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GB/T 3114-2023

Replacing GB/T 3114-2010

Copper and copper alloy rectangular wire

铜及铜合金扁线

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Standardization Administration of the People's Republic of China.

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Foreword

This document was drafted in accordance with the rules provided 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 3114-2010 *Copper and copper alloy rectangular wire*. Compared with GB/T 3114-2010, in addition to structural adjustments and editorial changes, the main technical changes of this document are as follows:

a) Add the chapter "Terms and definitions" (see Chapter 3);

b) Add a total of 11 designations including TTe0.3, TTe0.5, H58, H66, H90, QSn8-0.3, BZn12-24, BZn18-18, BZn25-18, BZn12-24-1.1, BZn12-37-1.5 and technical requirements for corresponding designations (see 4.1 and Chapter 5);

c) Delete a total of 6 designations including H90B, HBi60-1.3, HSb60-0.9, HSb61-0.8-0.5, QCr1-0.18, QCr1 and technical requirements for corresponding designations (see 3.1 and Chapter 4 of the 2010 edition);

d) Change the state representation method of rectangular wires, from "soft (M)" to "softening annealing (O60)", from "hard (Y)" to "hard (H04)", and from "semi-hard (Y_2)" to "1/2 hard (H02)" (see 4.1; 3.1 of the 2010 edition);

e) Change the accuracy requirements for the width and thickness of rectangular wires (see 5.2.1; 4.2.1 of the 2010 edition);

f) Change the requirements for side curvature of rectangular wires (see 5.2.2; 4.2.2 of the 2010 edition);

g) Add requirements for torsion (see 5.2.3);

h) Delete the sharp corners in the edge shape and change the requirements for rounded corners (see Table 4; Table 5 of the 2010 edition);

i) Change the regulations on the radius of curvature (R) of the round edge in the edge shape (see Table 5; Table 6 of the 2010 edition);

j) Change the requirements for reverse bend performance from "When required by the user and specified in the contract, semi-hard wires and hard wires shall be subjected to reverse bend tests, no less than 3 times for semi-hard wires and no less than 2 times for hard wires, and no cracks shall occur at the bends" to "Rectangular wires can be subjected to reverse bend tests, and the specific requirements shall be agreed upon by both parties." (See 5.4.1; 4.4 of the 2010 edition);

Copper and copper alloy rectangular wire

1 Scope

This document specifies the classification and identification, technical requirements, test methods, inspection rules, as well as marking, packaging, transportation, storage, accompanying document and order form content of copper and copper alloy rectangular wire (hereinafter referred to as “rectangular wire”).

This document applies to pure copper, brass, bronze and cupronickel rectangular wires for industrial use.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the version corresponding to that date is applicable to this document; for undated references, the latest version (including all amendments) is applicable to this document.

GB/T 238, Metallic materials - Wire - Reverse bend test

GB/T 239.1, Metallic materials - Wire - Part 1: Simple torsion test

GB/T 2828.1, Sampling procedures for inspection by attributes. Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection

GB/T 5121 (all parts), Methods for chemical analysis of copper and copper alloys

GB/T 5231, Designation and chemical composition of wrought copper and copper alloys

GB/T 8170, Rules of rounding off for numerical values & expression and judgment of limiting values

GB/T 8888, Wrought heavy non-ferrous metal products - packing, marking, transportation, storing and certificate of quality

GB/T 10567 (all parts), Wrought copper and copper alloys - Detection of residual stress

GB/T 26303.2, Measuring methods for dimensions and shapes of wrought copper and copper alloy - Part 2: Rod, wire and profile

GB/T 34505, Copper and copper alloy materials - Tensile testing at room temperature

YS/T 336, Methods of fracture test for tube and rod of copper and copper alloys, nickel and nickel alloys

YS/T 347, Copper and copper alloys - Estimation of average grain size

YS/T 482, Methods for analysis of copper and copper alloys - The atomic emission spectrometry

YS/T 483, Methods for analysis of copper and copper alloys - X-Ray fluorescence spectrometric (wavelength dispersive)

YS/T 668, Sampling method of physical and chemical testing for copper and copper alloys

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

free roll

Uncoiled roll-shaped rectangular wires that are freely formed in a certain direction and sequence.

3.2

close-packed roll

Rectangular wires, wound layer by layer, arranged closely according to certain winding direction rules.

