



SLOVENSKI STANDARD
SIST EN 62798:2015

01-junij-2015

Oprema za industrijsko električno ogrevanje - Preskusne metode za infrardeče oddajnike

Industrial electroheating equipment - Test methods for infrared emitters

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Ta slovenski standard je istoveten z: EN 62798:2014

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ICS:

25.180.10 Električne peči Electric furnaces

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EUROPEAN STANDARD

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NORME EUROPÉENNE

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October 2014

ICS 25.180.10

English Version

**Industrial electroheating equipment -
Test methods for infrared emitters
(IEC 62798:2014)**

Chauffage électrique industriel - Méthodes d'essais des
émetteurs de rayonnement infrarouge
(CEI 62798:2014)

Industrielle Elektrowärmeeinrichtungen - Prüfverfahren für
Infrarotstrahler
(IEC 62798:2014)

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

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Foreword

The text of document 27/938/CDV, future edition 1 of IEC 62798, prepared by IEC/TC 27 "Industrial electroheating and electromagnetic processing" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62798:2014.

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) 2015-06-29
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2017-09-29

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Endorsement notice

The text of the International Standard IEC 62798:2014 was approved by CENELEC as a European Standard without any modification.

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

IEC 60519-1:2010	NOTE	Harmonized as EN 60519-1:2011 (not modified).
IEC 62471:2006	NOTE	Harmonized as EN 62471:2008 (modified).
IEC 60079-0	NOTE	Harmonized as EN 60079-0.

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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 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
		Methods of test for dense shaped refractory products - Part 11: Determination of resistance to thermal shock	EN 993-11	
IEC 60061-1	-	Lamp caps and holders together with gauges for the control of interchangeability and safety - Part 1: Lamp caps	EN 60061-1	-
IEC 60061-2	-	Lamp caps and holders together with gauges for the control of interchangeability and safety - Part 2: Lampholders	EN 60061-2	-
IEC 60061-3	-	Lamp caps and holders together with gauges for the control of interchangeability and safety - Part 3: Gauges	EN 60061-3	-
IEC 60068-2-6	-	Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	-
IEC 60068-2-7	-	Basic environmental testing procedures - Part 2-7: Tests - Test Ga and guidance: Acceleration, steady state	EN 60068-2-7	-
IEC 60432-1 (mod)	1999	Incandescent lamps - Safety specifications -	EN 60432-1	2000
+A1	2005	Part 1: Tungsten filament lamps for domestic and similar general lighting purposes	+A1	2005
+A2	2011		+A2	2012
IEC 60519-12	-	Safety in electroheating installations - Part 12: Particular requirements for infrared electroheating installations	EN 60519-12	-
IEC 60682	1980	Standard method of measuring the pinch temperature of quartz-tungstenhalogen lamps	EN 60682	1993
+A1	1987			
+A2	1997		+A2	1997
IEC 62693	2013	Industrial electroheating installations - Test methods for infrared electroheating installations	EN 62693	2013

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Industrial electroheating equipment – Test methods for infrared emitters

Chauffage électrique industriel – Méthodes d'essais des émetteurs de rayonnement infrarouge

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

INDUSTRIAL ELECTROHEATING EQUIPMENT –**Test methods for infrared emitters**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 62798 has been prepared by IEC technical committee 27: Industrial electroheating and electromagnetic processing.

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

CDV	Report on voting
27/938/CDV	27/942/RVC

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 contents of the corrigendum of November 2014 have been included in this copy.

INTRODUCTION

This standard on particular test methods for infrared electroheating emitters is one of TC 27 standards that describe test methods for various types of electroheating installations.

This standard is solely concerned with tests for infrared emitters. Tests that focus on the performance of infrared equipment or installations are covered by IEC 62693, *Industrial electroheating installations – Test methods for infrared electroheating installations*. The rationale for this separation is that infrared installations are usually manufactured by other companies than infrared emitters. Still, infrared emitters are a very important and distinct part of infrared installations and a set of tests that allow for proper characterisation, comparison of different infrared emitters is valuable to manufacturers of infrared installations.

The major guiding principle for this standard is to determine

- simple tests that define the basic characteristics of all infrared emitters and can be performed with the usual test and measuring equipment available to different kinds of companies, large or small;
- more complex tests that provide valuable extra information, but need a well-equipped laboratory.

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INDUSTRIAL ELECTROHEATING EQUIPMENT – Test methods for infrared emitters

1 Scope and object

This International Standard specifies test procedures, conditions and methods according to which the main parameters and the main operational characteristics of industrial infrared emitters are established.

A limitation of the scope of this standard is that the infrared emitters have a maximum spectral emission at longer wavelengths than 780 nm in air or vacuum, and are emitting wideband continuous spectra such as by thermal radiation or high pressure arcs.

