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SIST EN 60079-30-2:2007

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English version

**Explosive atmospheres -
Part 30-2: Electrical resistance trace heating -
Application guide for design, installation and maintenance
(IEC 60079-30-2:2007)**

Atmosphères explosives -
Partie 30-2: Traçage
par résistance électrique -
Guide d'application pour la conception,
l'installation et la maintenance
(CEI 60079-30-2:2007)

Explosionsfähige Atmosphäre -
Teil 30-2: Elektrische
Widerstands-Begleitheizungen -
Anwendungsleitfaden für Entwurf,
Installation und Instandhaltung
(IEC 60079-30-2:2007)

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This European Standard was approved by CENELEC on 2007-03-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 31/662/FDIS, future edition 1 of IEC 60079-30-2, prepared by IEC TC 31, Equipment for explosive atmospheres, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60079-30-2 on 2007-03-01.

This European Standard supersedes EN 62086-2:2005.

The general revisions and updating to produce EN 60079-30-2:2007 are a result of national comments received.

The main technical differences apart from the general revision and updating of EN 62086-2:2005 are as follows:

- corrections;
- extensive revision and additions for design and installation recommendations.

This standard is to be used in conjunction with EN 60079-30-1:2007, *Explosive atmospheres – Part 30-1: Electrical resistance trace heating – General and testing requirements*.

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

Annex ZA has been added by CENELEC [IST EN 60079-30-2:2007](https://standards.iteh.ai/catalog/standards/sist/70417cba-88fc-42a2-9c0f-e630323f162c/sist-en-60079-30-2-2007)
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Endorsement notice

The text of the International Standard IEC 60079-30-2:2007 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60079-0 (mod)	2004	Electrical apparatus for explosive gas atmospheres - Part 0: General requirements	EN 60079-0	2006
IEC 60079-1	2003	Electrical apparatus for explosive gas atmospheres - Part 1: Flameproof enclosures "d"	EN 60079-1 + corr. April	2004 2006
IEC 60079-7	2001	Electrical apparatus for explosive gas atmospheres - Part 7: Increased safety "e"	EN 60079-7 ¹⁾	2003
IEC 60079-10	2002	Electrical apparatus for explosive gas atmospheres - Part 10: Classification of hazardous areas	EN 60079-10	2003
IEC 60079-14	1996	Electrical apparatus for explosive gas atmospheres - Part 14: Electrical installations in hazardous areas (other than mines)	EN 60079-14 ²⁾	1997
IEC 60079-17	1996	Electrical apparatus for explosive gas atmospheres - Part 17: Inspection and maintenance of electrical installations in hazardous areas (other than mines)	EN 60079-17 ³⁾	1997
IEC 60079-30-1	2007	Explosive atmospheres - Part 30-1: Electrical resistance trace heating - General and testing requirements	EN 60079-30-1	2007

¹⁾ EN 60079-7 is superseded by EN 60079-7:2007, which is based on IEC 60079-7:2006.

²⁾ EN 60079-14 is superseded by EN 60079-14:2003, which is based on IEC 60079-14:2002.

³⁾ EN 60079-17 is superseded by EN 60079-17:2003, which is based on IEC 60079-17:2002.

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Atmosphères explosives –

Partie 30-2:

**Traçage par résistance électrique –
Guide d'application pour la conception,
l'installation et la maintenance**

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Explosive atmospheres –

SIST EN 60079-30-2:2007

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Part 30-2:

**Electrical resistance trace heating –
Application guide for design, installation
and maintenance**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

EXPLOSIVE ATMOSPHERES –**Part 30-2: Electrical resistance trace heating –
Application guide for design, installation and maintenance**

FOREWORD

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International Standard IEC 60079-30-2 has been prepared by IEC technical committee 31: Equipment for explosive atmospheres.

This edition cancels and replaces the first edition of IEC 62086-2 published in 2001 and constitutes a technical revision.

The general revisions and updating to produce the first edition of IEC 60079-30-2 are as a result of National comments received.

The main technical differences apart from the general revision and updating a former edition of IEC 62086-2, are as follows:

- a) corrections;

b) extensive revision and additions for design and installation recommendations.

This Part 30-2 is to be used in conjunction with the first edition of IEC 60079-30-1:2006, *Explosive atmospheres – Part 30-1: Electrical resistance trace heating – General and testing requirements*.

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

FDIS	Report on voting
31/662/FDIS	31/672/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 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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EXPLOSIVE ATMOSPHERES –

Part 30-2: Electrical resistance trace heating – Application guide for design, installation and maintenance

1 Scope

This part of IEC 60079 provides guidance for the application of electrical resistance trace heating systems in areas where explosive gas atmospheres may be present, with the exception of those classified as zone 0.

It provides recommendations for the design, installation, maintenance and repair of trace heating equipment and associated control and monitoring equipment. It does not cover devices that operate by induction heating, skin effect heating or direct pipeline heating, nor those intended for stress relieving.

This part supplements the requirements specified in IEC 60079-30-1.

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 60079-0:2004, *Electrical apparatus for explosive gas atmospheres – Part 0: General requirements* <https://standards.iteh.ai/catalog/standards/sist/70417cba-88fc-42a2-9c0f-e630323f162c/sist-en-60079-30-2-2007>

IEC 60079-1:2003, *Electrical apparatus for explosive gas atmospheres – Part 1: Flameproof enclosures “d”*

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 60079-14:1996, *Electrical apparatus for explosive gas atmospheres – Part 14: Electrical installations in hazardous areas (other than mines)*

IEC 60079-17:1996, *Electrical apparatus for explosive gas atmospheres – Part 17: Inspection and maintenance of electrical installations in hazardous areas (other than mines)*

IEC 60079-30-1:2006, *Explosive atmospheres – Part 1: Electrical resistance trace heating – General and testing requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60079-0, IEC 60079-1 and IEC 60079-7 apply.

