

# INTERNATIONAL STANDARD



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

Document Preview

[IEC 60404-8-4:2022](#)

<https://standards.iteh.ai/catalog/standards/iec/67b36d90-574b-4d01-88ac-5024fc21fffb/iec-60404-8-4-2022>





**THIS PUBLICATION IS COPYRIGHT PROTECTED**  
**Copyright © 2022 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.

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

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://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](http://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 It also gives information on projects, replaced and withdrawn publications.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](http://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](http://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](mailto:sales@iec.ch).

**IEC Products & Services Portal - [products.iec.ch](http://products.iec.ch)**

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

**Electropedia - [www.electropedia.org](http://www.electropedia.org)**

The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

International Standards  
standards.iteh.ai)  
Document Preview

[IEC 60404-8-4:2022](https://standards.iteh.ai/catalog/standards/iec/67b36d90-574b-4d01-88ae-5024fc21fffb/iec-60404-8-4-2022)

<https://standards.iteh.ai/catalog/standards/iec/67b36d90-574b-4d01-88ae-5024fc21fffb/iec-60404-8-4-2022>



IEC 60404-8-4

Edition 4.0 2022-09  
REDLINE VERSION

# INTERNATIONAL STANDARD



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

Document Preview

[IEC 60404-8-4:2022](https://standards.iteh.ai/catalog/standards/iec/67b36d90-574b-4d01-88ae-5024fc21ffb/iec-60404-8-4-2022)

<https://standards.iteh.ai/catalog/standards/iec/67b36d90-574b-4d01-88ae-5024fc21ffb/iec-60404-8-4-2022>

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

ICS 17.220.20; 29.030

ISBN 978-2-8322-5735-7

**Warning! Make sure that you obtained this publication from an authorized distributor.**

## CONTENTS

FOREWORD .....	4
INTRODUCTION .....	2
1 Scope .....	7
2 Normative references .....	7
3 Terms and definitions .....	8
4 Classification .....	8
5 Designation .....	9
6 General requirements .....	10
6.1 Production process .....	10
6.2 Form of supply .....	10
6.3 Delivery condition .....	10
6.4 Surface condition .....	10
6.5 Suitability for cutting .....	11
7 Technical requirements .....	11
7.1 Magnetic properties .....	11
7.1.1 General .....	11
7.1.2 Magnetic polarization .....	11
7.1.3 Specific total loss .....	15
7.1.4 Anisotropy of loss .....	15
7.2 Geometrical characteristics and tolerances .....	15
7.2.1 Thickness .....	15
7.2.2 Width .....	16
7.2.3 Length .....	17
7.2.4 Edge wave (wave factor) .....	17
7.2.5 <del>Flatness (wave factor) .....</del>	<del>18</del>
7.2.5 Residual curvature .....	18
7.2.6 Edge camber .....	18
7.3 Technological characteristics .....	18
7.3.1 Density .....	18
7.3.2 Stacking factor .....	18
7.3.3 Number of bends .....	19
7.3.4 Deviation from the shearing line (internal stress) .....	19
8 Inspection and testing .....	19
8.1 General .....	19
8.2 Selection of samples .....	19
8.3 Preparation of test specimens .....	20
8.3.1 Magnetic properties .....	20
8.3.2 Geometrical characteristics and tolerances .....	20
8.3.3 Technological characteristics .....	21
8.4 Test methods .....	21
8.4.1 General .....	21
8.4.2 Magnetic properties .....	21
8.4.3 Geometrical characteristics and tolerances .....	22
8.4.4 Technological characteristics .....	22
8.5 Retests .....	23

9	Marking, labelling and packaging.....	23
10	Complaints .....	23
11	Information to be supplied by the purchaser .....	23
	Annex A (informative) Non-specified magnetic properties .....	25
	Annex B (informative) European steel numbers.....	
	Annex B (informative) <del>Calculation of density values</del> Calculated density of non-oriented electrical steel .....	27
	Bibliography.....	28
	Table 1 – Technological properties and magnetic properties (magnetic properties are measured <del>by</del> using the Epstein method according to IEC 60404-2) .....	12
	Table 2 – Technological properties and magnetic properties <del>measured by the Epstein method</del> for strip and sheet of nominal thickness 0,47 mm for use at 60 Hz only (magnetic properties are measured using the Epstein method according to IEC 60404-2) .....	14
	Table 3 – Tolerances on nominal thickness.....	16
	Table 4 – Tolerances on nominal width .....	17
	Table A.1 – Non-specified magnetic properties .....	25

iTeh Standards  
(<https://standards.iteh.ai>)  
Document Preview

[IEC 60404-8-4:2022](#)

