SLOVENSKI STANDARD
SIST EN IEC 60676:2024

01-junij-2024

Oprema za industrijsko električno ogrevanje - Preskusne metode za peči z odkritim oblokom (IEC 60676:2024)

Industrial electroheating equipment - Test methods for direct arc furnaces (IEC 60676:2024)

Industrielle Elektrowärmeanlagen - Prüfverfahren für Lichtbogen-Schmelzöfen (IEC 60676:2024)

Chauffage électrique industriel - Méthodes d'essai des fours à arc direct (IEC 60676:2024)

Ta slovenski standard je istoveten z: **EN IEC 60676:2024**

ICS:

25.180.10	Električne peči	Electric furnaces

SIST EN IEC 60676:2024 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 60676

April 2024

ICS 25.180.10

Supersedes EN 60676:2012

English Version

Industrial electroheating equipment - Test methods for direct arc furnaces (IEC 60676:2024)

Chauffage électrique industriel - Méthodes d'essai des fours à arc direct (IEC 60676:2024)

Industrielle Elektrowärmeanlagen - Prüfverfahren für Lichtbogen-Schmelzöfen (IEC 60676:2024)

This European Standard was approved by CENELEC on 2024-04-03. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 27/1181/FDIS, future edition 4 of IEC 60676, prepared by IEC/TC 27 "Industrial electroheating and electromagnetic processing" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60676:2024.

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)	2025-01-03
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2027-04-03

This document supersedes EN 60676:2012 and all of its amendments and corrigenda (if any).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 60676:2024 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 standard indicated:

The Bibliography of EN 60398:2015 is applicable with the following addition:

IEC 60076 (series) NOTE Approved as EN 60076 (series)

IEC 60146-1-1 NOTE Approved as EN 60146-1-1

IEC 60683:2011 NOTE Approved as EN 60683:2012 (not modified)

IEC 61869 (series) NOTE Approved as EN IEC 61869 (series)

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1 Where 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.cencenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60398	2015	Installations for electroheating and electromagnetic processing - General performance test methods	EN 60398	2015
IEC 60519-1	-	Safety in installations for electroheating and electromagnetic processing - Part 1: General requirements	EN IEC 60519-1	-
IEC 60519-4	2021	Safety in installations for electroheating and electromagnetic processing - Part 4: Particular requirements for arc furnace installations	EN IEC 60519-4	2022
ISO 13578	-	Industrial furnaces, and associated processing equipment - Safety requirements for machinery and equipment for production of steel by electric arc furnaces	-	-

IEC 60676

Edition 4.0 2024-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Industrial electroheating equipment – Test methods for direct arc furnaces

Chauffage électrique industriel – Méthodes d'essai des fours à arc direct

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 25.180.10

ISBN 978-2-8322-8367-7

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

____

INDUSTRIAL ELECTROHEATING EQUIPMENT – TEST METHODS FOR DIRECT ARC FURNACES

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.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 60676 has been prepared by IEC technical committee 27: Industrial electroheating and electromagnetic processing. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2011. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) The structure has been redrafted according to IEC 60398:2015.
b) The scope has been redrafted.
c) The terms/definitions, normative references and bibliography have been updated and completed.
d) The test methods and content from IEC 60398:2015 have been confirmed, replaced, or complemented with regards to direct arc furnaces (EAF, LF).

e) The annexes from IEC 60398:2015 have been confirmed, replaced, or complemented with regards to direct arc furnaces (EAF, LF).

The text of this International Standard is based on the following documents:

Draft	Report on voting
27/1181/FDIS	27/1184/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This standard is to be read in conjunction with IEC 60398:2015. It supplements or replaces the corresponding clauses of IEC 60398:2015. Where the text indicates a "modification" of, "addition" to or a "replacement" of the relevant provision of IEC 60398:2015, these changes are made to the relevant text of IEC 60398:2015. Where no change is necessary, the words "This clause of IEC 60398:2015 is applicable" are used. When a particular subclause of IEC 60398:2015 is not mentioned in this standard, that subclause applies as far as it is reasonable. When a particular subclause of IEC 60398:2015 is not applicable, the word "Void" is used.

In this standard, the following print types are used:

- terms defined in Clause 3: **bold type**.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

IMPORTANT – The "colour inside" logo on the cover page of this document 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

Direct electrical arc furnaces are very important applications for steel scrap melting, melting of direct reduced iron (DRI), hot bricked iron (HBI) or hot metal. While ladle furnaces are mainly used for providing the required quality and final adjustment of temperature of molten steel before sending to casting machine or to vacuum treatment stations.

The manufacturer of the installation or equipment usually fulfils the following requirements, which come from different sources and are quite often in this order of priorities:

a) to enable the intended process and make the installation work properly;

b) to be cost effective during design and manufacturing;

c) to ensure that the equipment is safe to use in the sense of providing freedom from unacceptable risk of physical injury or damage to the health of the operator (safety in the narrower sense of ISO 12100:2010);

d) to ensure that the equipment is safe to use in the sense of providing freedom from unacceptable risk or physical injury or damage to the health of people, or damage to property or the environment (adding other safety aims to item c), and in the much broader definition of safety according to ISO/IEC Guide 51);

e) to prove that the equipment is cost effective to operate and uses sufficiently small amounts of energy, material and other resources.

It is usually part of the proprietary knowledge of the manufacturer or user of the equipment, to make it cost effective or enable intended processes with a benefit. IEC 60519-1 and IEC 60519-4 assist with achieving safety in the ISO 12100:2010 sense. The focus of this document is on basic requirements for measuring instrumentation and test methods concerned with energy and resource efficiency, performance of the intended process and assessing cost of ownership for installations and equipment.

This document presumes that the installation or equipment is operated and maintained only by personnel consisting of skilled or instructed persons.