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Electrical resistance trace heating systems for industrial and commercial applications -- Part 2: Application guide for system design, installation and maintenance

I.S. EN 62395-2:2013

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(IEC 62395-2:2013)

Systèmes de traçage par résistance électrique pour applications industrielles et commerciales -
Partie 2: Guide d'application pour la conception, l'installation et la maintenance du système
(CEI 62395-2:2013)

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(IEC 62395-2:2013)

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Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 27/927/FDIS, future edition 1 of IEC 62395-2, prepared by IEC/TC 27 "Industrial electroheating and electromagnetic processing" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62395-2:2013.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2014-07-14
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2016-10-14

This document supersedes CLC/TS 62395-2:2010.

EN 62395-2:2013 includes the following significant technical changes with respect to CLC/TS 62395-2:2010:

- this document has been changed from a Technical Specification to a European Standard;
- design considerations for trace heating on sprinkler systems have been expanded and a figure has been added to illustrate how to avoid undue shadowing of spray patterns from insulated sprigs close to sprinkler heads;
- specific details of design considerations for trace heating for emergency eyewash units and safety showers have been added.

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In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60079-30-1:2007	NOTE	Harmonized as EN 60079-30-1:2007 (not modified).
IEC 60079-30-2:2007	NOTE	Harmonized as EN 60079-30-2:2007 (not modified).
IEC 60335-2-83:2001	NOTE	Harmonized as EN 60335-2-83:2002 (not modified).
IEC 60335-2-83:2001/A1:2008	NOTE	Harmonized as EN 60335-2-83:2002/A1:2008 (not modified).
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IEC 60335-2-96:2002/A1:2003	NOTE	Harmonized as EN 60335-2-96:2002/A1:2004 (not modified).
IEC 60335-2-96:2002/A2:2008	NOTE	Harmonized as EN 60335-2-96:2002/A2:2009 (not modified).

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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.

Publication	Year	Title	EN/HD	Year
IEC 60519-1	-	Safety in electroheating installations - Part 1: General requirements	EN 60519-1	-
IEC 62395-1	2013	Electrical resistance trace heating systems for industrial and commercial applications - Part 1: General and testing requirements	EN 62395-1	2013

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Electrical resistance trace heating systems for industrial and commercial applications – Part 2: Application guide for system design, installation and maintenance

Systèmes de traçage par résistance électrique pour applications industrielles et commerciales – Partie 2: Guide d'application pour la conception, l'installation et la maintenance du système

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IEC 62395-2

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Electrical resistance trace heating systems for industrial and commercial applications – Part 2: Application guide for system design, installation and maintenance

Systèmes de traçage par résistance électrique pour applications industrielles et commerciales – Partie 2: Guide d'application pour la conception, l'installation et la maintenance du système

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTRICAL RESISTANCE TRACE HEATING SYSTEMS FOR INDUSTRIAL AND COMMERCIAL APPLICATIONS –

Part 2: Application guide for system design, installation and maintenance

FOREWORD

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International Standard IEC 62395-2 has been prepared by IEC technical committee 27: Industrial electroheating and electromagnetic processing.

This standard cancels and replaces IEC/TS 62395-2:2008.

This standard includes the following significant technical changes with respect to IEC/TS 62395-2:2008:

- This document has been changed from a Technical Specification to an International Standard.
- Design considerations for trace heating on sprinkler systems have been expanded and a figure has been added to illustrate how to avoid undue shadowing of spray patterns from insulated sprigs close to sprinkler heads;

- Specific details of design considerations for trace heating for emergency eyewash units and safety showers have been added.

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

FDIS	Report on voting
27/927/FDIS	27/936/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.

A list of all parts in the IEC 62395 series, under the general title *Electrical resistance trace heating systems for industrial and commercial applications*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability 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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

IEC 62395-1 provides the essential requirements and testing appropriate to electrical resistance trace heating equipment used in industrial and commercial applications. While some of this work already exists in national or international standards, this standard has collated much of this existing work and added considerably to it.

IEC 62395-2 provides detailed recommendations for the system design, installation, maintenance and repair of electrical resistance trace heating systems in industrial and commercial applications which can include piping, vessels, roofs and concrete slab heating applications.

