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CCS H62



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

**GB/T 1531-2020**

Replacing GB/T 1531-2009

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**Copper and copper alloy capillary tube**

铜及铜合金毛细管

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### 1 Scope

GB/T 1531-2020 is the Chinese national standard on copper and copper alloy capillary tube, 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 29 September 2020 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 August 2021. Classification: ICS 77.150.30, CCS H62. 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 Standard specifies the technical requirements, test methods, inspection rules, signs, packaging, transportation, storage, quality certificate and order sheet (or contract) content of copper and copper alloy capillary tubes. This Standard is applicable to copper and copper alloy capillary tubes used for air conditioners, refrigeration equipment, instruments, and apparatuses (hereinafter referred to as tubes).

## 2 Normative References

The following documents are indispensable to the application of this document. 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 242 Method for Flaring Test on Tubes of Metals

GB/T 245 Metallic Materials - Tube - Flanging Test

GB/T 2828.1 Sampling Procedures for Inspection by Attribute - Part 1: Sampling Schemes Indexed by Acceptance Quality Limit (AQL) for Lot-by-lot Inspection

GB/T 4340.1 Metallic Materials - Vickers Hardness Test - Part 1: Test Method

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 Judgement of Limiting Values

GB/T 8888 Wrought Heavy Non-ferrous Metal Products - Packing, Marking, Transportation, Storing and Certificate of Quality

GB/T 10567.2 Wrought Copper and Copper Alloys - Detection of Residual Stress - Ammonia Test

GB/T 26303.1 Measuring Method for Dimensions and Shapes of Wrought Copper and Copper Alloy - Part 1: Tube

GB/T 34505 Copper and Copper Alloy Materials - Tensile Testing at Room Temperature

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

YS/T 815 Preparation Method of Test Pieces for Mechanical and

Technological Properties of Copper and Copper Alloys

YS/T 999 Capillary Tube of Copper

and Copper Alloy-eddy Current Testing Method

## 3 Terms and Definitions

The following terms and definitions are applicable to this document.

3.1 Capillary Capillary refers to a copper tube for current limiting, and with an outer diameter of not greater than

6.1 mm and an inner diameter of not greater than

3.2 Pressure Difference Pressure difference refers to the resistance drop of the inner hole of tubes of a certain length.

3.3 Flow Flow refers to the volume of air flow passing through a tube per unit time at a certain temperature, a certain atmospheric pressure and a certain inlet pressure.

3.4 Residue Residue refers to solid impurities remaining on the inner surface of a tube unit.

3.5 Oil Content Oil content refers to processing oil remaining on the inner surface of a tube unit.

## 6 Test Methods

6.1 Chemical Composition The analysis method for the chemical composition of the tubes shall comply with the stipulations of GB/T 5121 (all parts) or YS/T 482 and YS/T 483. The arbitration shall comply with the stipulations of GB/T 5121 (all parts).

6.2 Overall Dimensions and Allowable Deviations The measurement method for the overall dimensions and allowable deviations of the tubes shall comply with the stipulations of GB/T 26303.1.

6.3 Mechanical Properties The tensile test of the tubes shall be conducted in accordance with the stipulations of GB/T 34505; the tensile test specimens shall comply with the stipulations of full-section test specimens in GB/T 34505. The Vickers hardness test of the tubes shall be conducted in accordance with the stipulations of GB/T 4340.1.

### 6.4 Process Properties

6.4.1 Air permeability The air permeability test of the tubes shall be conducted under the air pressure of not greater than

7.8 MPa; continuously pressurize it, and when there is relatively violent bubble-turning phenomenon at one end of the tube placed in the water, it proves that the tube is unblocked.

6.4.2 Air tightness For the air tightness test of the tubes, seal one end of the tube; immerse it in the water; ventilate at the other end, so that it complies with the test requirements of Table 8.

6.4.3 Pressure difference The test method for the pressure difference of the tubes shall take Appendix A as a reference. When there are special requirements, the test method shall be determined by the demand-side and the supply-side through negotiation.

6.4.4 Flow rate test The test method for the flow rate of the tubes shall take Appendix B as a reference. When there are special requirements, the test method shall be determined by

the demand-side and the supply-side through negotiation. supply-side in the written form, and the supply-side and the demand-side shall solve this through negotiation. Objections related to surface quality and overall dimensions shall be proposed within 1 month from the date of receipt of the products; objections related to other properties shall be proposed within 3 months from the date of receipt of the products. If arbitration is required, it may be entrusted to an organization acknowledged by the demand-side and the supply-side, and samples shall be jointly taken at the demand-side's place.

**7.2 Batch** The products shall be submitted for acceptance inspection in batches. Each batch shall be composed of products of the same designation, the same state and the same specification. The weight of each batch shall not exceed 500 kg.

**7.3 Inspection Items** The inspection items of the tubes shall comply with the stipulations of Table 11. Under any of the following circumstances, type inspection shall be carried out in accordance with the stipulations of this Standard:

- a) During trial production and appraisal of new products;
- b) After formal production, if there are relatively significant changes in structures, materials and processes that might affect product performance;
- c) When type inspection has not been carried out for two consecutive years;
- d) When requested by the demand-side;
- e) When a national quality supervisory institution requests for type inspection.
- c) Specification;
- e) Net weight or quantity;

## **8.2 Packaging, Transportation, Storage and Quality Certificate**

**8.2.1** The requirements for the packaging, transportation, storage and quality certificate of the tubes shall comply with the stipulations of GB/T 8888.

**8.2.2** When there are special requirements for the packaging mode, they shall be determined by the demand-side and the supply-side through negotiation.

## **9 Order Sheet (or contract) Content**

The order sheet (or contract) ordering the materials listed in this Standard shall include the following content:

- a) Product name;
- b) Alloy designation;
- d) Specification;