SLOVENSKI STANDARD

SIST EN 60404-13:2008

01-januar-2008

Magnetni materiali - 13. del: Metode za meritve gostote, upornosti in skladnega faktorja elektriļ ne ploļ evine in trakov (IEC 60404-13:1995)

Magnetic materials - Part 13: Methods of measurement of density, resistivity and stacking factor of electrical steel sheet and strip (IEC 60404-13:1995)

Magnetische Werkstoffe - Teil 13: Prüfverfahren zur Messung der Dichte, des spezifischen Widerstandes und des Stapelfaktors von Elektroblech und -band (IEC 60404-13:1995)

Matériaux magnétiques - Partie 13: Méthodes de mesure de la masse volumique, de la résistivité et du facteur de foisonnement des tôles et bandes magnétiques (IEC 60404-13:1995)

Ta slovenski standard je istoveten z: **EN 60404-13:2007**

ICS:

17.220.20	Merjenje elektriļ nih in magnetnih veliļ in	Measurement of electrical and magnetic quantities
29.030	Magnetni materiali	Magnetic materials

SIST EN 60404-13:2008 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60404-13

October 2007

ICS 17.220.20; 29.030

English version

Magnetic materials - Part 13: Methods of measurement of density, resistivity and stacking factor of electrical steel sheet and strip (IEC 60404-13:1995)

Matériaux magnétiques -
Partie 13: Méthodes de mesure
de la masse volumique, de la résistivité
et du facteur de foisonnement des tôles
et bandes magnétiques
(CEI 60404-13:1995)

Magnetische Werkstoffe -
Teil 13: Prüfverfahren zur Messung der
Dichte, des spezifischen Widerstandes
und des Stapelfaktors von Elektroblech
und -band
(IEC 60404-13:1995)

This European Standard was approved by CENELEC on 2007-10-01. 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.

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

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

Ref. No. EN 60404-13:2007 E

Foreword

The text of the International Standard IEC 60404-13:1995, prepared by IEC TC 68, Magnetic alloys and steels, was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 60404-13 on 2007-10-01 without any modification.

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)	2008-10-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2010-10-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60404-13:1995 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.

Publication	Year	Title	EN/HD	Year
IEC 60404-2	1996	Magnetic materials - Part 2: Methods of measurement of the magnetic properties of electrical steel sheet and strip by means of an Epstein frame	EN 60404-2	1998
IEC 60404-3	1992	Magnetic materials - Part 3: Methods of measurement of the magnetic properties of magnetic sheet and strip by means of a single sheet tester	–	–
IEC 60404-10	1988	Magnetic materials - Part 10: Methods of measurement of magnetic properties of magnetic steel sheet and strip at medium frequencies	–	–
ISO 1183	Series	Plastics - Methods for determining the density of non-cellular plastics	EN ISO 1183	Series
ISO 2738	1999	Sintered metal materials, excluding hard metals - Permeable sintered metal materials - Determination of density, oil content, and open porosity	EN ISO 2738	1999

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Matériaux magnétiques –
Partie 13:
Méthodes de mesure de la masse volumique, de la résistivité et du facteur de foisonnement des tôles et bandes magnétiques

Magnetic materials –
Part 13:
Methods of measurement of density, resistivity and stacking factor of electrical steel sheet and strip

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Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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Pour prix, voir catalogue en vigueur
For price, see current catalogue

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

MAGNETIC MATERIALS –

Part 13: Methods of measurement of density, resistivity and stacking factor of electrical steel sheet and strip

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international cooperation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. 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. The 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 the IEC on technical matters, prepared by technical committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.

3) They have the form of recommendations for international use published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.

4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.

International Standard IEC 404-13 has been prepared by IEC technical committee 68: Magnetic alloys and steels.

This standard supersedes chapters VI, VII and IX of IEC 404-2: 1978 which will shortly be revised to include only magnetic measurements.

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

DIS	Report on voting
68/110/DIS	68/121/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.

Annex A is for information only.

MAGNETIC MATERIALS –

Part 13: Methods of measurement of density, resistivity and stacking factor of electrical steel sheet and strip

1 Scope and object

This part of IEC 404 specifies the methods used for determining the density, resistivity and stacking factor of electrical steel sheet and strip. These quantities are necessary to establish the magnetic characteristics of the material. In particular, the density is necessary to allow specified values of the flux density to be set without knowing the thickness of the test specimen.

For the determination of the density, the immersion method was earlier considered to be a fundamental method for use in cases of arbitration. However, experience has shown that this method is very difficult to use in the case of sheet samples with a relatively large surface area. This method is therefore not included. It is described in ISO 2738 and ISO 1183.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 404. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 404 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 404-2: 1978, *Magnetic materials – Part 2: Methods of measurement of magnetic, electrical and physical properties of magnetic sheet and strip*

IEC 404-3: 1992, *Magnetic materials – Part 3: Methods of measurement of magnetic properties of magnetic sheet and strip by means of a single sheet tester*

IEC 404-10: 1988, *Magnetic materials – Part 10: Methods of measurement of magnetic properties of magnetic steel sheet and strip at medium frequencies*

ISO 1183: 1987, *Plastics – Methods for determining the density and relative density of non-cellular plastics*

ISO 2738: 1987, *Permeable sintered metal materials – Determination of density, oil content and open porosity*

3 Determination of the density

3.1 *Field of application*

The method of measurement of the density defined in this clause applies only to non-oriented iron-silicon electrical sheet and strip with or without insulation, with the following range of chemical composition by mass:

- silicon: $p(\mathrm{Si}) \leq 4$ %;
- aluminium: $0{,}17\ p(\mathrm{Si}) - 0{,}28 \leq p(\mathrm{Al}) \leq 0{,}17\ p(\mathrm{Si}) + 0{,}28$ and $p(\mathrm{Al}) \geq 0$;
- total of other alloy constituents: $p \leq 0{,}4$ %

where

$p(\mathrm{Si})$ is the percentage of Si by mass;

$p(\mathrm{Al})$ is the percentage of Al by mass.

NOTE – If the chemical composition is not known, it should be verified before using this method.

The two methods of determination of density described in this standard are applicable to Epstein strips (method A) as specified by IEC 404-2 and IEC 404-10 and to sheets (method B) as specified by IEC 404-3.

For materials not meeting the above range of chemical composition, immersion methods of equivalent accuracy such as those defined in ISO 2738 or ISO 1183 shall be used.

The measurements shall be made at an ambient temperature of (23 ± 5) °C.

3.2 *Test specimens*

3.2.1 *Strip specimens*

The strip specimen used in method A (see 3.3.2) shall have the following dimensions:

- width $b = (30 \pm 0{,}2)$ mm;
- length 280 mm $\leq l \leq$ 320 mm.

It shall be cut with its longitudinal axis parallel to the direction of rolling.

It is not necessary to remove the oxide or other insulating coating except from places where electrical contacts are made.

3.2.2 *Sheet specimens*

The dimensions of the sheet used for method B (see 3.3.3) shall be as follows:

- width $b = 500$ mm;
- length $l = 500$ mm.