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Replacing GB/T 14991-1994

Deformable permanent-magnet steels

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Foreword

This Standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This Standard replaces GB/T 14991-1994 *Deformable permanent-magnet steels*.

Compared with GB/T 14991-1994, the main modifications are as follows:

- added “normative references”;
- added “order content”;
- modified the thickness deviation of the cold rolled strip from negative to positive and negative;
- modified the smelting method from "non-vacuum induction" to "vacuum induction”;
- deleted “marking example”;
- modified the magnetic performance indicators as the international unit system.

This Standard was proposed by China Iron and Steel Industry Association.

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

Main drafting organizations of this Standard: Iron and Steel Research Institute, Metallurgical Industry Information Standards Institute.

Main drafters of this Standard: Yu Yipeng, Zhang Jinglin, Wu Bin, Lu Fengshuang, Zhang Jiansheng, Zhang Jianfu, Yan Zhengming.

Versions of standard substituted by this Standard are:

- GBn 174-1982;
- GB/T 14991-1994.

Deformable permanent-magnet steels

1 Scope

This Standard specifies the designations, dimensions, shapes and tolerances, technical requirements, test methods, inspection rules, packaging, marks and quality certificates of deformable permanent-magnet steels.

This Standard is applicable to the deformable permanent-magnet cold rolled strips, hot rolled (forged) bars and flat materials used to manufacture permanent magnets.

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.

GB/T 223.5, *Methods for chemical analysis of iron, steel and alloy - The reduced molybdosilicate spectrophotometric method for the determination of acid-soluble silicon content*

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

GB/T 223.20, *Methods for chemical analysis of iron steel and alloy - The Potentiometric titration method for the determination of cobalt content*

GB/T 223.23, *Iron, Steel and Alloy-Determination of Nickel Content - The Dimethylglyoxime Spectrophotometric Method*

GB/T 223.28, *Methods for chemical analysis of iron, steel and alloy - The α -benzoinoxime gravimetric method for the determination of molybdenum content*

GB/T 223.43, *Iron steel and alloy - Determination of tungsten content - Gravimetryc method and spectrophotometric method*

GB/T 223.62, *Methods for chemical analysis of iron, steel and alloy - The butyl acetate extraction photometric method for the determination of phosphorus content*

GB/T 223.64, *Iron, Steel and Alloy - Determination of Manganese Content - Flame Atomic Absorption Spectrometric Method*

GB/T 223.68, *Methods for Chemical Analysis of Iron, Steel and Alloy - The Potassium Iodate Titration Method after Combustion in the Pipe Furnace for the Determination of Sulfur Content*

GB/T 223.69, *Iron, Steel and Alloy-Determination of Carbon Contents-Gas-volumetric Method after Combustion in the Pipe Furnace*

GB/T 231.1, *Metallic materials - Brinell hardness test - Part 1: Test method*

GB/T 11170, *Stainless steel - Determination of multi-element contents - Spark discharge atomic emission spectrometric method (Routine method)*

GB/T 13012, *Methods of measurement of d.c. magnetic properties of magnetically soft materials*

GB/T 20066, *Steel and Iron-Sampling and Preparation of Samples for the Determination of Chemical Composition*

GB/T 20123, *Steel and iron - Determination of total carbon and sulfur content Infrared absorption method after combustion in an induction furnace (routine method)*

YB/T 5242, *General Rules of Packaging, Marking and Quality Certification for Precision Alloys*

3 Order content

The contract or order in accordance with this Standard shall include the following information:

- a) reference to this Standard;
- b) designations;
- c) dimensions;
- d) weight or quantity;
- e) delivery status;
- f) other special requirements made by the purchaser shall be determined by consultation between the supplier and the purchaser and indicated in the contract.

7 Inspection rules

7.1 Inspection and acceptance

The inspection and acceptance of permanent-magnet steels shall be carried out by the supplier quality inspection departments. The purchaser shall also carry out the inspection in accordance with the provisions of this Standard.

7.2 Batching rule

The permanent-magnet steels shall be submitted for inspection and acceptance by batches. Each batch shall consist of the permanent-magnet steels of same designation, same melting furnace number, same specification, same processing method and same delivery status.

7.3 Sampling part and sampling quantity

The sampling quantity and sampling part of permanent-magnet steel shall comply with the provisions of Table 8.

7.4 Re-inspection and determination rules

7.4.1 When the hardness of the bar or flat material of the permanent-magnet steel is unqualified, the batch of steels shall be allowed to reheat and submit for inspection. Deliver when qualified.

7.4.2 When the magnetic properties of the permanent-magnet steels are unqualified, it is allowed to re-take two samples for re-inspection. If the result is still unqualified, the batch of permanent-magnet steels shall not be accepted. But the supplier can change the heat treatment system and resubmit for inspection as a new batch.

7.4.3 The size, shape and surface quality of the permanent-magnet steels are not qualified, the inspection piece (roll) by piece (roll) shall be determined as unqualified.

8 Packaging, marks and quality certificate

8.1 The packaging, marks and quality certificate of permanent-magnet steels shall meet the requirements of YB/T 5242.

8.2 With the agreement of the supplier and the purchaser, the supplier can use other materials that can ensure that the surface quality and magnetic properties of the permanent magnet are not affected in the transportation and storage for packaging.

Annex B

(Normative)

Preparation and test for permanent-magnet steel sample

B.1 The sample shall be made in strip shape with an aspect ratio greater than or equal to 8. The aspect ratio of 2J67 is greater than or equal to 5. The two ends of the strip shall be parallel to each other and perpendicular to the axis. The cross-sectional area of the specimen is consistent along the entire length and its deviation shall not exceed 1% of the minimum cross-sectional area. Cold rolled strip samples are cut along the processing direction for strips of 40 mm length, 5 mm ~ 8 mm width.

B.2 A magnetometer is recommended for measuring magnetic properties. The magnetic field strength applied during the test shall comply with the provisions in Table B.1.

Table B.1 -- Magnetic field strength applied during measuring magnetic properties

Designation	Magnetic field strength / (kA/m)
2J63	47.75
2J64	47.75
2J65	79.58
2J67	159.16

_____**END**_____

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