

ICS 77.120.30
CCS J31



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

GB/T 1176-2013

Replacing GB/T 1176-1987

Casting copper and copper alloys

铸造铜及铜合金

Issued on: September 18, 2013

Implemented on: June 1, 2014

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine of the People's Republic of China;
Standardization Administration of China**

Table of Contents

1	Scope
2	Normative References
3	Designation and Code of Alloys
4	Technical Requirements
4.1	Chemical compositions
4.2	Mechanical properties
5	Test Methods
5.2	Mechanical properties
6	Test Rules
6.1	Chemical compositions
6.2	Mechanical properties
	Annex A

Foreword

This standard is developed in accordance with the rules given in GB/T 1.1-2009. This standard replaces GB/T 1176-1987 Specification for Cast Copper Alloys. The following main technical changes have been made, comparing with GB/T 1176-1987. -- the standard name is changed to "Casting Copper and Copper Alloys"; -- the designations of casting copper and copper alloys, i.e., ZCu99, ZCuPb9Sn5, ZCuAl8Mn14Fe3Ni2, ZCuAl8Be1Co1, ZCuZn21Al5Fe2Mn2, ZCuAl10Fe4Ni4, ZCuNi10Fe1Mn1 and ZCuNi30Fe1Mn1 are added; -- the scope is added; -- the spectral analysis method of alloy chemical compositions is added; -- the composition range of ZCuSn10P1, ZCuSn10Zn2, ZCuPb10Sn10, ZCuZn38, ZCuZn25Al6Fe3Mn3, ZCuZn26Al4Fe3Mn3 and ZCuAl8Mn14Fe3Ni2 is modified; -- the expression method of Brinell hardness number in Table 3 is modified; -- Annex A and Annex B are modified; -- Annex C is deleted. This standard was proposed by and shall be under the jurisdiction of the National Technical Committee on Foundry of Standardization Administration of China (SAC/TC 54). The previous editions of this standard are as follows: -- GB/T 1176-1974, GB/T 1176-1987. Casting Copper and Copper Alloys

1 Scope

GB/T 1176-2013 is the Chinese national standard on casting copper and copper alloys, 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 18 September 2013 by the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China; Standardization Administration of China, and has been in force since 1 June 2014. Classification: ICS 77.120.30, CCS J31. 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 designation, code, technical requirements, test methods and test rules of casting copper and copper alloys. This standard is applicable to the manufacture of copper and copper alloys castings.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated reference, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 228.1 Metallic Materials - Tensile Testing - Part

3 Designation and Code of Alloys

3.1 Designation of alloys The designation of casting copper and copper alloys shall meet the requirements of GB/T 8063, and see Table 1 for the designation of alloys.

3.2 Alloy nomenclature According to the requirements of GB/T 8063, the alloy is named based on the mass fraction of its major elements, e.g., 5-5-5 tin bronze, 38 brass and 25-6-3-3 aluminum brass.

4.1 Chemical compositions

4.1.1 The content of major elements in the alloy shall be in accordance with those specified in Table 1; the content of impurity elements shall be in accordance with those specified in Table

2. Elements not contained in Tables 1 and 2 shall be determined through negotiation of the supplier and the purchaser.

4.1.4 ZCuSn5Pb5Zn5, ZCuSn10Zn2, ZCuPb10Sn10, ZCuPb15Sn8 and ZCuPb20Sn5 alloys are applicable to centrifugal casting and continuous casting, and the phosphorus content is determined through negotiation of the supplier and the purchaser.

4.2 Mechanical properties

4.2.1 The room-temperature mechanical properties of as-cast alloy shall be in accordance

with those specified in Table 3.

4.2.2 The mechanical properties of the alloy shall be determined with separately cast test bar, test block, or the sample processed with attached test block. The shape and dimension of the casting test block are detailed in Annex A.

5 Test Methods

5.1 Chemical compositions The chemical compositions of alloys are inspected according to those specified in GB/T 5121 (all parts) or YS/T 482. Other test methods are allowable to be adopted only if the analysis precision is guaranteed.

6.1 Chemical compositions

6.1.1 Only the major elements of the alloy compositions are analyzed, and the analysis for impurity elements is determined through negotiation of the supplier and the purchaser.

6.2 Mechanical properties

6.2.1 Tensile test is conducted with the tensile sample (one) specified in 4.2.4. If the test result fails to meet those specified in Table 3, retest is conducted with another two samples, if one sample in the retest is unqualified, the mechanical properties of the alloy are regarded as unqualified.

6.2.2 If the property is unqualified due to the test or the defect on the sample, the test is invalid and resample shall be done for retest.

Annex A

(Normative) Figures for Casting Test Block for Mechanical Property Inspection A.1 Sand mold test bars Sand mold test bars applicable to tin bronze, lead bronze and silicon brass are detailed in Figure A.1. In mm