<https://standards.iteh.ai/catalog/standards/iec/67b36d90-574b-4d01-88ae-5024fc21ffb/iec-60404-8-4-2022>

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## MAGNETIC MATERIALS –

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

## 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.

**This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 60404-8-4:2013. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.**

IEC 60404-8-4 has been prepared by IEC technical committee 68: Magnetic alloys and steels. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2013. This edition constitutes a technical revision.

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

- a) modification of terms and technical requirements concerning geometrical characteristics to be consistent with IEC 60404-9:2018;
- b) insertion of Table 3 – Tolerances on nominal thickness;
- c) change of the length of test specimen for determination of geometrical characteristics from 2 m to 1 m.

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

Draft	Report on voting
68/700/CDV	68/713/RVC

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 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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

A list of all parts in the IEC 60404 series, published under the general title *Magnetic materials*, can be found on the IEC website.

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](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.

**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

This revision of International Standard IEC 60404-8-4 has been prepared by the experts of the Working Group 1 of the IEC Technical Committee 68: Magnetic alloys and steels.

The third edition of IEC 60404-8-4 was issued in 2013. After that, other IEC 60404 standards were revised and IEC TC 68 decided in 2019 at their meeting in Düsseldorf to revise this document to maintain consistency for user's convenience. The revision is made mainly on technical amendments regarding testing and definitions of geometrical characteristics in accordance with IEC 60404-9. The length of test specimen for determination of geometrical characteristics is changed from 2 m to 1 m. The term of “flatness” is divided into “edge wave (wave factor)” and “residual curvature” and the horizontal method is introduced for verification of residual curvature. This revision also includes corrections in order to improve consistency with other standards of the IEC 60404-8 series.

**iTeh Standards**  
**(<https://standards.iteh.ai>)**  
**Document Preview**

[IEC 60404-8-4:2022](https://standards.iteh.ai/catalog/standards/iec/67b36d90-574b-4d01-88ac-5024fc21fff/iec-60404-8-4-2022)

<https://standards.iteh.ai/catalog/standards/iec/67b36d90-574b-4d01-88ac-5024fc21fff/iec-60404-8-4-2022>



## MAGNETIC MATERIALS –

### Part 8-4: Specifications for individual materials – Cold-rolled non-oriented electrical steel strip and sheet delivered in the fully-processed state

#### 1 Scope

This part of IEC 60404 defines the grades of cold-rolled non-oriented electrical steel strip and sheet in nominal thicknesses of 0,35 mm, 0,47 mm, 0,50 mm, 0,65 mm and 1,00 mm. In particular, it ~~specifies~~ gives general requirements, magnetic properties, geometric characteristics, tolerances and technological characteristics, as well as inspection procedure. The nominal thickness 0,47 mm applies to the grades for use at 60 Hz only.

~~This standard gives in Table 2 the magnetic properties of cold-rolled non-oriented electrical steel strip and sheet of nominal thickness 0,47 mm for use at 60 Hz only.~~

~~This standard applies to materials supplied in the fully annealed condition intended for the construction of magnetic circuits. It does not apply to semi-processed material.~~

~~These magnetic materials correspond to class C.21 of IEC 60404-1.~~

This document applies to cold-rolled non-oriented electrical steel strip and sheet supplied in the fully-processed state, i.e. the final annealed condition, in coils or sheets, and intended for the construction of magnetic circuits. This document does not apply to materials supplied in the semi-processed state.

NOTE The cold-rolled non-oriented electrical steel strip and sheet supplied in the semi-processed state is specified in IEC 60404-8-3.

The grades defined in this document correspond to Class C21 of IEC 60404-1.

#### 2 Normative references

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.

