

STN	Zariadenia na elektrotepelné a elektromagnetické spracovanie Skúšobné metódy pre elektrotroskové pretavovacie pece	STN EN IEC 60779 36 1112
------------	---	--

Installations for electroheating and electromagnetic processing - Test methods for electroslag remelting furnaces

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 10/20

Obsahuje: EN IEC 60779:2020, IEC 60779:2020

Oznámením tejto normy sa od 21.07.2023 ruší
STN EN 60779 (36 1112) z júla 2006

131807

EUROPEAN STANDARD

EN IEC 60779

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2020

ICS 25.180.10

Supersedes EN 60779:2005 and all of its amendments
and corrigenda (if any)

English Version

**Installations for electroheating and electromagnetic processing -
Test methods for electroslag remelting furnaces
(IEC 60779:2020)**

Installations pour traitement électrothermique et
électromagnétique - Méthodes d'essai des fours de refusion
sous laitier électroconducteur
(IEC 60779:2020)

Elektroerwärmungsanlagen und Anlagen für
elektromagnetische Bearbeitungsprozesse - Prüfverfahren
für Elektroschlacke-Umschmelzöfen
(IEC 60779:2020)

This European Standard was approved by CENELEC on 2020-07-21. 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, Turkey 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

EN IEC 60779:2020 (E)**European foreword**

The text of document 27/1128/FDIS, future edition 3 of IEC 60779, 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 60779:2020.

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) 2021-04-21
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-07-21

This document supersedes EN 60779:2005 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.

Endorsement notice

The text of the International Standard IEC 60779:2020 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the notes in EN 60398:2015 have to be added for the standards indicated.

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.cenelec.eu.

Annex ZA of EN 60398:2015 is applicable except as follows:

Add the following references:

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60398	2015	Installations for electroheating and electromagnetic processing - General performance test methods	EN 60398	2015
IEC 60519-8	-	Safety in installations for electroheating and electromagnetic processing - Part 8: Particular requirements for electroslag remelting furnaces	EN IEC 60519-8	-
IEC 60676	2011	Industrial electroheating equipment - Test methods for direct arc furnaces	EN 60676	2012



IEC 60779

Edition 3.0 2020-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Installations for electroheating and electromagnetic processing – Test methods for electroslag remelting furnaces

Installations pour traitement électrothermique et électromagnétique – Méthodes d'essai des fours de refusion sous laitier électroconducteur



**THIS PUBLICATION IS COPYRIGHT PROTECTED****Copyright © 2020 IEC, Geneva, Switzerland**

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC - webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 000 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

67 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.



IEC 60779

Edition 3.0 2020-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Installations for electroheating and electromagnetic processing – Test methods for electroslag remelting furnaces

Installations pour traitement électrothermique et électromagnétique – Méthodes d'essai des fours de refusion sous laitier électroconducteur

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 25.180.10

ISBN 978-2-8322-8447-6

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD	4
1 Scope	6
2 Normative references	6
3 Terms and definitions	7
3.1 General.....	7
3.2 Energy efficiency	8
3.3 State and parts	8
4 Basic provisions for testing and test conditions.....	9
5 Comparing equipment or installations	9
6 Measurements and workloads	9
7 Numerical modelling	9
8 Technical tests	10
8.100 Measurement of the effective stroke of the electrode ram motion	10
8.101 Measurement of the speed of the electrode motion	10
8.102 Measurement of the time interval for exchanging electrodes	10
8.103 Measurement of the open-circuit secondary voltage of the electroheating installation	10
8.104 Measurement of the electrical parameters of the secondary circuit of the electroheating installation	10
8.104.1 General	10
8.104.2 Carrying out a short-circuit test.....	11
8.104.3 Measurement of electrical parameters of the secondary circuit under normal operating conditions.....	12
8.104.4 Measurement of currents of the coaxial return conductors	14
8.105 Measurement of the active power, reactive power and power factor of the electroheating installation	14
8.106 Measurement of the melting rate of consumable electrode(s).....	14
8.107 Measurement of vacuum parameters for a vacuum electroslag remelting furnace	14
8.107.1 Measurement of the limit vacuum pressure	14
8.107.2 Measurement of the pumping time	14
8.107.3 Measurement of pressure rise rate	14
8.107.4 Measurement of working pressure in the vacuum chamber of a furnace.....	15
8.108 Measurement of the pressure in the chamber of a pressurized electroslag remelting furnace	15
8.109 Measurement of the gas composition of an electroslag remelting furnace working under an inert gas atmosphere.....	15
9 Efficiency of the installation	15
Annex A (informative) Energy efficiency assessment	16
Annex B (informative) Visual display of energy efficiency related information.....	17
Annex C (informative) Estimating energy use.....	18
Annex D (informative) Energy recoverability	19
Annex AA (normative) Explanatory diagrams for symbols and definitions relating to the power circuit of electroslag remelting equipment.....	20
AA.1 Power circuit of electroslag remelting equipment (see Figure AA.1 to Figure AA.3)	20