IEC 60519-1:2010 [1]¹ defines infrared as optical radiation within the frequency range between about 400 THz and 300 GHz. This corresponds to the wavelength range between 780 nm and 1 mm in vacuum. Industrial infrared heating usually uses infrared sources with rated temperatures between 500 °C and 3 000 °C; the emitted radiation from these sources dominates in the wavelength range between 780 nm and 10 µm.

Industrial infrared emitters under the scope of this standard typically use the Joule effect for the conversion of electric energy in one or several sources into infrared radiation, which is emitted from one or several elements. Such infrared emitters are especially

- thermal infrared emitters in the form of tubular, plate-like or otherwise shaped ceramics with a resistive element inside;
- infrared quartz glass tube or halogen lamp emitters with a hot filament as a source;
- non-insulated elements made from molybdenum-disilicide, silicon-carbide, iron-chromium-aluminium alloys or comparable materials;
- wide-spectrum arc lamps.

This standard is not applicable to

- infrared emitters which are lasers or light-emitting diodes (LEDs);
- infrared emitters for use by the general public;
- infrared emitters for laboratory use.

Most of the tests described, especially the destructive tests, are for type testing.

The tests specified in this standard are intended to be used for evaluating or comparing the performance of emitters belonging to the same category.

Tests related to performance of industrial infrared electroheating installations are specified in IEC 62693:2013.

Most tests specified in this standard are applicable to wide-spectrum arc lamps, but not all.

¹ Numbers in square brackets refer to the Bibliography.

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 60061-1, *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 1: Lamp caps*

IEC 60061-2, *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 2: Lampholders*

IEC 60061-3, *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 3: Gauges*

IEC 60068-2-6, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-7, *Basic environmental testing procedures – Part 2-7: Tests – Test Ga and guidance: Acceleration, steady state*

IEC 60432-1:1999, *Incandescent lamps – Safety specifications – Part 1: Tungsten filament lamps for domestic and similar general lighting purposes*

IEC 60432-1:1999/AMD1:2005

IEC 60432-1:1999/AMD2:2011

IEC 60519-12, *Safety in electroheating installations – Part 12: Particular requirements for infrared electroheating installations*

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IEC 60682:1980, *Standard method of measuring the pinch temperature of quartz-tungsten-halogen lamps*

IEC 60682:1980/AMD1:1987

IEC 60682:1980/AMD2:1997

IEC 62693:2013, *Industrial electroheating installations – Test methods for infrared electroheating installations*

EN 993-11, *Methods of test for dense shaped refractory products – Part 11: Determination of resistance to thermal shock*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60519-12, IEC 62693 as well as the following apply.

NOTE General definitions are given in the International Electrotechnical Vocabulary, IEC 60050 [2]. Terms relating to industrial electroheating are defined in IEC 60050-841.

3.1 General

3.1.1

infrared radiation

optical radiation for which the wavelengths are longer than those for visible radiation

Note 1 to entry: The infrared radiation range between 780 nm and 1 mm is commonly subdivided into:

IR-A 780 nm to 1 400 nm, or for a grey emitter 3 450 °C to 1 800 °C surface temperature;

IR-B 1 400 nm to 3 000 nm, or for a grey emitter 1 800 °C to 690 °C surface temperature;

IR-C 3 000 nm to 1 mm, or for a grey emitter less than 690 °C surface temperature.

The temperature corresponds to a spectrum where maximum intensity is at the wavelength of the limit.

These ranges comply with IEC 62471:2006 [3].

Note 2 to entry: In IEC 60050-841:2004 the following terms are defined:

841-24-04 – shortwave infrared radiation or near infrared radiation (780 nm to 2 µm);

841-24-03 – mediumwave infrared radiation or medium infrared radiation (2 µm to 4 µm);

841-24-02 – longwave infrared radiation or far infrared radiation (4 µm to 1 mm).

These terms are not used in this standard.

[SOURCE: IEC 60519-12:2013, 3.101]

3.1.2

emitter category

group of emitters using the same principle for applying thermal energy to the workload

3.1.3

inrush current

short term high lamp current occurring during the transient period from the moment of applying voltage to a cold emitter to steady state

3.1.4

average electrical lifetime

net operating time of infrared emitters at rated voltage under intended conditions when 50 % of all emitters are still operating (standards.iteh.ai)

3.2 Radiation

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3.2.1

radiant power

radiant flux

power emitted, transmitted or received in the form of radiation

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3.2.2

irradiance

irradiation

quotient of the radiant power incident on a surface element containing the point, by the area of that element

3.2.3

radiance

quantity L defined by the formula
$$L = \frac{d\Phi}{dA \cdot \cos \theta \cdot d\Omega}$$

where

$d\Phi$ is the radiant power or flux transmitted by an elementary beam passing through the given point and propagating in the solid angle containing the given direction;

$d\Omega$ is the solid angle;

dA is the area of a section of that beam containing the given point;

$\cos \theta$ is the angle between the normal to that section and the direction of the beam.

3.2.4

radiant exitance, <of a body>

quotient of the radiant flux emitted by a body into the hemispherical space (2π sr) by the surface unit area of that body