~~IEC 60050 (all parts), International Electrotechnical Vocabulary (available at <<http://www.electropedia.org>>)~~

IEC 60050-121, *International Electrotechnical Vocabulary – Part 121: Electromagnetism*

IEC 60050-221, *International Electrotechnical Vocabulary – Chapter 221: Magnetic materials and components*

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

IEC 60404-2, *Magnetic materials – Part 2: Methods of measurement of the magnetic properties of electrical steel strip and sheet ~~and strip~~ by means of an Epstein frame*

IEC 60404-3, *Magnetic materials – Part 3: Methods of measurement of the magnetic properties of electrical steel strip and sheet by means of a single sheet tester*

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

IEC 60404-13, *Magnetic materials – Part 13: Methods of measurement of ~~density~~, resistivity, density and stacking factor of electrical steel strip and sheet ~~and strip~~*

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

ISO 7799, *Metallic materials – Sheet and strip 3 mm thick or less – Reverse bend test*

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

### 3 Terms and definitions

For the purposes of this document, the terms and definitions ~~relating to magnetic properties~~ given in IEC 60050-121, IEC 60050-221 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

#### 3.1

##### **edge wave**

wave factor

variations of flatness of a length of strip or a sheet taking a form of waves at the slit edge of the product

<https://standards.iteh.ai/catalog/standards/iec/67b36d90-574b-4d01-88ae-5024fc21ffb/iec-60404-8-4-2022>

<https://standards.iteh.ai/catalog/standards/iec/67b36d90-574b-4d01-88ae-5024fc21ffb/iec-60404-8-4-2022>

Note 1 to entry: The edge wave is characterized by the wave factor which is the relation of the height of the wave to its length, expressed as a percentage.

[SOURCE: IEC 60404-9:2018, 3.1]

#### 3.2

##### **residual curvature**

variations of flatness of a length of strip or a sheet taking a permanent curvature in the direction of rolling of the product

[SOURCE: IEC 60404-9:2018, 3.2]

#### 3.3

##### **edge camber**

greatest distance between a longitudinal edge of a length of strip or a sheet and the line joining the two extremities of the measured length of this edge

[SOURCE: IEC 60404-9:2018, 3.3]

#### ~~3.2~~

##### ~~**flatness**~~

~~property of a sheet or a length of strip which is characterized by the wave factor, i.e. by the relation of the height of the wave to its length~~

### 3.4 deviation from the shearing line

internal stress

~~deviation from the shearing line due to internal stresses~~

greatest distance between corresponding points on the two sheared edges of a length of strip or a sheet sheared in the middle of the width, in parallel to the direction of rolling of the product, which characterizes the internal stress of the materials

[SOURCE: IEC 60404-9:2018, 3.4]

### 3.5 number of bends

~~number of alternate bends possible before the appearance in the base metal of the first crack visible to the naked eye~~

~~Note 1 to entry:—The number of bends constitutes an indication of the ductility of the material.~~

counts of alternate bending in the reverse bend test prior to the appearance of the first crack in the base metal of the specimen visible to the naked eye or sudden failure occurs by fracture

[SOURCE: IEC TR 63114:2018, 3.2]

## 4 Classification

The grades covered by this document are classified according to the specified value of maximum specific total loss ~~in watts per kilogram at 1,5 T~~ and according to the nominal thickness of ~~the material (0,35 mm, 0,47 mm, 0,50 mm, 0,65 mm and 1,00mm)~~ the product<sup>1</sup>. The products of the nominal thicknesses 0,35 mm, 0,50 mm, 0,65 mm and 1,00 mm are classified according to the specified values tested at a magnetic polarization of 1,5 T and 50 Hz, in watts per kilogram. The product of the nominal thickness 0,47 mm is classified according to the specified value tested at a magnetic polarization of 1,5 T and 60 Hz, in watts per kilogram.

<https://standards.iteh.ai/catalog/standards/iec/67b36d90-574b-4d01-88ae-5024fc21ffb/iec-60404-8-4-2022>

## 5 Designation

The steel name comprises the following in the order given:

- a) a letter “M” for electrical steel;
- b) one hundred times the specified value of maximum specific total loss at a magnetic polarization of 1,5 T and 50 Hz, in watts per kilogram, ~~at 1,5 T and 50 Hz for the materials given in Table 1 and at 1,5 T and 60 Hz for the materials given in Table 2 and corresponding to the nominal product thickness~~ for the products of the nominal thicknesses 0,35 mm, 0,50 mm, 0,65 mm and 1,00 mm, or at a magnetic polarization of 1,5 T and 60 Hz, in watts per kilogram, for the products of the nominal thickness 0,47 mm;
- c) one hundred times the nominal thickness of the ~~material~~ product, in millimeters;
- d) the characteristic letter “A” for the grades of cold-rolled non-oriented electrical steel strip or sheet supplied in the fully-processed state;
- e) one tenth of the frequency at which the maximum specific total loss is specified, i.e. 5 or 6.