4 Classification and identification

4.1 Product classification

The designation, code, state, specifications and supply method of rectangular wires shall comply with the provisions of Table 1.

5.9.2 When the weight per roll (reel) is less than or greater than 10% of the weight specified in Table 8, it is a lighter roll (reel) or a heavier roll (reel), and the number of lighter rolls (reels) or heavier rolls (reels) in each batch shall not exceed 10% of the total number of rolls (reels).

5.9.3 If the buyer has special requirements for the roll (reel) weight of rectangular wires, it shall be determined through negotiation between the supplier and the buyer.

6 Test methods

6.1 Chemical composition

The chemical composition analysis of rectangular wires shall be carried out in accordance with the provisions of GB/T 5121 (all parts), YS/T 482 or YS/T 483. The arbitration shall be conducted in accordance with the provisions of GB/T 5121 (all parts).

6.2 Dimensions and their allowable deviation

The overall dimensions and allowable deviations of rectangular wires shall be in accordance with the provisions of GB/T 26303.2.

6.3 Mechanical properties

The room temperature tensile mechanical properties of rectangular wires shall be tested in accordance with the provisions of GB/T 34505. The test portions shall comply with the requirements of GB/T 34505.

6.4 Process performance

6.4.1 The reverse bend test of rectangular wires shall be carried out in accordance with the provisions of GB/T 238.

6.4.2 The torsion test of rectangular wires shall be carried out in accordance with the provisions of GB/T 239.1.

6.5 Grain size

The grain size detection of rectangular wires shall be carried out in accordance with the provisions of YS/T 347.

6.6 Residual stress

The residual stress inspection of rectangular wires shall be carried out in accordance with the provisions of GB/T 10567 (all parts).

6.7 Internal quality

The internal quality inspection of rectangular wires shall be carried out in accordance with the provisions of YS/T 336.

6.8 Surface quality

The surface quality of rectangular wires shall be inspected visually.

6.9 Roll (reel) weight

The roll (reel) weight of rectangular wires shall be measured with measuring tools of corresponding accuracy.

7 Inspection rules

7.1 Inspection and acceptance

7.1.1 The rectangular wire shall be inspected by the supplier or a third party, to ensure that the product quality meets the requirements of this document and the order form.

7.1.2 The buyer may inspect the received products in accordance with the provisions of this document. If the inspection results are inconsistent with the provisions of this document and the order form, it shall be submitted to the supplier in writing within 3 months from the date of receipt of the product, and the supplier and the buyer shall negotiate and resolve. If an arbitration is required, the arbitration sampling shall be carried out jointly by the supplier and the buyer.

7.2 Batch

Rectangular wires shall be submitted for inspection in batches. Each batch shall be composed of rectangular wires of the same designation, specification and condition. The weight of each batch shall not exceed 2 000 kg. After negotiation between the supplier and the buyer, when the batch of rectangular wires belongs to the same melting and casting heat, the weight of each batch shall not exceed 5 000 kg.

7.3 Inspection items

The inspection items of rectangular wires are divided into ex-factory inspection items and type inspection items, as shown in Table 9. In any of the following situations, type inspection shall be carried out:

a) during trial formulation appraisal of new products or old products transferred to another factory;

b) when there are major changes in the raw materials and processes of the product, which may affect the performance of the product;

c) when the product is put back on production after a time of suspension;

8 Marking, packaging, transportation, storage and accompanying documents

8.1 Marking, packaging, transportation and storage

The marking, packaging, transportation and storage of rectangular wires shall be carried out in accordance with the provisions of GB/T 8888.

8.2 Accompanying documents

Each batch of products shall be accompanied by accompanying documents, which should include the following documents in addition to supplier information, product information, number of this document, date of production or packaging date.

a) Product quality guarantee:

- Main performance and technical parameters of the product;
- Product features (including the features of manufacturing process and raw materials);
- Responsibility for product quality;
- Quality certification obtained by the product and various analysis and inspection results checked and printed by the technical supervision department of the supplier.

b) Product certification:

- Inspection items and their results or inspection conclusions;
- Batch number;
- Inspection date;
- Inspector’s signature or seal.

c) Inspection report and finished product inspection report during product quality control.

d) Product instructions: correct handling, use and storage methods.

e) Other.

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