

Translated English of Chinese Standard: GB/T1527-2017

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NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA

ICS 77.150.30

H 62

GB/T 1527-2017

Replacing GB/T 1527-2006

Drawn tube of copper and copper alloys

Issued on: July 12, 2017

Implemented on: June 1, 2018

Issued by: General Administration of Quality Supervision, Inspection and Quarantine of the PRC;

Standardization Administration of the PRC.

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Foreword

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

This Standard replaces GB 1527-2006 [should be: GB/T 1527-2006] “Drawn tube of copper and copper alloys”. As compared with GB/T 1527-2006, the main technical changes are as follows:

- ADD representation method of alloy code;
- According to the new national standard, MODIFY alloy designation and state;
- ADD high copper TCr1 (C18200) designation and corresponding requirements;
- DELETE 1/3 hard-state products and corresponding requirements;
- MODIFY the wall thickness range of pure copper tubes from “0.5 mm~15 mm” to “0.3 mm~20 mm”.
- MODIFY the length specification of the tubes, SEE Table 2;
- MODIFY the mechanical property index of some tubes, SEE Table 3, Table 4;
- ADD the provision that “the inspection method for the overall dimensions of the tubes shall be in accordance with the provisions of GB/T 26303.1”;
- ADD the chemical analysis methods of YS/T 482 and YS/T 483;
- According to the provisions of GB/T 228.1-2010, MODIFY the tensile test piece;
- ADD the provisions that “the sampling method shall be in accordance with the provisions of YS/T 668; the preparation of test pieces for mechanical and technological properties shall be carried out in accordance with the provisions of YS/T 815”.

This Standard was proposed by China Non-Ferrous Metals Industry Association.

This Standard shall be under the jurisdiction of China National Technical Committee for Non-Ferrous Metals Standardization (SAC/TC 243).

Responsible drafting organizations of this Standard: Chinalco Luoyang Copper Co., Ltd., Zhejiang Hailiang Co., Ltd., Golden Dragon Precise Copper Tube

Drawn tube of copper and copper alloys

1 Scope

This Standard specifies the requirements, test methods, inspection rules, marking, packing, transportation, storing, certificate of quality, and order form (or contract) content, etc. of drawn tube of copper and copper alloys.

This Standard applies to general-purpose round, rectangular (square) copper, and drawn tube of copper alloys (hereafter known as tube for short).

2 Normative references

The following documents are indispensable for the application of this document. For the dated references, only the versions with the dates indicated are applicable to this document. For the undated references, the latest version (including all the amendments) are applicable to this document.

GB/T 228.1-2010 Metallic materials - Tensile testing - Part 1: Method of test at room temperature

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

GB/T 242 Metal materials - Tube - Drift-expanding test

GB/T 246 Metal materials - Tube - Flattening test

GB/T 2828.1 Sampling procedures for inspection - Part 1: by acceptance quality limit (AQL) retrieval by Batch inspection sampling plan

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 5248 Electromagnetic (eddy-current) examination of copper and copper alloy seamless tube

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

GB/T 10119 Determination of dezincification corrosion resistance of brass

GB/T 10567.1 Wrought copper and copper alloys - Detection of residual stress - Mercury nitrate test

GB/T 10567.2 Wrought copper and copper alloys - Detection of residual stress - Ammonia test

GB/T 16866 Dimensions and tolerances of copper and copper alloy seamless tubes

GB/T 26303.1 Measuring method for dimensions and shapes of wrought copper and copper alloy - Part 1: Tube

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

3 Requirements

3.1 Product classification

3.1.1 Designations, states, specifications

The designation, state, and specification of the tubes shall comply with the provisions of Table 1 and Table 2.

3.1.2 Marking example

Product marking is expressed in the order of product name, standard number, designation, state, and specification. Marking examples are as follows.

Example 1: A round tube made of T2 (T11050), at O60 (softening annealing) state, with an outer diameter of 20 mm, and a wall thickness of 0.5 mm is marked as:

Round copper tube GB/T 1527-T2 O60- ϕ 20×0.5

Or Round copper tube GB/T 1527-T11050 O60- ϕ 20×0.5

Example 2: A rectangular tube made of H62 (T27600), at O82 (ANNEAL to 1/2 hard) state, with a long side of 20 mm, a short side of 15 mm, and a wall thickness of 0.5 mm is marked as:

Rectangular copper tube GB/T 1527-H62O82-20×15×0.5

Or Rectangular copper tube GB/T 1527-T27600O82-20×15×0.5

3.2 Chemical composition

The designation and chemical composition of the tubes shall conform to the provisions of the corresponding designation in GB/T 5231. The content of As of HAs65-0.04 designation is 0.03%~0.06%. The content of other elements is the same as that of H65 designation.

3.3 Overall dimensions and their permissible deviations

The dimensions and their permissible deviations of the tubes shall conform to the provisions of GB/T 16866.

3.4 Mechanical properties

The longitudinal mechanical properties at room temperature of pure copper, high copper round tubes shall comply with the provisions of Table 3. The mechanical properties at room temperature of pure copper, high copper rectangular (square) tubes are determined by negotiation between supplier and demander. The longitudinal mechanical properties at room temperature of brass, cupronickel tubes shall comply with the provisions of Table 4.

(O60), and light annealing (O50) states. The average grain size of tube is determined by negotiation between supplier and demander.

3.8 Residual stress

After the tube is tested for residual stress, there shall be no visible cracks.

3.9 Dezincification corrosion resistance

The tubes, which have a requirement for corrosion resistance, can be tested for dezincification corrosion resistance. The requirements are determined by negotiation between supplier and demander.

3.10 Surface quality

3.10.1 The inner and outer surfaces of the tube shall be smooth and clean. There shall be no delamination, pinholes, cracks, peeling, bubbles, rough draw bead, inclusions, and other defects which affect the use.

3.10.2 It is allowed that, there are minor, localized defects such as fine scratches, pits, indentations, and spots, which do not cause the outer diameter and wall thickness of the tube to exceed the permissible deviations, on the surface of tube. Minor straightening and turning traces, ring traces, oxidation tint, darkening, water stain, and oil stains are not used as bases for scrapping.

4 Test methods

4.1 Chemical composition

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

4.2 Overall dimensions and their permissible deviations

The inspection method for the overall dimensions of tube shall be in accordance with the provisions of GB/T 26303.1.

4.3 Mechanical properties

4.3.1 The tensile test of tube shall be conducted in accordance with the provisions of GB/T 228.1-2010. The test pieces used for the test shall conform to the provisions of GB/T 228.1-2010. The selection of test pieces is shown in Table 5.