Bibliography.....	23
Figure AA.1 – Example of a single-phase electroslag remelting furnace circuit	20
Figure AA.2 – Example of a three-phase electroslag remelting furnace circuit.....	21
Figure AA.3 – Example of a coaxial electroslag remelting furnace circuit	22

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**INSTALLATIONS FOR ELECTROHEATING
AND ELECTROMAGNETIC PROCESSING –
TEST METHODS FOR ELECTROSLAG REMELTING 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) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60779 has been prepared by IEC technical committee 27: Industrial electroheating and electromagnetic processing.

This third edition cancels and replaces the second edition published in 2005. It constitutes a technical revision.

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

- the structure has been redrafted according to IEC 60398:2015;
- the scope and object have been redrafted;
- the terms/definitions, normative references and bibliography have been updated and completed;
- all test methods and content from IEC 60779:2005 that have been included in IEC 60398:2015 have been removed to avoid any duplication.

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

FDIS	Report on voting
27/1128/FDIS	27/1130/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

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

This standard is to be read in conjunction with IEC 60398:2015. It supplements or modifies 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 is reasonable. When a particular subclause of IEC 60398:2015 is not applicable, the word "Void" is used.

Additional specific provisions to those in IEC 60398:2015, given as individual clauses or subclauses, are numbered starting from 101.

NOTE The following numbering system is used:

- subclauses, tables and figures that are numbered starting from 101 are additional to those in IEC 60398:2015;
- unless notes are in a new subclause or involve notes in IEC 60398:2015, they are numbered starting from 101, including those in a replaced clause or subclause;
- additional annexes are lettered AA, BB, etc.

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

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

INSTALLATIONS FOR ELECTROHEATING AND ELECTROMAGNETIC PROCESSING – TEST METHODS FOR ELECTROSLAG REMELTING FURNACES

1 Scope

Clause 1 of IEC 60398:2015 is replaced by the following.

Replacement:

This International Standard specifies the test procedures, conditions and methods for determining the main performance parameters and operational characteristics of electroslag remelting furnaces.

Measurements and tests that are solely used for the verification of safety requirements of the installations are outside the scope of this document and are covered by IEC 60519-1 and IEC 60519-8.

This document applies to industrial electroslag remelting furnaces, the rated capacity of which is equal to, or greater than, 50 kg.

This document is applicable to industrial electroslag remelting furnaces having one or more electrodes and having different melting power supplies, such as alternating current, direct current, or low-frequency current.

This document includes the concept and material on energy efficiency dealing with the electrical and processing parts of the installations, as well as the overall performance.

2 Normative references

Clause 2 of IEC 60398:2015 is applicable except as follows.

Replacement:

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.

Modification:

Delete the footnotes.

Additions:

IEC 60398:2015, *Installations for electroheating and electromagnetic processing – General performance test methods*

IEC 60519-8, *Safety in installations for electroheating and electromagnetic processing – Part 8: Particular requirements for electroslag remelting furnaces*

IEC 60676:2011, *Industrial electroheating equipment – Test methods for direct arc furnaces*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN