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PREDSTANDARD**

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**Eksplozivne atmosfere – 30-1. del: Električni uporovni grelni trakovi –  
Splošno in zahteve za preskušanje**

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

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Functions concerned Fonctions concernées	
<input type="checkbox"/> Safety Sécurité	<input type="checkbox"/> EMC CEM
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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Title

**IEC 60079-30-1 Ed. 1.0: Explosive atmospheres - Part 30-1: Electrical resistance trace heating - General and testing requirements**

Titre

**CEI 60079-30-1 Ed. 1.0: Atmosphères explosives - Partie 30-1: Traçage par résistance électrique - Exigences générales et d'essais**

**ATTENTION  
VOTE PARALLÈLE  
CEI – CENELEC**

L'attention des Comités nationaux de la CEI, membres du CENELEC, est attirée sur le fait que ce projet final de Norme internationale est soumis au vote parallèle. Un bulletin de vote séparé pour le vote CENELEC leur sera envoyé par le Secrétariat Central du CENELEC.

**ATTENTION  
IEC – CENELEC  
PARALLEL VOTING**

The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this final Draft International Standard (DIS) is submitted for parallel voting. A separate form for CENELEC voting will be sent to them by the CENELEC Central Secretariat.

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1906-2006

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

## FOREWORD

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International Standard IEC 60079-30-1 has been prepared by IEC technical committee 31: Equipment for explosive atmospheres.

This edition cancels and replaces the first edition of IEC 62086-1 published in 2001 and constitutes a technical revision.

The general revisions and updating to produce the first edition of IEC 60079-30-1, with respect to former edition of IEC 62086-1, are a result of national comments received.

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

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

This Part 30-1 is intended to be used in conjunction with the first edition of IEC 60079-30-2: 2006, *Explosive atmospheres – Part 30-2: Electrical resistance trace heating – Application guide for design, installation and maintenance*.

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

FDIS	Report on voting
31/XX/FDIS	31/XX/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.

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

The list of all parts of IEC 60079 series, 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 maintenance result date<sup>1</sup> indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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1) The National Committees are requested to note that for this publication the maintenance result date is 2011.

## 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.

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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 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.

[https://standards.iteh.ai/catalog/standards/sist/ba66aa8f-ae23-4313-8f0f-7a0a632d4530/sist-en-iec-60050\(151\)](https://standards.iteh.ai/catalog/standards/sist/ba66aa8f-ae23-4313-8f0f-7a0a632d4530/sist-en-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 60050-426<sup>2</sup>.

### 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

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<sup>2</sup> 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]

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**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

**3.29****start-up current**

the current response of a trace heater following energization