EXAMPLE M250-35A5 for cold-rolled non-oriented electrical steel strip or sheet with a maximum specific total loss of 2,50 W/kg at a magnetic polarization of 1,5 T and 50 Hz, and a nominal thickness of 0,35 mm, supplied in the fully-processed state.

~~NOTE—The corresponding steel numbers used in the European standard are given in Annex B.~~

<sup>1</sup> In the rest of the document, the word “product” is used to mean “strip and sheet”.

## 6 General requirements

### 6.1 Production process

The production process of the steel and its chemical composition are left to the discretion of the manufacturer.

### 6.2 Form of supply

The ~~material~~ product is supplied in coils in the case of strip and in bundles in the case of sheets.

The mass of coils or bundles of sheets shall be agreed ~~between the manufacturer and the purchaser~~ at the time of ~~ordering~~ enquiry and order.

The recommended value for the internal diameter of coils is ~~approximately~~ 508 mm or ~~approximately~~ 610 mm.

Strip shall be of constant width and wound in such a manner that the ~~edges~~ are superimposed in a regular manner and the side faces of the coil are substantially flat.

Coils shall be sufficiently tightly wound in order that they do not collapse under their own weight.

Strip ~~can occasionally~~ may exhibit welds or interleaves resulting from the removal of defective zones, ~~subject to prior agreement~~ if agreed between the ~~parties~~ manufacturer and the purchaser at the time of enquiry and order. If necessary, the marking of welds or interleaves may be agreed between the manufacturer and the purchaser at the time of ~~ordering~~ enquiry and order.

For coils containing welds or interleaves, each part of the strip shall be of the same grade.

The edges of parts welded together shall not be so much out of alignment as to affect the further processing of the ~~material~~ product. [IEC 60404-8-4:2022](https://standards.itec.ai/iec/60404-8-4-2022)

Sheets which make up each bundle shall be stacked so that the side faces of the bundle are substantially flat and approximately perpendicular to the top face.

### 6.3 Delivery condition

The ~~material~~ products ~~may be~~ are usually supplied either without insulation coating or with insulation coating on one or both sides. If the ~~material~~ product is supplied with insulation coating, the nature of the ~~insulation~~ coating, its properties, the stacking factor and their verification ~~shall be agreed~~ are subject to agreement between the manufacturer and the purchaser at the time of ~~ordering~~ enquiry and order.

NOTE Further information on the classification of surface insulation coatings can be found in IEC 60404-1-1.

### 6.4 Surface condition

The surfaces shall be smooth and clean, free from grease and rust<sup>2</sup>. Dispersed defects such as scratches, blisters, cracks, etc. are ~~only permitted~~ if they are within the ~~limits of~~ tolerances on thickness ~~tolerances~~, and if they are not detrimental to the correct use of the supplied ~~material~~ product.

~~When an insulation coating is present on the surface of the material, it~~ For products supplied with insulation coating, the coating shall be sufficiently adherent so that it does not become detached during ~~cutting~~ manufacturing operations. During the ~~alternating~~ reverse bend test (see 8.4.4.2), the coating shall not become detached after a bend of 90°. If the coating becomes

<sup>2</sup> This should not be confused with some coloration of the insulation coating inherent to the manufacturing process.

detached during the test, the ~~piece~~ sample of the product from which the ~~sample~~ test specimen was taken shall be subjected to a shearing test. ~~During this test, it shall not be admissible for large pieces of the coating to become detached.~~ By shearing the sample with well sharpened tools, a detachment of large pieces of the coating shall not be admissible. However, some slight chipping of the coating at the sheared edges shall be tolerated.

## 6.5 Suitability for cutting

The ~~material~~ product shall be able to be cut or punched without causing premature wear of tools; ~~it shall be able to be cut at any point and into the usual shapes, thus ensuring accurate working with the correct cutting tools. If there are special requirements with regard to a suitability test for cutting or punching, these shall be established by agreement between the manufacturer and the purchaser.~~ The product shall be suitable for cutting or punching accurately into the usual shapes at any point when appropriate cutting or punching tools and technologies are used.

