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Recycling material for copper

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Recycling material for copper

1 Scope

This document specifies the classification, technical requirements, test methods, inspection rules, factory inspection, transportation, storage and accompanying documents of recycling materials for copper (hereinafter referred to as “raw materials”).

This document applies to recycling materials for copper.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the version corresponding to that date is applicable to this document; for undated references, the latest version (including all amendments) is applicable to this document.

GB 5085.1, Identification standards for hazardous wastes - Identification for corrosivity

GB 5085.2, Identification standards for hazardous wastes - Screening test for acute toxicity

GB 5085.3, Identification standards for hazardous wastes - Identification for extraction toxicity

GB 5085.4, Identification standards for hazardous wastes - Identification for ignitability

GB 5085.5, Identification standards for hazardous wastes - Identification for reactivity

GB 5085.6, Identification standards for hazardous wastes - Identification for toxic substance content

GB/T 5121.1, Methods for chemical analysis of copper and copper alloys - Part 1: Determination of copper content

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

SN/T 0570-2022, Rules for the inspection of radioactive contamination of imported recycling materials

7.4.2 If any of the inspection results for appearance quality, radioactive contamination, hazardous wastes, or other requirements do not meet the requirements, judge the batch of raw materials not to meet the requirements of this document.

7.4.3 If any of the inspection results for foreign substances and coatings, other volatile substances, and physical quantity of copper are unqualified, double the number of representative samples shall be taken from the batch of raw materials and repeated tests shall be conducted on the unqualified items. If all the repeated test results are qualified, judge the batch of raw materials to be qualified, otherwise, judge that the batch of raw materials does not meet the requirements of this document.

8 Factory inspection

The purchaser shall conduct factory inspection of raw materials in accordance with Appendix C.

9 Transportation, storage and accompanying documents

9.1 Transportation and storage

9.1.1 During transportation, bulk raw materials of different categories and names shall not be mixed.

9.1.2 In order to make full use of shipping space, when raw materials of different categories and names are packaged independently, two or more raw materials of different names may be mixed in one vehicle, ship or container, but they shall be placed according to categories and clearly marked.

9.1.3 The transportation and storage of raw materials shall be protected from rain and snow.

9.2 Accompanying documents

Each batch of raw materials shall be accompanied by accompanying documents, which shall indicate:

a) name of the supplier;

b) raw material category, name or code;

c) gross weight and net weight;

d) foreign substances and coatings;

e) other volatile substances;

f) physical quantity of copper;

Appendix B

(Normative)

Detection methods for volatile substances

Warning – This method has the risk of high temperature scalds and burns. Operators shall wear high temperature resistant gloves, protective masks and protective clothing. The laboratory shall have good ventilation measures.

B.1 Method summary

Heat the sample to a fixed temperature and keep it at this temperature until constant weight is reached; measure the mass loss to calculate the volatile substance.

B.2 Instruments and apparatuses

B.2.1 Drying oven: The operating temperature can reach 500 ℃, with an accuracy of ±5 ℃.

B.2.2 Sample plate.

B.2.3 Electronic scale: The accuracy is 0.01 g.

B.2.4 Desiccator.

B.3 Sampling

In each inspection batch, take 2 representative raw material samples, each weighing not less than 1.0 kg. The sample can be divided into several independent test samples.

B.4 Test procedure

B.4.1 After the sample pan has reached constant weight at 105 °C, place it in a drying oven and cool it to room temperature. Weigh the mass and record it as m_0.

B.4.2 Place the sample in a sample pan and flatten it; weigh the mass of the sample pan containing the sample and record it as m_5.

B.4.3 Place the sample pan containing the representative sample in a drying oven; raise the temperature to 105 °C; keep it warm for 1 hour.

B.4.4 Take out the sample pan containing the representative sample from the drying oven and place it in a desiccator. After cooling to room temperature, weigh the mass of the sample pan containing the representative sample and record it.

B.4.5 Repeat B.4.3 and B.4.4. Record the mass of the sample pan containing the representative sample weighed for the last time as m_6.

B.4.6 Place the sample pan containing the representative sample from the last weighing in B.4.5 into a drying oven; heat it to 350 °C; keep it warm for 35 minutes.

B.4.7 Take out the sample pan containing the representative sample from the drying oven and place it in a desiccator. After cooling to room temperature, weigh the mass of the sample pan containing the representative sample and record it.

B.4.8 Repeat B.4.6 and B.4.7 until the difference between the two weighing results is no more than 0.05 g. Otherwise, repeat B.4.6 and B.4.7, and record the mass of the sample pan containing the representative sample in the last weighing as m_7.

B.5 Test data processing

Calculate other volatile substances (w_V) of the sample according to Formula (B.1), and express the value in %:

$$w_V = \left(\frac{m_6 - m_7}{m_5 - m_0}\right) \times 100\% \qquad \text{(B.1)}$$

Where:

m_6 – mass of the representative sample and the sample pan weighed for the last time in step B.4.5, in grams (g);

m_7 – mass of the representative sample and the sample pan weighed for the last time in step B.4.8, in grams (g);

m_5 – mass of the initial sample and the sample pan in step B.4.2, in grams (g);

m_0 – mass of the sample pan in step B.4.1, in grams (g).

The final result of other volatile substance content of raw materials is the average of the test results of 2 representative samples.

C.3 Inspection methods

C.3.1 Metal recovery rate

The metal recovery rate of raw materials shall be tested in accordance with the provisions of Appendix D.

C.3.2 Copper content

The copper content of the raw materials shall be determined as follows:

a) When on-site inspection is required, a portable rapid spectrometer may be used to conduct a preliminary inspection of the chemical composition of the raw materials; when verification is required, a copper content sample shall be prepared according to Appendix D and tested in accordance with the provisions of GB/T 5121.1 or YS/T 483.

b) When arbitration is required, it shall be conducted in accordance with the provisions of GB/T 5121.1.

C.4 Determination of inspection results

If any inspection result of copper content and metal recovery rate is unqualified, double the number of representative samples shall be taken from the batch of raw materials and repeated tests shall be conducted on the unqualified item. If all the repeated test results are qualified, judge the batch of raw materials to be qualified; otherwise, judge that the batch of raw materials does not meet the requirements of this document.

Appendix D

(Normative)

Preparation of copper content samples and test method of metal recovery rate

Warning – This method has the risk of high temperature scalds and burns. Operators shall wear high temperature resistant gloves, protective masks and protective clothing. The laboratory shall have good ventilation measures.

D.1 Method summary

Take the raw material sample; after pretreatment, place it in a melting furnace; fully melt; remove slags; prepare it into a copper content sample. After the remaining fuse-element solidifies, the ratio of the mass of the obtained ingot to the mass of the sample is the metal recovery rate.

D.2 Reagents or materials

Smelting covering agents and slag cleaning agents (such as charcoal, salt, borax, etc.).

D.3 Instruments and apparatuses

D.3.1 Melting furnace.

D.3.2 Crucible: preferably a graphite crucible.

D.3.3 Mold.

D.3.4 Electronic scale: The accuracy is 0.01kg.

D.4 Test procedure

D.4.1 Sampling

From each inspection batch, take a representative sample with a mass of not less than 10 kg.

D.4.2 Weighing

Weigh and record the sample mass m_8.

D.4.3 Pre-treatment

Pick out foreign substances and non-copper metals mixed into the representative sample as much as possible.

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