

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Magnetic materials –

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

Matériaux magnétiques –

Partie 13: Méthodes de mesure de la résistivité, de la masse volumique et du facteur de foisonnement des bandes et tôles en acier électrique



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

FOREWORD

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International Standard IEC 60404-13 has been prepared by IEC Technical Committee 68: Magnetic alloys and steels.

This second edition cancels and replaces the first edition published in 1995 and constitutes a technical revision.

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

- a) the sequence of the density and resistivity sections is changed and the title of the document revised to reflect this;
- b) the van-der-Pauw method (Method R2) is also applicable to Epstein strip specimens;
- c) the gas pycnometer method is introduced, and the liquid immersion method and the calculation method based on the chemical composition are quoted;

- d) the requirements of the stacking factor section, such as the tolerance of the dimensions of the test specimen and the repeatability of measurement, are changed;
- e) an example of the apparatus for determination of the resistivity using a rectangular sheet, which was previously part of the main body of the text, is moved to constitute informative Annex A;
- f) an example of the determination of the density by using the gas pyknometer method is added as an informative Annex B;
- g) an example of the determination of density based on the calculation of silicon and aluminium contents is added as an informative Annex C.

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

CDV	Report on voting
68/574/CDV	68/586A/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 web site.

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.

MAGNETIC MATERIALS –

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

1 Scope

This part of IEC 60404 specifies the methods used for determining the resistivity, density and stacking factor of grain-oriented and non-oriented electrical steel strip and sheet. These quantities are necessary to establish the physical characteristics of the material. Moreover, the density is necessary to allow specified values of the magnetic polarization, resistivity and stacking factor to be determined.

Since these properties are functions of temperature, the measurements will be made at an ambient temperature of (23 ± 5) °C except when specified in this document.

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*

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

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

ISO 1183-3, *Plastics – Methods for determining the density of non-cellular plastics – Part 3: Gas pycnometer method*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-121, IEC 60050-221 and ISO 1183-3 apply.

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