A special requirement concerning suitability for cutting or punching of the product may be subject to agreement between the manufacturer and the purchaser at the time of enquiry and order.

## 7 Technical requirements

### 7.1 Magnetic properties

#### 7.1.1 General

The properties defined in 7.1.2 to 7.1.4 ~~are applicable~~ shall apply to products in the delivery conditions defined in 6.3.

For ~~coated~~ products supplied with insulation coating, the mass of the ~~insulation~~ coating shall be taken into account to determine the magnetic properties.

#### 7.1.2 Magnetic polarization

[IEC 60404-8-4:2022](https://standards.iteh.ai/catalog/standards/iec/67b36d90-574b-4d01-88ac-5024f21ffb/iec-60404-8-4-2022)

~~The minimum specified values of magnetic polarization for magnetic field strengths  $H$  of 2 500 A/m, 5 000 A/m and 10 000 A/m (expressed as a peak value) shall be as given in Table 1.~~

~~The magnetic polarization shall be determined in an alternating magnetic field at 50 Hz or 60 Hz.~~

The specified values of minimum magnetic polarization, expressed as a peak value, at AC magnetic field strengths  $H$  of 2 500 A/m, 5 000 A/m and 10 000 A/m, expressed as a peak value, shall be as given in Table 1 at 50 Hz or Table 2 at 60 Hz.

**Table 1 – Technological properties and magnetic properties (magnetic properties are measured by using the Epstein method according to IEC 60404-2)**

Steel name	Nominal thickness mm	Maximum specific total loss at 1,5 T W/kg		Minimum magnetic polarization <sup>a</sup> in an alternating magnetic field for at an AC magnetic field strength T			Maximum anisotropy of loss %	Minimum stacking factor	Minimum number of bends	Conventional density <sup>c</sup> kg/dm <sup>3</sup>
		at 50 Hz	at 60 Hz <sup>b</sup>	2 500 A/m	5 000 A/m	10 000 A/m				
M210-35A5	0,35	2,10	2,65	1,49	1,60	1,70	±17	0,95	2	7,60
M230-35A5		2,30	2,90	1,49	1,60	1,70	±17		2	7,60
M235-35A5		2,35	2,97	1,49	1,60	1,70	±17		2	7,60
M250-35A5		2,50	3,14	1,49	1,60	1,70	±17		2	7,60
M270-35A5		2,70	3,36	1,49	1,60	1,70	±17		2	7,65
M300-35A5		3,00	3,74	1,49	1,60	1,70	±17		3	7,65
M330-35A5		3,30	4,12	1,49	1,60	1,70	±17		3	7,65
M360-35A5	3,60	4,55	1,49	1,60	1,70	±17	3	7,65		
M230-50A5	0,50	2,30	2,95	1,49	1,60	1,70	±17	0,96	2	7,60
M250-50A5		2,50	3,21	1,49	1,60	1,70	±17		2	7,60
M270-50A5		2,70	3,47	1,49	1,60	1,70	±17		2	7,60
M290-50A5		2,90	3,71	1,49	1,60	1,70	±17		2	7,60
M310-50A5		3,10	3,95	1,49	1,60	1,70	±14		3	7,65
M330-50A5		3,30	4,20	1,49	1,60	1,70	±14		3	7,65
M350-50A5		3,50	4,45	1,50	1,60	1,70	±12		5	7,65
M400-50A5		4,00	5,10	1,53	1,63	1,73	±12		5	7,70
M470-50A5		4,70	5,90	1,54	1,64	1,74	±10		10	7,70
M530-50A5		5,30	6,66	1,56	1,65	1,75	±10		10	7,70
M600-50A5		6,00	7,53	1,57	1,66	1,76	±10		10	7,75
M700-50A5		7,00	8,79	1,60	1,69	1,77	±10		10	7,80
M800-50A5		8,00	10,06	1,60	1,70	1,78	±10		10	7,80
M940-50A5	9,40	11,84	1,62	1,72	1,81	±8	10	7,85		
M1000-50A5	10,00	12,60	1,62	1,72	1,81	±8	10	7,85		