It is the objective of IEC 62395 that, when in normal use, electrical trace heating systems operate safely under their defined conditions of use, by

a) employing heaters of the appropriate construction so as to meet the test criteria and requirements detailed in IEC 62395-1. The construction includes a metallic sheath, braid, screen or equivalent electrically conductive covering;
b) operating at safe temperatures when designed, installed, and maintained in accordance with IEC 62395-2;
c) having at least the minimum levels of overcurrent and earth-fault protection required in IEC 62395-1 and IEC 62395-2.

ELECTRICAL RESISTANCE TRACE HEATING SYSTEMS FOR INDUSTRIAL AND COMMERCIAL APPLICATIONS —

Part 2: Application guide for system design, installation and maintenance

1 Scope

This part of IEC 62395 provides detailed recommendations for the system design, installation, maintenance and repair of electrical resistance trace heating systems in industrial and commercial applications. This standard does not include or provide for any applications in potentially explosive atmospheres.

This standard pertains to trace heating systems that may comprise either factory fabricated or field-assembled (work-site) units, and which may be series or parallel trace heaters, or surface heaters (heater pads or heater panels) that have been assembled and/or terminated in accordance with the manufacturer's instructions.

The products covered by this standard are intended to be installed by persons who are suitably trained in the techniques required and that only trained personnel carry out especially critical work, such as the installation of connections and terminations. Installations are intended to be carried out under the supervision of a qualified person who has undergone supplementary training in electric trace heating systems.

This standard does not cover induction, impedance or skin effect heating.

Trace heating systems can be grouped into different types of installations. These are characterized by different requirements for testing and are usually certified for a specific type of installation or application. Typical applications for the different types of installation are as follows:

a) Installations of trace heating on pipes, vessels and associated equipment. Applications include:
   - freeze protection and temperature maintenance;
   - hot water lines;
   - oil and chemical lines;
   - sprinkler systems.
b) Outdoor exposed area installations of trace heating. Applications include:
   - roof de-icing;
   - gutter and downspout de-icing;
   - catch basins and drains;
   - rail heating.
c) Installation with embedded trace heating. Applications include:
   - snow melting;
   - floor warming;
   - frost heave prevention;
   - underground thermal energy storage systems;
   - door frames.

d) Installations of trace heating internal to conduit or piping. Applications include:
   - snow melting – in conduit;
   - floor warming – in conduit;
   - frost heave prevention – in conduit;
   - underground thermal energy storage systems – in conduit;
   - internal trace heating of potable water lines;
   - enclosed drains and culverts.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60519-1, *Safety in electroheating installations – Part 1: General requirements*

IEC 62395-1:2013, *Electrical resistance trace heating systems for industrial and commercial applications – Part 1: General and testing requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60519-1 and IEC 62395-1:2013 apply.

NOTE General definitions are given in the International Electrotechnical Vocabulary, IEC 60050. Terms relating to industrial electroheat are defined in IEC 60050-841.

4 Surface heating of vessels and piping systems

4.1 Application description

4.1.1 General

Piping and vessels often utilise surface-mounted trace heating systems to maintain water above freezing-point and to maintain process fluids and gases at given temperature levels. The trace heaters compensate for heat losses to the environment that are reduced but not eliminated by thermal insulation.

4.1.2 Environmental conditions

Attention should be directed to the surrounding environmental conditions, especially for systems that are exposed to sunlight (ultraviolet exposure), coastal atmospheres (corrosive salt spray and high humidity), and chemical atmospheres such as oil refineries and chemical plants.

Equipment subject to ultraviolet exposure may degrade due to surface oxidation, which can possibly lead to surface embrittlement and cracking. Corrosive atmospheres can affect the same exposed surfaces and can accelerate degradation of surfaces that are also susceptible to ultraviolet exposure. Chemical exposure can affect all equipment, whether covered by thermal insulation or not.

The trace heating equipment for piping and vessels is often protected from corrosion and ultraviolet exposure to some degree by the thermal insulation. However, these systems can have components that are exposed to the environment such as electrical connection