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CCS H21

NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 3658-2022

Methods of measurement of the magnetic properties of magnetically soft metallic and powder materials at frequencies in the range 20 Hz to 100 kHz by the use of ring specimens

软磁金属材料和粉末冶金材料20Hz～100kHz频率范围磁性能的环形试样测量方法

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Foreword

This document was issued on 12 October 2022 by the State Administration for Market Regulation; Standardization Administration of the PRC and takes effect on 12 October 2022.

It is a GB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

It is classified under ICS 77.040.99, Chinese classification H21.

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part 1.Structure and Drafting Rules for Standardization Documents"

drafting.

This document replaces GB/T 3658-2008 "Measurement method for ring specimens of AC magnetic properties of soft magnetic materials", and GB/T 3658-2008

In comparison, except for structural adjustments and editorial changes, the main technical changes are as follows.

a) Electrical steel is added to the scope of materials (see Chapter 1);

b) The frequency range is changed from 20Hz~20kHz to 20Hz~100kHz (see Chapter 1, 6.1, Chapter 1, 5.1 of the.2008 edition);

c) Modified the technical requirements for various voltmeters and power meters (see 6.2, 7.2, 7.3, 5.2.1, 6.1.1, 6.1.2,.2008 version

6.1.3);

d) The use of digital impedance bridges to measure magnetic properties and the use of digital methods to measure magnetic properties have been deleted (see Chapter 7 and Chapter 8 of the.2008 edition).

This document is modified to adopt IEC 60404-6.2018 "Magnetic Materials Part 6.Soft Magnetic Metal Materials and Powder Metallurgy Materials 20Hz~

Method for measuring the magnetic properties of ring specimens in the frequency range of 100kHz".

Compared with IEC 60404-6.2018, this document has made the following structural adjustments.

--- Added Appendix A;

--- Added Appendix B;

---Appendix C corresponds to Appendix A in IEC 60404-6.2018;

---Appendix D corresponds to Appendix B in IEC 60404-6.2018;

---Appendix E corresponds to Appendix C in IEC 60404-6.2018.

Compared with IEC 60404-6.2018, this document has more technical differences, and vertical

Straight line (|) is marked. See Appendix A for a list of these technical differences and their causes.

The following editorial changes were made to this document.

--- In order to coordinate with existing standards, change the name of the standard to "20Hz~100kHz frequency range for soft magnetic metal materials and powder metallurgy materials

Measurement method of ring sample with surrounding magnetic properties";

--- Added note (see 6.1, 7.1, Chapter 8, D.2);

--- Deleted Note 1 of 7.2.1 in IEC 60404-6.2018;

--- Increased Appendix B (informative) magnetic measuring equipment calibration scheme.

Please note that some contents of this document may refer to patents. The issuing agency of this document assumes no responsibility for identifying patents.

This document is proposed by China Iron and Steel Industry Association.

This document is under the jurisdiction of the National Steel Standardization Technical Committee (SAC/TC183).

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This document was first released in 1983 and revised for the first time in.1990.When it was revised for the second time in.2008, GB/T 5026-1985 "Soft magnetic

Alloy Amplitude Magnetic Permeability Measurement Method" was incorporated, this is the third revision.

Soft magnetic metal materials and powder metallurgy materials

20Hz~100kHz frequency range of magnetic properties

Measuring method of ring sample

1 Scope

GB/T 3658-2022 specifies how soft magnetic materials are measured on ring specimens across the range from mains frequency to 100 kHz. The ring is chosen because it is the only shape with no ends: the magnetic path closes on itself, so there is no demagnetising field to correct for and the measurement reflects the material rather than the geometry. That makes it the reference method against which everything else is judged. The frequency range is what makes the standard current: transformers and motors ran at 50 Hz, but switched-mode power supplies, electric vehicle chargers and solar inverters operate in the tens of kilohertz, where core loss rises steeply and dominates the design. A material that performs well at 50 Hz may be unusable at 20 kHz, and the loss cannot be extrapolated - it has to be measured at the frequency of use. This document specifies the AC magnetic performance test method for soft magnetic materials other than ferrites over 20 Hz to 100 kHz. Under ICS 77.040.99 and CCS H21, it is written for producers of electrical steels and soft magnetic powder cores, for magnetic component designers, and for testing laboratories.

This document specifies the AC magnetic performance test method for soft magnetic materials other than ferrite in the frequency range of 20Hz~100kHz. Book

The materials involved in the document include electrical steel, castings and soft magnetic composite materials, special alloys listed in GB/T 21220 and GB/T 24296

Pressed, sintered and metal injection molded components listed in

The purpose of this document is to clarify the general principles and technical details for testing the magnetic properties of soft magnetic materials with ring test pieces. For powdered materials, through appropriate

The extrusion method is used to make ring samples.

Refer to GB/T 13012 for the measurement method of the ring-shaped sample of the DC magnetic properties of soft magnetic materials; for the determination of the magnetic properties of soft magnetic components, see

GB/T 28869.1.

It is usually tested at an ambient temperature of (23+/-5)°C, and the ring sample is demagnetized before the test. After negotiation between the supplier and the buyer, the test can also be carried out in other

within the temperature range.

2 Normative references