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

GB/T 2521.2-2016

**Cold-rolled electrical steel delivered in the fully-processed state
-- Part 2: Grain-oriented steel strip (sheet)
(English Translation)**

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1 Scope

This document specifies the classification, symbols and grades, general requirements, technical requirements, inspection and testing, rules for acceptance and re-inspection, packaging, marking and quality certificate, and order contents for the cold-rolled grain-oriented electrical steel strip and sheet with double-sided insulating coatings-in nominal thicknesses of 0.18 mm,

0.20 mm, 0.23 mm, 0.27 mm, 0.30 mm, and 0.35 mm.

This document is applicable to cold-rolled grain-oriented electrical steel strip and sheet

[hereinafter referred to as the "steel strip (sheet)"] supplied in the fully-processed state and intended for use in magnetic circuit structures.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through normative references in the text. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 247 General rule of package, mark and certification for steel plates (sheets) and strips

GB/T 2522 Methods of test for the determination of coating insulation resistance and coating adhesion of electrical strip and sheet (GB/T 2522-2017, IEC 60404-11.2012, NEQ)

GB/T 2900.60 Electrotechnical terminology - Electromagnetism [GB/T 2900.60-2002, eqv IEC

60050(121).1998]

GB/T 3655 Methods of measurement of the magnetic properties of electrical steel strip and sheet by means of an Epstein frame (GB/T 3655-2022, IEC 60404-21996, MOD)

GB/T 9637 Electrotechnical terminology - Magnetic materials and components [GB/T 9637-2001, eqv IEC 60050(221).1990]

GB/T 13789-2022 Methods of measurement of the magnetic properties of electrical steel strip and sheet by means of a single sheet tester (GB/T 13789-2022, IEC 60404-3.1992, MOD)

GB/T 17505 Steel and steel products - General technical delivery requirements (GB/T 17505-

2016, ISO 404.2013, MOD)

GB/T 18253 Steel and steel products - Types of inspection documents (GB/T 18253-2018, ISO

10474.2013, IDT)

GB/T 19289 Methods of measurement of resistivity, density and stacking factor of electrical steel strip and sheet (GB/T 19289-2019, IEC 60404-13.2018, IDT)

YB/T 4292 Methods of determination of the geometrical characteristics of electric steel sheet and strip (YB/T 4292-2012, IEC 60404-9.1987, MOD)

YB/T 4731 Reverse bend test method for electrical steel strip and sheet (YB/T 4731-2019, IEC

TR 63114.2018, IDT)

3 Terms and Definitions

The terms and definitions defined in GB/T 2900.60 and GB/T 9637 are applicable to this document.

4 Classification

4.1

The grades of steel strip (sheet) are classified based on nominal thickness (0.18 mm, 0.20 mm, 0.23 mm, 0.27 mm, 0.30 mm, and 0.35 mm) and the maximum specific total loss value (P1.7/50) at a magnetic polarization of 1.7 T and a frequency of 50 Hz; they are subdivided into four categories: ordinary type, high magnetic polarization type, non-heat-resistant magnetic domain-refined type, and heat-resistant magnetic domain-refined type.

4.2

Steel strips (sheets) are classified into two categories based on delivery conditions: trimmed and untrimmed.

5 Symbols and Grades

5.1

See Table 1 for the symbols used in this document and their corresponding descriptions.

Table 1 -- Symbols and Descriptions

5.2

The steel grade consists of the following elements in the order given.

a) 100 times the nominal thickness of the material (mm);

b) Characteristic characters.

--- S denotes ordinary grain-oriented electrical steel;

--- P denotes high magnetic polarization grain-oriented electrical steel;

--- R denotes non-heat-resistant magnetic domain-refined grain-oriented electrical steel;

--- HR denotes heat-resistant magnetic domain-refined grain-oriented electrical steel.

c) 100 times the maximum specific total loss value P1.7/50 (W/kg).

Example.

30S130 designates an ordinary cold-rolled grain-oriented electrical steel strip and sheet with a nominal thickness of 0.30 mm and a maximum specific total loss (P1.7/50) of 1.30 W/kg;

30P105 designates a high magnetic polarization cold-rolled grain-oriented electrical steel strip and sheet with a nominal thickness of 0.30 mm and a maximum specific total loss (P1.7/50) of 1.05 W/kg;

23R085 designates a non-heat-resistant magnetic domain-refined cold-rolled grain-oriented

electrical steel strip and sheet with a nominal thickness of 0.23 mm and a maximum specific total loss (P1.7/50) of 0.85 W/kg;

23HR080 designates a heat-resistant magnetic domain-refined cold-rolled grain-oriented electrical steel strip and sheet with a nominal thickness of 0.23 mm and a maximum specific total loss (P1.7/50) of 0.80 W/kg.

5.3

A comparison of the steel grades in this document with those in IEC 60404-8-7.2020 and GB/T 2521.2-2016 is given in Appendix C.

6.1 Manufacturing Process

The manufacturing process and chemical composition of steel strips (sheets) shall be determined by the manufacturer.

6.2 Form of Supply

Steel strips are supplied in coils, and steel sheets are supplied in boxes; specific requirements are as follows.

- a) The weight of coils and boxes shall comply with the order requirements; the steel coil weight generally ranges from 2 t to 10 t;
- b) The inner diameter of the steel coil shall range from 500 mm to 520 mm, with a recommended inner diameter value of 508 mm;
- c) The side profile of the stacked steel sheets shall be flat and approximately perpendicular to the top surface;
- d) Steel coils shall be tightly wound from steel strip of uniform width to prevent collapse under their own weight, and the coil sides shall be as flat and straight as possible;
- e) Steel strips may contain strip joints or welds resulting from the removal of defects; such strip joints or welds shall be marked, and the steel strip sections on either side of the strip joint or weld shall be of the same grade;
- f) There shall be no more than two strip joints or welds, the length of the steel strip sections on either side shall be at least 200 m, and the welds shall be smooth so as not to interfere with subsequent processing of the material.

6.3 Delivery Conditions

Steel strips (sheets) are typically delivered in the trimmed condition. If the demand side has particular requirements, delivery in the untrimmed condition may be agreed upon. Prior to delivery, both sides of the steel strip (sheet) shall be coated with an insulating coating. The