NOTE Additional terms and definitions applicable to explosive atmospheres can be found in IEC 60050 (426)¹.

4 Application considerations

4.1 General

This standard supplements the requirements of IEC 60079-14 and IEC 60079-17.

Where trace heating systems are to be installed in explosive gas atmospheres, full details of the hazardous area classification(s) (IEC 60079-10) shall be specified. The specification shall state the zone (1 or 2), gas group (IIA, IIB or IIC) and temperature classification in accordance with IEC 60079-0. Where special considerations apply or where site conditions may be especially onerous, these conditions shall be detailed in the trace heating specification.

Where trace heating systems are to be installed on mobile equipment or interchangeable skid units, the specification for these trace heating systems should accommodate the worst conditions in which the trace heating system may be used.

Where any parts of the trace heating system are likely to be exposed, those parts should be suitable for the environment.

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4.2 Corrosive areas

All components of electric trace heating systems should be examined to verify that they are compatible with any corrosive materials that may be encountered during the lifetime of the system. Trace heating systems operating in corrosive environments have a higher potential for failure than in non-corrosive environments. Deterioration of the thermal insulation system is made worse by corrosion of the weather barrier and the possibility of pipeline and vessel leaks soaking the thermal insulation. Particular attention should be given to the materials of piping systems, as well as the electric trace heating systems, as related to the effective earth-leakage/ground-fault return path. The use of non-metallic or lined or coated piping systems may further complicate the earth-leakage/ground-fault return path and special consideration should be given to these piping systems. Earth-leakage/ground-fault return paths established at the time of installation may become degraded due to corrosion during the operation of the plant.

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

4.3 Process temperature accuracy

4.3.1 Type I

A Type I process is one for which the temperature should be maintained above a minimum point. Ambient sensing control may be acceptable. Large blocks of power may be controlled by means of a single control device and an electrical distribution panel board. Heat input may be provided unnecessarily at times and wide temperature excursions should be tolerable. Energy efficiency may be improved through the use of dead-leg control techniques (see 6.13).

4.3.2 Type II

A Type II process is one for which the temperature should be maintained within a moderate band. Control by pipeline sensing mechanical thermostats is typical.

4.3.3 Type III

A Type III process is one for which the temperature should be controlled within a narrow band. Electronic pipe-sensing controllers using thermocouple or resistance-temperature detector (RTD) units facilitate field (work site) calibration and provide maximum flexibility in the selection of temperature alarm and monitoring functions. Heat input capability may be provided to preheat an empty pipe or raise the fluid temperature, or both, within a specified range and time interval. Type III systems require strict adherence to flow patterns and thermal insulation systems.

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4.4 Installation considerations

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If failure of any part of the trace heating system can result in a safety or process problem, then the trace heating system may be considered to be a critical component of the total process. The temperature control and circuit monitoring requirements of an application may be defined according to the temperature control types described in 4.3, together with the circuit monitoring criticality as described in Table 1.

Table 1 – Process types

Is trace heating a critical component of the process?	Desired accuracy of process temperature control		
	Above a minimum point Type I	Within a moderate band Type II	Within a narrow band Type III
Yes = Critical (C-)	C – I	C – II	C – III
No = Non-critical (NC-)	NC – I	NC – II	NC – III

When trace heating is critical to the process, circuit monitoring for correct operation, malfunction alarms, and back-up (redundant) trace heaters should be considered. Spare or back-up controllers can be specified to be automatically activated in the event of a fault being indicated by the monitoring/alarm system. This is sometimes known as "redundancy". Back-up trace heaters may allow maintenance or repairs to be performed without a process shutdown and may be used to enhance reliability.

5 Thermal insulation

5.1 General

The selection, installation and maintenance of thermal insulation should be considered a key component in the performance of an electrical trace heating system. The thermal insulation system is normally designed to prevent the majority of heat loss with the trace heating system compensating for the remainder. Therefore, problems with thermal insulation will have a direct impact on the overall system performance.

The primary function of thermal insulation is to reduce the rate of heat transfer from a surface that is operating at a temperature other than ambient. This reduction of energy loss may

- reduce operating expenses;
- improve system performance;
- increase system output capability.

Prior to any heat loss analysis for an electrically traced pipeline, vessel or other mechanical equipment, a review of the selection of the insulation system is recommended. The principal areas for consideration are as follows:

- selection of an insulation material;
- selection of a weather barrier (cladding);
- selection of the economic insulation thickness;
- selection of the proper insulation size.

5.2 Selection of insulating material

The following are important aspects to be considered when selecting an insulation material. These factors should be considered and the selection optimised according to the operator's criteria:

- temperature rating;
- thermal conductivity, λ , of the insulation;
- mechanical properties;
- chemical compatibility and corrosion resistance;
- moisture resistance;
- health risks during installation;
- fire resistance;
- toxicological properties when exposed to fire;
- costs.

Insulation materials commonly available include:

- expanded silica;
- mineral fibre;
- cellular glass;
- urethane;
- fibreglass;
- calcium silicate;
- polyisocyanurate;
- perlite silicate.