



IEC 60404-8-8

Edition 2.0 2017-09

INTERNATIONAL STANDARD

**Magnetic materials –
Part 8-8: Specifications for individual materials – Thin electrical steel strip and
sheet for use at medium frequencies**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.030

ISBN 978-2-8322-4805-8

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

CONTENTS

FOREWORD.....	4
1 Scope.....	6
2 Normative references	6
3 Terms and definitions	7
4 Classification.....	7
5 Designation	7
6 General requirements	7
6.1 Production process	7
6.2 Form of supply.....	7
6.3 Delivery condition	8
6.4 Surface condition.....	8
6.5 Suitability for cutting	8
7 Technical requirements	9
7.1 Magnetic properties	9
7.1.1 Magnetic polarization.....	9
7.1.2 Specific total loss	10
7.2 Geometric characteristics and tolerances.....	10
7.2.1 Thickness	10
7.2.2 Width.....	12
7.2.3 Edge camber	12
7.2.4 Residual curvature.....	12
7.2.5 Burr height.....	13
7.3 Technological characteristics	13
7.3.1 Density	13
7.3.2 Stacking factor.....	13
7.3.3 Number of bends	13
7.3.4 Insulation coating resistance	13
8 Inspection and testing.....	13
8.1 General.....	13
8.2 Selection of samples.....	14
8.3 Preparation of test specimens.....	14
8.3.1 Magnetic properties	14
8.3.2 Geometrical characteristics and tolerances.....	15
8.3.3 Technological characteristics.....	15
8.4 Test methods	15
8.4.1 General	15
8.4.2 Magnetic properties	15
8.4.3 Geometrical characteristics and tolerances.....	16
8.4.4 Technological characteristics.....	16
8.5 Retests	17
9 Marking, labelling and packaging.....	17
10 Complaints	17
11 Information to be supplied by the purchaser	17
Annex A (informative) Optional stacking factor for non-oriented coated products	18
Annex B (informative) Optional magnetic specifications	19

Annex C (informative) Calculation of density values 20

Bibliography 21

Table 1 – Magnetic and technological characteristics of non-oriented electrical steel strip and sheet 9

Table 2 – Magnetic and technological characteristics of grain-oriented electrical steel strip and sheet 10

Table 3 – Thickness tolerances 11

Table 4 – Width tolerance of non-oriented strip and sheet 12

Table 5 – Width tolerance of grain oriented electrical steel products 12

Table A.1 – Optional stacking factor for non-oriented coated products 18

Table B.1 – Optional magnetic specifications for non-oriented electrical steel strip and sheet 19

INTERNATIONAL ELECTROTECHNICAL COMMISSION

MAGNETIC MATERIALS –**Part 8-8: Specifications for individual materials –
Thin electrical steel strip and sheet for use at medium frequencies**

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

This second edition cancels and replaces the first edition published in 1991.

This edition constitutes a technical revision.

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

- extension of the range of electrical steels to include the improved grades.

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

CDV	Report on voting
68/546/CDV	68/562/RVC

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.

A list of all the parts in the IEC 60404 series, 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 "<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.

A bilingual version of this publication may be issued at a later date.

MAGNETIC MATERIALS –

Part 8-8: Specifications for individual materials – Thin electrical steel strip and sheet for use at medium frequencies

1 Scope

This part of IEC 60404 defines the grades of thin non-oriented electrical steel strip and sheet in nominal thicknesses of 0,05 mm, 0,10 mm, 0,15 mm, 0,20 mm, 0,25 mm, 0,30 mm and 0,35 mm and of thin grain-oriented electrical steel strip and sheet in nominal thicknesses of 0,05 mm, 0,10 mm, 0,15 mm and 0,18 mm. In particular, it gives general requirements, magnetic properties, geometric characteristics and tolerances, technological characteristics, as well as inspection procedures.

NOTE For thin non-oriented electrical steel strip and sheet, other nominal thicknesses (i.e. 0,12 mm, 0,18 mm, 0,23 mm and 0,27 mm) can be agreed between the manufacturer and the purchaser.

This document applies to electrical steel strip and sheet supplied in the finally annealed condition in coils or sheets and intended for the construction of magnetic circuits predominantly used at frequencies in the range from 100 Hz to 10 kHz.

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 60050-121, *International Electrotechnical Vocabulary – Part 121: Electromagnetism* (available at <http://www.electropedia.org/>)

IEC 60050-221, *International Electrotechnical Vocabulary – Chapter 221: Magnetic materials and components* (available at <http://www.electropedia.org/>)

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

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

IEC 60404-10, *Magnetic materials – Part 10: Methods of measurement of magnetic properties of magnetic steel sheet and strip at medium frequencies*

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

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*