

SLOVENSKI STANDARD
SIST EN 60404-8-6:2009**01-april-2009**

**Magnetni materiali - 8-6. del: Specifikacije za posamezne materiale -
Mehkomagnetni kovinski materiali (IEC 60404-8-6:1999 + A1:2007)**

Magnetic materials - Part 8-6: Specifications for individual materials - Soft magnetic
metallic materials (IEC 60404-8-6:1999 + A1:2007)

Magnetische Werkstoffe - Teil 8-6: Anforderungen an einzelne Werkstoffe -
Weichmagnetische metallische Werkstoffe (IEC 60404-8-6:1999 + A1:2007)

Matériaux magnétiques - Partie 8-6: Spécifications pour matériaux particuliers -
Matériaux métalliques magnétiquement doux (CEI 60404-8-6:1999 + A1:2007)

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Ta slovenski standard je istoveten z: EN 60404-8-6:2009

ICS:

29.030

Magnetni materiali

Magnetic materials

SIST EN 60404-8-6:2009**en,fr**

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 60404-8-6

January 2009

ICS 29.030

English version

**Magnetic materials -
Part 8-6: Specifications for individual materials -
Soft magnetic metallic materials
(IEC 60404-8-6:1999 + A1:2007)**

Matériaux magnétiques -
Partie 8-6: Spécifications
pour matériaux particuliers -
Matériaux métalliques
magnétiquement doux
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Magnetische Werkstoffe -
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Werkstoffe
(IEC 60404-8-6:1999 + A1:2007)

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This European Standard was approved by CENELEC on 2008-12-01. 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: avenue Marnix 17, B - 1000 Brussels

Foreword

The text of the International Standard IEC 60404-8-6:1999 + A1:2007, prepared by IEC TC 68, Magnetic alloys and steels, was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 60404-8-6 on 2008-12-01 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) 2009-12-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2011-12-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60404-8-6:1999 + A1:2007 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

ISO 286-1

NOTE Harmonized as EN 20286-1:1993 (not modified).
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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 Where an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-121	1978	International Electrotechnical Vocabulary (IEV) - Chapter 121: Electromagnetism	-	-
IEC 60050-131	1978	International Electrotechnical Vocabulary (IEV) - Chapter 131: Electric and magnetic circuits	-	-
IEC 60050-221	1990	International Electrotechnical Vocabulary (IEV) - Chapter 221: Magnetic materials and components	-	-
IEC 60404-1	1979	Magnetic materials - Part 1: Classification	-	-
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 60404-4	1995	Magnetic materials - Part 4: Methods of measurement of d.c. magnetic properties of magnetically soft materials	EN 60404-4	1997
IEC 60404-6 ¹⁾	1986	Magnetic materials - Part 6: Methods of measurement of the magnetic properties of isotropic nickel-iron soft magnetic alloys, types E1, E3 and E4	-	-
IEC 60404-7	1982	Magnetic materials - Part 7: Method of measurement of the coercivity of magnetic materials in an open magnetic circuit	-	-
IEC 60404-8-2	1998	Magnetic materials - Part 8-2: Specifications for individual materials - Cold-rolled electrical alloyed steel sheet and strip delivered in the semi-processed state	-	-

¹⁾ IEC 60404-6:1986 is superseded by IEC 60404-6:2003, which is harmonized as EN 60404-6:2003.

EN 60404-8-6:2009

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<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60404-8-4	1998	Magnetic materials - Part 8-4: Specifications for individual materials - Cold-rolled non-oriented electrical steel sheet and strip delivered in the fully-processed state	-	-
IEC 60404-8-7	1998	Magnetic materials - Part 8-7: Specifications for individual materials - Cold-rolled grain-oriented electrical steel sheet and strip delivered in the fully-processed state	-	-
IEC 60404-8-8	1991	Magnetic materials - Part 8: Specifications for individual materials - Section 8: Specification for thin magnetic steel strip for use at medium frequencies	-	-
IEC 60404-8-10	1994	Magnetic materials - Part 8: Specifications for individual materials - Section 10: Specification for magnetic materials (iron and steel) for use in relays	-	-
IEC 60404-9	1987	Magnetic materials - Part 9: Methods of determination of the geometrical characteristics of magnetic steel sheet and strip	-	-
IEC 60635	1978	Toroidal strip-wound cores made of magnetically soft material	-	-
ISO 404	1992	Steel and steel products - General technical delivery requirements	-	-
ISO 10474	1991	Steel and steel products - Inspection documents	-	-

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INTERNATIONAL
STANDARD

IEC
CEI

NORME
INTERNATIONALE

60404-8-6

Edition 2.1

2007-06

Edition 2:1999 consolidated with amendment 1:2007
Edition 2:1999 consolidée par l'amendement 1:2007

Magnetic materials –

Part 8-6:

**Specifications for individual materials –
Soft magnetic metallic materials**

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Matériaux magnétiques –

Partie 8-6: ST EN 60404-8-6:2009

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**Specifications pour matériaux particuliers –
Matériaux métalliques magnétiquement doux**



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE
CODE PRIX **CD**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

MAGNETIC MATERIALS –

**Part 8-6: Specifications for individual materials –
Soft magnetic metallic materials**

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 60404-8-6 has been prepared by IEC technical committee 68: Magnetic alloys and steels.

