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

GB/T 14986.4-2018

Replacing GB/T 14986-2008

Soft magnetic alloys - Part 4: Iron-chromium alloys

软磁合金 第4部分：铁铬合金

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Foreword

GB/T 14986 Soft Magnetic Alloys is divided into five parts as follows: -- Part 1.general requirements; -- Part 2.iron-nickel alloys; -- Part 3.iron-cobalt alloys; -- Part 4.iron-chromium alloys; -- Part 5.iron-aluminum alloy. This is the fourth part of GB/T 14986. This Part is drafted in accordance with stipulations in GB/T 1.1-2009. This Part is drafted as a replacement of iron-chromium alloys part in GB/T 14986-2008 High Saturation Magnetic Induction Magnetic Compensate Alloys Depending on Temperature Variation Corrosion-resisting Iron-aluminum Permanent Permeability Soft Magnetic Alloys. In comparison with GB/T 14986-2008, there are several main technical changes as follows: -- 1J111 alloy and relevant technical requirements are added (refer to Chapter 5 and 6.4); -- The limitation of S element content in 1J116 and 1J117 becomes more rigorous; the upper limit changes from 0.020% to 0.015% (refer to Table 1; Table 10 in Version 2008); -- 1J117 cold-rolled strip and relevant technical requirements are added (refer to Chapter 1 and Table 2; Chapter 1 in Version 2008); -- 1J116 and 1J117 cold-drawn wire and relevant technical requirements are added (refer to Chapter 1 and Table 2; Chapter 1 in Version 2008); -- Smelting methods are modified (refer to 6.2;

6.2 in Version 2008); -- The magnetic performance of 1J116 is enhanced; coercivity decreases from 80 A/m to 70 A/m (refer to Table 3; Table 13 in Version 2008); -- The re-inspection and determination rules of alloy bar low-magnification and tower-shaped texture are added as a supplement (refer to 8.4.2, 8.4.3; Chapter 9 in Version 2008); -- The

fundamental physical parameters of alloys are added as a supplement (refer to Appendix B; Appendix B in Version 2008). This Part is proposed by China Iron and Steel Industry Association (CISA). This Part is summarized by National Technical Committee 183 on Steel Standardization (SAC/TC 183). This Part is drafted by: Dalian Precision Alloy Co., Ltd. of DONGBEI Special Steel Group, China Metallurgical Information and Standardization Institute. The main drafters of this Part include. Xu Xiaoping, Luanyan, Daiqiang, Yan Chengming. The issuing of the previous versions of the standard replaced by this Part is listed below. -- GBn 160-1982, GBn 160-1988; -- GB/T 14986-1994, GB/T 14986-2008. Soft Magnetic Alloys - Part

1 Scope

GB/T 14986.4-2018 is the Chinese national standard on soft magnetic alloys - part 4: iron-chromium alloys, in the field of metallurgy. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 7 June 2018 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 March 2019. Classification: ICS 77.140.40, CCS H58. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This Part in GB/T 14986 specifies the terms, definitions, content of order, dimension, appearance, technical requirements, test methods, inspection rules, packaging, mark and quality certificate of iron-chromium soft magnetic alloys with relatively high saturation, magnetic induction strength, and relatively low coercivity. This Part is applicable to cold-rolled strip, cold-rolled sheet, cold-drawn wire, hot-rolled strip, hot-rolled wire rod and hot-rolled (wrought) bar (hereinafter referred to as alloys) that apply 1J111, 1J116 and 1J117 iron-chromium soft magnetic alloys to certain corrosive medium.

2 Normative References

The following documents are indispensable to the application of this Standard. In terms of references with a specified date, only versions with a specified date are applicable to this Standard. The latest version (including all the modifications) of references without a specified date is also applicable to this Standard.

GB/T 223.5 Steel and Iron - Determination of Acid-soluble Silicon and Total Silicon Content - Reduced Molybdosilicate Spectrophotometric Method

GB/T 223.11 Iron, Steel and Alloy - Determination of Chromium Content - Visual Titration or Potentiometric Titration Method

GB/T 223.13 Methods for Chemical Analysis of Iron, Steel and Alloy - The Ammonium Ferrous Sulfate Titration Method for the Determination of Vanadium Content

GB/T 223.18 Methods for Chemical Analysis of Iron, Steel and Alloy - The Sodium Thiosulfate Separation Iodimetric Method for the Determination of Copper Content

GB/T 223.20 Methods for Chemical Analysis of Iron, Steel and Alloy - The Potentiometric Titration Method for the Determination of Cobalt Content

3 Terms and Definitions

Terms and definitions provided in GB/T 14986.1-2018 are applicable to this Standard.

4 Content of Order

Order-placing contract shall include the following content.

5 Dimension and Appearance

The dimension, appearance and allowable deviation of alloys shall comply with stipulations in GB/T 14986.1-2018. The thickness of cold-rolled strip and the allowable deviation division of trimming width shall be indicated in the contract.

6 Technical Requirements

6.1 Trademark and Chemical Composition The trademark and chemical composition (smelting analysis) of alloys shall comply with stipulations in Table

1. When the magnetic performance of alloys complies with stipulations in Table 3, the allowable deviation range of chemical composition is shown in Table 1 below.

6.2 Smelting Method Unless it is stipulated otherwise in the contract, the smelting method of alloys shall be selected by the manufacturers.

6.3 State of Delivery

6.4 Magnetic Performance After heat treatment, the magnetic performance of alloy sample shall comply with stipulations in Table

3. Please refer to Appendix A for the recommended sample heat treatment rules.

6.5 Other Performance Please refer to Appendix B for the fundamental physical parameters of alloys and typical performance value of alloy materials in Appendix B.

7 Test Methods

Test items and methods of alloys shall comply with stipulations in Table 4 below.

8 Inspection Rules

8.1 Inspection and Acceptance Check The suppliers' quality and technical supervision department shall conduct the inspection and acceptance check of alloys. The demanders are entitled to conduct acceptance check in accordance with the requirements in this Part.

8.2 Batch Rules Alloys shall be submitted for inspection and acceptance check by batches. Each batch shall be constituted of alloys of the same trademark, furnace number, specification and state of delivery.

8.4 Re-inspection and Determination Rules

8.4.1 The re-inspection and determination of alloys shall comply with stipulations in GB/T 14986.1-2018.

9 Packaging, Mark and Quality Certificate

Packaging, mark and quality certificate of alloys shall comply with relevant stipulations in GB/T 14986.1-2018.

Appendix A

(informative appendix) Recommended Sample Heat Treatment Rules A.1 Generally speaking, sample heat treatment shall be conducted in pure hydrogen (dew point ≤ -40 °C). When vacuum heat treatment is required, residual pressure $\leq$

0.1 Pa is recommended. A.2 All the mechanical processes (punching, cutting, winding, deburring, etc.) for sample preparation shall be conducted before heat treatment. Sample shall be degreased and kept clean before heat treatment. After annealing, the surface of the sample shall be smooth. During annealing, no mutual adhesion or mechanical deformation is allowed.