079-30-1:2007 was approved by CENELEC as a European Standard without any modification.

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INTRODUCTION

This part of IEC 60079 is intended to provide a comprehensive overview of the essential requirements and testing appropriate to electric surface heating equipment used in explosive gas atmospheres. The requirements of this standard are considered to be the minimum requirements for zone 1 or zone 2. 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.

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 gas atmospheres. The standard covers trace heaters that may comprise either factory- or field- (work-site) assembled units, and which may be series heating cables, parallel heating cables or heating pads and heating 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. The hazardous areas referred to by this standard are those defined in IEC 60079-10.

Where a requirement of this standard conflicts with a requirement of IEC 60079-0, the requirement of this standard shall take precedence.

2 Normative references

The following referenced documents are indispensable for the application 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 60079-0:2004, *Electrical apparatus for explosive gas atmospheres – Part 0: General requirements*

IEC 60079-7:2001, *Electrical apparatus for explosive gas atmospheres – Part 7: Increased safety 'e'*

IEC 60079-10:2002, *Electrical apparatus for explosive gas atmospheres – Part 10: Classification of hazardous areas*

IEC 60079-30-2, *Explosive atmospheres – Part 30-2: Electrical resistance trace heating – Application guide for design, installation and maintenance*

IEC 60364-5-55, *Electrical installations of buildings – Part 5-55: Selection and erection of electrical equipment – Other equipment*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60079-0 and IEC 60079-7 as well as the following apply.

NOTE Additional definitions applicable to explosive atmospheres can be found in IEC 60050-426¹.

3.1**ambient temperature**

temperature surrounding the object under consideration. Where electrical trace heaters are enclosed in thermal insulation, the ambient temperature is the temperature exterior to such thermal insulation

3.2**branch circuit**

that portion of the wiring installation between the overcurrent device protecting the circuit and the trace heater unit(s)

3.3**connections** (terminations)**3.3.1****cold lead**

electrically insulated conductor or conductors used to connect a trace heater to the branch circuit and designed so that it does not produce significant heat

3.3.2**end termination**

termination, which may be heat producing, applied to a trace heater at the end opposite that where the power is supplied

3.3.3**power termination**

termination applied to the end of a trace heater at which the power is supplied

3.4**tee**

electrical connection of trace heaters, in series or in parallel, to accommodate a tee or branch

3.5**dead leg**

segment of process piping segregated from the normal flow pattern for the purpose of providing a heat-loss reference

3.6**design loading**

minimum power that will meet the design requirements, in the worst conditions, after voltage and resistance tolerances and appropriate safety factors have been considered

3.7**factory-fabricated**

trace heaters, including the necessary terminations and connections, assembled into units or sets

¹ IEC 60050(426), International Electrotechnical Vocabulary (IEV) – Chapter 426: Electrical apparatus for explosive atmospheres

3.8**field-assembled**

trace heaters supplied in bulk with terminating components to be assembled at the work site

3.9**heat loss**

energy flow from a pipe, vessel or equipment to its surroundings

3.10**heat sink**

part that conducts and dissipates heat away from a workpiece

NOTE Typical heat sinks are pipe shoes, pipe supports and items of large mass such as valve actuators or pump bodies.

3.11**heat-transfer aids**

thermally conductive materials, such as metallic foils or heat-transfer compounds used to increase the heat-transfer efficiency from trace heaters to the workpiece

3.12**heating pad**

trace heater comprising series- or parallel-connected elements having sufficient flexibility to conform to the shape of the surface to be heated

3.13**heating panel**

non-flexible trace heater comprising series- or parallel-connected elements fabricated to conform to the general shape of the surface to be heated

3.14**high-limit temperature**

maximum allowable temperature of the system, including piping, fluid and heating system

3.15**maximum withstand temperature**

maximum operating or exposure temperature that will not adversely effect the thermal stability of the trace heater and its component parts

3.16**metallic covering**

metal sheath or braid used to provide physical protection for a trace heater, and may provide an electrical earth path

3.17**minimum ambient temperature**

lowest ambient temperature specified at which heat-loss calculations are based and the trace heating is operable and performs according to the specified requirements

3.18**operating voltage**

actual voltage applied to the trace heater when in service

3.19

overjacket

continuous layer of insulating material applied outside the metallic sheath, screen or armouring to protect against corrosion

3.20

parallel trace heater(s)

heating elements that are electrically connected in parallel, either continuously or in zones, so that the watt density per lineal length is maintained, irrespective of any change in length for the continuous type or for any number of discrete zones

3.21

power density

power output in watts per linear metre for trace heater cables and cable units, and in watts per square metre for trace heater pads and panels and trace heater pad and panel units

3.22

rated output

total power or power per unit length or unit surface area of a trace heater, at rated voltage, temperature and length, which is normally expressed in watts, watts per metre or watts per square metre

3.23

rated voltage

voltage to which operating and performance characteristics of trace heaters are referred

3.24

routine test

conformity test made on each individual item during or after manufacture

[IEV 151-16-17]

3.25

series trace heater(s)

heating elements electrically connected in series with a single current path and with a specific resistance at a given temperature for a given length

3.26

sheath

uniform and continuous metallic or non-metallic outer covering enclosing the trace heater used to provide protection against influence from the surroundings (corrosion, moisture etc.). See overjacket, 3.19

3.27

sheath temperature

temperature of the outermost continuous covering that may be exposed to the surrounding atmosphere

3.28

stabilized design

concept where the temperature of the trace heater will, by design and use, stabilize below the high-limit temperature, under the most unfavourable conditions, without the need for a protective system to limit the temperature