This consolidated version of IEC 60404-8-6 consists of the second edition (1999) [documents 68/197/FDIS and 68/200/RVD] and its amendment 1 (2007) [documents 68/325A/CDV and 68/328/RVC].

The technical content is therefore identical to the base edition and its amendment(s) and has been prepared for user convenience.

It bears the edition number 2.1.

A vertical line in the margin shows where the base publication has been modified by amendment 1.

MAGNETIC MATERIALS –

Part 8-6: Specifications for individual materials – Soft magnetic metallic materials

1 Scope

This part of IEC 60404 specifies the general requirements, magnetic properties, geometric characteristics and tolerances as well as inspection procedures for pure iron, silicon-iron, nickel-iron and cobalt-iron. The materials are in the form of bar, billet, sheet, strip or wire. The alloys covered correspond to those defined by classes A, C1, C2, E1 to E4 and F1 to F3 in IEC 60404-1.

Magnetic materials used primarily for relays, pure iron and steel products, classified only by coercivity, are covered in IEC 60404-8-10. IEC 60404-8-10 is less restrictive in terms of magnetic properties than the pure iron material (class A) and the silicon-iron alloys (classes C21 and C22) specified in this standard, but it gives more comprehensive dimensional tolerances.

Non-oriented and oriented silicon steels (C21 and C22) for industrial power frequency applications, classified by specific total loss, are covered in IEC 60404-8-2, IEC 60404-8-4 and IEC 60404-8-7.

Non-oriented and oriented thin magnetic materials for use at medium frequencies, classified by specific total loss, are covered in IEC 60404-8-8.

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2 Normative references

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IEC 60050(121):1978, *International Electrotechnical Vocabulary (IEV) – Chapter 121: Electromagnetism*

IEC 60050(131):1978, *International Electrotechnical Vocabulary (IEV) – Chapter 131: Electric and magnetic circuits*

IEC 60050(221):1990, *International Electrotechnical Vocabulary (IEV) – Chapter 221: Magnetic materials and components*

IEC 60404-1:1979, *Magnetic materials – Part 1: Classification*

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*

IEC 60404-4:1995, *Magnetic materials – Part 4: Methods of measurement of d.c. magnetic properties of iron and steel*

IEC 60404-6:1986, *Magnetic materials – Part 6: Methods of measurement of the magnetic properties of isotropic nickel-iron soft magnetic alloys, types E1, E3 and E4*

IEC 60404-7:1982, *Magnetic materials – Part 7: Method of measurement of the coercivity of magnetic materials in an open magnetic circuit*

IEC 60404-8-2:1998, *Magnetic materials – Part 8-2: Specifications for individual materials – Cold-rolled electrical alloyed steel sheet and strip delivered in the semi-processed state*

IEC 60404-8-4:1998, *Magnetic materials – Part 8-4: Specifications for individual materials – Cold-rolled non-oriented electrical steel sheet and strip delivered in the fully-processed state*

IEC 60404-8-7:1998, *Magnetic materials – Part 8-7: Specifications for individual materials – Cold-rolled grain-oriented electrical steel sheet and strip delivered in the fully-processed state*

IEC 60404-8-8:1991, *Magnetic materials – Part 8: Specifications for individual materials – Section 8: Specification for thin magnetic steel strip for use at medium frequencies*

IEC 60404-8-10:1994, *Magnetic materials – Part 8: Specifications for individual materials – Section 10: Specification for magnetic materials (iron and steel) for use in relays*

IEC 60404-9:1987, *Magnetic materials – Part 9: Methods of determination of the geometrical characteristics of magnetic steel sheet and strip*

IEC 60635:1978, *Toroidal strip-wound cores made of magnetically soft material*

ISO 404:1992, *Steel and steel products – General technical delivery requirements*

ISO 10474:1991, *Steel and steel products – Inspection documents*

3 Definitions

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For the purpose of this part of IEC 60404, the definitions of the principal terms relative to magnetic properties and to electric and magnetic circuits given in IEC 60050(121), IEC 60050(131) and IEC 60050(221) apply, as well as the following definitions.

3.1

ageing

change of coercivity, expressed as a percentage, resulting from heat treatment

3.2

bar

solid product of uniform cross-section supplied in straight lengths. The cross-section may be round, square, rectangular or regular polygonal.

flat: A bar of rectangular cross-section, rolled on the four faces, whose thickness is generally 5 mm or greater and whose width is not greater than 150 mm

round: A bar of circular cross-section whose diameter is generally 8 mm or greater

3.3

billet

solid product of uniform cross-section, which may be square, round or rectangular, with a width less than twice the thickness

3.4

edge camber

the edge camber is characterized by the greatest distance between an edge of the sheet and the line joining the two extremities of the measured length of this edge (see IEC 60404-9)