

ICS 77.150.30

CCS H62



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

GB/T 467-2010

Copper cathode

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Issued on: January 10, 2011

Implemented on: October 1, 2011

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

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009. In this standard, grade A copper (Cu-CATH-1) equivalently adopts the impurity limit of the designation (Cu-CATH-1) in EN 1978.1998 "Copper and copper alloys - Copper cathode". The N.1 standard copper (Cu-CATH-2) modifies and adopts the impurity limit of the designation Grade2A in ASTM B 115-00 (R2004) "Electrolytic copper cathode"; AND the No.2 standard copper (Cu-CATH-3) modifies and adopts the impurity limit of the designation Cu-CATH-2 in EN 1978.1998 "Copper and copper alloy - copper cathode". As compared with EN 1978.1998 and ASTM B 115-00 (R2004), the differences of this standard are as follows: - The limit of bismuth in standard copper (Cu-CATH-2) is $\leq 0.0005\%$, which is higher than that in designation Grade 2A ($\leq 0.0003\%$) in ASTM B 115-00 (R2004). The limit of lead is $\leq 0.002\%$, which is lower than that in the designation Grade 2A ($\leq 0.0040\%$). It does not consider the selenium, tellurium, and silver. The limit of phosphorus is increased, BUT the rest limit indicators are the same; - The bismuth and lead in No.2 standard copper (Cu-CATH-3) equivalently adopt the limit of the designation Cu-CATH-2 in EN 1978.1998; AND the silver equivalently adopts the limit of the designation Cu-CATH-1. This standard replaces GB/T 467-1997 "Copper cathode". As compared with the original standard, the main changes are as follows: - ADD the designation No.2 standard copper (Cu-CATH-3); - ADD the specifications on the physical performance

indicators AND the mass resistivity; - MAKE unified specification on the surface quality; - As for the copper cathode chemical composition analysis method, ADD the YS/T 464 "Methods for analytical of copper cathode - The optical emission spectrometry"; - ADD the copper cathode production sampling and sample preparation method. This standard shall be under the jurisdiction of the National Nonferrous Metals Standardization Committee (SAC/TC 243). The responsible drafting organizations of this standard. Jiangxi Copper Co., Ltd., China Nonferrous Metals Industry Standard Measurement Quality Institute. The participating drafting organizations of this standard. Daye Nonferrous Metals Company, Tongling Nonferrous Metals Group Holdings Co., Ltd., Yunnan Copper Co., Ltd., Jinchuan Group Co., Ltd., Zijin Mining Group Co., Ltd., Yanggu Xiangguang Copper Co., Ltd., Co., Ltd., North Copper Co., Ltd. The main drafters of this standard. Wu Yiwei, Li Baodi, Long Ziping, Zhao Yongshan, Huang Mingjin, Huang Hongwei, Cheng Tong, Tu Lixin, Wu Wenming, Wu Zhiqing, Lu Weiming, Liao Zhanpi, Zhou Songlin, Zhang Guanghua, Yan Hong, Zhang Yonghong, Li Jiasheng. This Standard replaces the standard previously issued as follows: - GB/T 467-1997; - GB/T 13585-1992; - GB/T 467-1982. Copper cathode

1 Scope

China's national standard for copper cathode. Copper cathode is the form in which refined copper is traded worldwide: sheets of about 99.99 per cent copper, produced either by electrolytic refining of blister copper or by electrowinning from leach solution, and destined almost entirely for remelting into rod, wire, tube and alloys. Its purity specification is unusually consequential, because copper's value lies in its electrical conductivity and conductivity is destroyed by impurities at concentrations of parts per million - a few thousandths of a per cent of phosphorus, iron or arsenic in solid solution costs several per cent of conductivity, and bismuth or lead at similar levels makes the metal crack when it is worked hot. That is why cathode is specified in tens of trace elements rather than in a single purity figure. The standard specifies the requirements, test methods, inspection rules, marking, packaging, transport, storage, quality certificate and contract contents for copper cathode.

This standard specifies the requirements, test methods, inspection rules, marking, packaging, transportation, storage, quality certificate, and contract (or order) contents of the copper cathode. This standard applies to copper cathode produced by electrolytic refining or electrolytic deposition. AND it is usually used in remelting.

2 Normative references

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

GB/T 351 Metallic material - Resistivity measurement method

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

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

3 Requirements

3.1 Product classification The copper cathode is divided into three designations in accordance with chemical compositions. grade A copper (Cu-CATH-1), No.1 standard copper (Cu-CATH-2), AND No.2 standard copper (Cu-CATH-3).

3.2 Chemical composition

3.3 Physical properties If the purchaser has special requirement for the electrical performance AND indicated in the contract, it may perform the mass resistivity test. The grade A copper mass resistivity $\leq 0.15176 \text{ g/m}^2$, AND the No.1 and No.2 standard copper mass resistivity $\leq 0.15328 \text{ g/m}^2$.

3.4 Surface quality

3.4.1 The copper cathode surface shall be clean, AND be free from sludge, oil stain, electrolytic residue, or other foreign debris.

3.5 Other requirements

3.5.1 Copper cathode shall be supplied in whole piece. If the purchaser has special requirement, it may be negotiated with the supplier.

4 Test method

4.1 Analysis of chemical composition of copper cathode is performed in accordance with the requirements of GB/T 5121 and YS/T 464. AND the arbitration analysis method is GB/T 5121.

5.1 Inspection and acceptance

5.1.1 The product shall be inspected by the technical supervision department of the supplier, to ensure that the product quality complies with the provisions of this standard or the contract (or the order form), AND meanwhile fill in the quality certificate.

5.2 Batching The product shall be submitted in batches, AND each batch is composed of the copper cathode of the same designation produced from the same day and the same circulation system. AND the mass of a batch shall not exceed 500 t.

5.3 Copper cathode sampling and sample preparation method

5.3.1 Production sampling method Copper cathode sampling is made through the drilling machine, OR otherwise by the punch.

5.3.2 Arbitration sampling method for copper cathode

5.3.2.1 Randomly TAKE 24 bundles from each batch of copper cathode; randomly TAKE one block from each bundle; NUMBER them in the order of natural number.

5.3.2.6 In the process of melting, it shall avoid the intrusion of oxygen.

5.3.2.7 After removing the surface of the ingot, USE a carbide cutting tool for drilling, milling or sawing (to avoid oxidization due to overheating) to take sample. OBTAIN the fine cuttings more than 600 g; carefully MIX the fine cuttings uniformly; USE the magnet to remove the iron which may be brought in during processing; REDUCE the sample which is removed of iron into four sets (not less than 150 g for each set); one set for the analysis by the supplier, one set for the analysis by the purchaser, one set of the arbitration analysis,

5.4 Determination of test results

5.4.1 The numerical results of the test results shall be rounded off and determined in accordance with the provisions of GB/T 8170.

6 Marking, packaging, transportation, storage and quality certificates

6.1 Copper cathode shall be packaged by the high strength materials which are not easy to produce pollution into bundles of such mass as suitable for handling. However, it may also not be packaged if agreed between the supplier and the purchaser.

6.2 Each bundle of copper cathode must have a clear marking, specifying.

6.3 Transportation and storage During transportation and storage, it shall not contaminate the product.

6.4 Each batch of copper cathode shall be accompanied by a quality certificate, indicating.