



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Methods of measurement of the magnetic properties of
electrical steel strip and sheet by means of an Epstein frame**

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Foreword

This document was drafted in accordance with the rules given in GB/T 1.1-2020

"Directives for standardization - Part 1.Rules for the structure and drafting of standardizing documents".

This document replaces GB/T 3655-2008 "Methods of measurement of the magnetic properties of electrical steel sheet and strip by means of Epstein frame". Compared with GB/T 3655-2008, in addition to the structural adjustments and editorial changes, the main technical changes in this document are as follows.

a) Add "For the convenience of automatic loading and unloading of specimens...shall

be indicated in the test report" (see 4.3 of this Edition);

b) Delete the requirements that the frame structure shall meet (see 3.3 of Edition 2008).

The modification of this document adopts 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".

Compared with IEC 60404-2.1996, there are many structural adjustments in this document. See Annex A for a list of structure number changes between the two documents.

Compared with IEC 60404-2.1996, this document has many technical differences. A single vertical line (|) is used to mark the outer margin of the terms involved. See Annex B for a list of these technical differences and their reasons.

The following editorial changes have been made to this document.

- To coordinate with the existing standard, the name of the standard is changed to "Methods of measurement of the magnetic properties of electrical steel strip and sheet by means of an Epstein frame";
- Incorporate the amendments of IEC 60404-2.1996/Amd.1.2008 and the corrigenda of IEC 60404-2.1996/Cor.1.2018. The position of the outer margin of the clause involved is marked with a vertical double line (||);
- Add Annex D (Informative) Confirmation and calibration scheme for magnetic measuring equipment;
- Add Annex E (informative) Control on the sinusoidal waveform of magnetic polarization by digital method.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. The issuing authority shall not be held responsible for identifying any or all such patent rights.

This document was proposed by China Iron and Steel Association.

This document shall be under the jurisdiction of National Technical Committee on Steel of Standardization Administration of China (SAC/TC 183).

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This document was first published in 1983. The first revision was in 1992. The second revision was in 2000. The third revision was in 2008. This is the fourth revision.

Methods of measurement of the magnetic properties of electrical steel strip and sheet by means of an Epstein frame

1 Scope

This document specifies the general rules and technical details for measuring the magnetic properties of electrical steel strip (sheet) by means of an Epstein frame.

2 Normative references

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.

3 Terms and definitions

For the purposes of this document, the terms and definitions defined in GB/T 2900.60 and GB/T 9637 apply.

4 General rules for AC measurements

The number of sample pieces that make up the specimen shall be an integer multiple of

4 and comply with the relevant product standards. For a specimen with a length of 280

mm, the effective mass of the specimen is at least 240 g, see formula (1).

5 Measurement steps for specific total loss

The specimen to be tested shall be under a demagnetizing field with an initial magnetic field higher than the previous test field. Gradually reduce the AC magnetic field for demagnetization.

6 Determination of peak value of magnetic polarization, effective value of magnetic field strength, peak value of magnetic field strength and specific apparent power

The peak value of the magnetic field strength shall be obtained from the peak value of the excitation current. Use the peak value voltmeter shown in Figure 5.

7 General rules for DC measurement

The power supply shall provide a rated current capable of producing the required maximum magnetic field strength. Its corrugation factor shall be less than 1%.

8 Determination of DC magnetic polarization

The specimen shall be demagnetized. That is, demagnetization is performed under a continuously decreasing AC magnetic field, or through a gradually decreasing and commutated DC current in the primary coil of the Epstein frame.

9 Test report

The test report shall contain the following.

Annex A

(informative)

Comparison on structural numbers between this document and IEC 60404-2.1996

Annex B

(informative)