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NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA

GB 13808-92

Replacing GB 4423~4426-84, 4429~4433-84

**Wrought copper and copper alloys - Extruded rods
and bars**

铜及铜合金挤制棒

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Wrought copper and copper alloys - Extruded rods and bars

1 Subject content and scope of application

This standard specifies the classification, technical requirements, test methods, inspection rules, marking, packaging, transportation, storage of wrought copper and copper alloys - extruded rods and bars.

This standard applies to round, square, hexagonal wrought copper and copper alloys - extruded rods and bars.

2 Normative references

GB 228 Radioactive stationary static eliminator

GB 231 Metallic materials - Brinell hardness test

GB 3310 Method of ultrasonic inspection for copper alloy bars

GB 5121 Copper - Chemical analysis method

GB 5122 Brass - Chemical analysis method

GB 5231 Wrought coppers - Chemical composition and forms of wrought products

GB 5232 Wrought copper-zinc alloys (brasses) - Chemical composition and forms of wrought products

GB 5233 Wrought bronzes - Chemical composition and forms of wrought products

GB 5234 Wrought copper nickel alloys - Chemical composition and forms of wrought products

GB 6397 Metallic materials - Test pieces for tensile testing

GB 6520 Silicon bronze and cinnamon brass - Chemical analysis method

GB 8002 Tin bronze - Chemical analysis method

less than 16 mm.

4.3.5 For QAl10-3-1.5 bars, which have a diameter greater than 50 mm, when the elongation δ_{10} is not less than 15%, the tensile strength may not be less than 540 N/mm².

4.3.6 For HFe59-1-1 and HAl60-1-1 bars, which have a diameter of 10 ~ 120 mm, when the sum of tensile strength and elongation δ_{10} is not less than 460, the elongation δ_{10} is allowed to drop to 20 and 15%, respectively.

4.4 Oxygen content

The oxygen content of the oxygen-free copper bar is in accordance with the requirements of YB 731. It is qualified, only if it meets the standard picture grades 1, 2, 3.

4.5 Internal quality

The fracture of the bar shall be dense, without tail shrinkage; there is no defect, such as pores, delamination, inclusions, which exceeds the provisions of YB 732.

4.6 Surface quality

4.6.1 The surface of the bar shall be clean. Cracks, blisters, inclusions and other defects are not allowed.

4.6.2 The surface of the bar is allowed to have oxidation color, and other defects with which the diameter of the bar does not exceed the permissible deviation.

5 Test method

5.1 Arbitration analysis method of chemical composition

The arbitration analysis of the chemical composition of bars shall be carried out according to the requirements of GB 5121, GB 5122, GB 6520, GB 8002, GB 8650, YB 55, YB 598, YB 599, respectively.

5.2 Test method of mechanical properties

5.2.1 The tensile test of the bar, at room temperature, shall be carried out in accordance with the provisions of GB 228. The tensile test specimens shall meet the requirements of GB 6397; the specimen numbers are R3 ~ R5 (R03 ~ R05).

5.2.2 The Brinell hardness test of the bar shall be carried out in accordance with the provisions of GB 231.

5.3 Test method of oxygen content

The inspection of oxygen content of oxygen-free copper bars shall be carried out, in accordance with the provisions of YB 731.

5.4 Inspection method of internal quality

5.4.1 The fracture inspection of the bar shall be carried out, in accordance with the provisions of YB 732, OR the internal quality of the bar may be inspected in accordance with the provisions of GB 3310.

5.4.2 The inspection of internal quality of cadmium bronze bars uses the following macroscopic testing method:

The cross-section of the bar specimen is first turned flat, polished by fine sandpaper, etched by a 1:1 aqueous solution of nitric acid for 10 ~ 30 s, taken out, washed by water, then observed under a magnifying glass of 5 ~ 10 times.

The cadmium bronze bar can also be used for fracture inspection or ultrasonic inspection, instead of macroscopic testing, BUT the macroscopic testing method shall prevail in the arbitration.

5.5 Dimension measurement method

The external dimensions of the bar shall be measured by the measuring tools of corresponding precision.

5.6 Inspection method of surface quality

The surface quality of the bar is inspected visually.

6 Inspection rules

6.1 Inspection and acceptance

6.1.1 The bar shall be inspected by the supplier's technical supervision department, to ensure that the product quality meets the requirements of this standard; meanwhile the quality certificate shall be filled in.

6.1.2 The purchaser shall inspect the products received, in accordance with the provisions of this standard. If the inspection results are not in conformity with the provisions of this standard, it shall be submitted to the supplier, within three months from the date of receipt of the product, to be resolved, through negotiation between the supplier and the buyer.

6.2 Group-batch

The bars shall be submitted for inspection in batches. Each batch shall be composed of the products of same designation, status, specification. The weight of each batch shall not exceed 3000 kg. However, for the bar with a diameter greater than 100 mm, the weight of each batch shall not exceed 5000 kg.

6.3 Inspection items

6.3.1 Each batch of bars shall be subject to the inspection of chemical composition, overall dimensions, surface quality.

6.3.2 For the bars, which have requirements for mechanical properties in Table 7, each batch shall be subject to the testing of mechanical properties.

6.3.3 Each batch of oxygen-free copper rods shall be inspected for oxygen content.

6.3.4 For the T2, T3, TP2, TU1, TU2, H96, QG0.5 bars, tin bronze bars which have a diameter greater than 80 mm, complex brass rods which have a diameter greater than 120 mm, silicon bronze bars, they are not subject to fracture inspection or ultrasonic flaw detection. QCd1 bar will be subject to macroscopic testing. For other alloy bars, fracture inspection or ultrasonic flaw testing must be carried out.

6.4 Sampling quantity and sampling location

6.4.1 For the sampling for chemical composition, the supplier shall take one specimen from each furnace, during the melting and casting; the buyer shall take any specimen from each batch of bars. For oxygen content inspection of oxygen-free copper, it shall randomly take 4 bars from each batch, take one specimen from each bar.

6.4.2 Each batch of bars shall be subjected to external dimension measurement AND surface quality inspection, one by one.

6.4.3 For the tensile test, it shall randomly take 2 bars from each batch of bars, randomly take one specimen from each bar.

Tensile test specimens shall be machined, according to the following requirements, based on the degree of proximity between the bar specimen blank and the diameter of each number of specimens:

- a. For pure copper and ordinary brass rods, which have a diameter of not more than 15 mm, or lead brass, complex brass, bronze and cupronickel bars, which have a diameter of not more than 10 mm, they shall not be machined;

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