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Copper and copper alloys —
Determination of copper content

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Foreword

This Japanese Industrial Standard has been revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Copper and Brass Association (JCBA)/Japanese Standards Association (JSA) with a draft being attached, based on the provision of Article 12, paragraph (1) of the Industrial Standardization Act applied mutatis mutandis pursuant to the provision of Article 16 of the said Act. This edition replaces the previous edition (**JIS H 1051** : 2013), which has been technically revised.

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Copper and copper alloys — Determination of copper content

Introduction

This Japanese Industrial Standard has been prepared based on **ISO 1554** : 1976, Edition 1, with some modifications of the technical contents to reflect the unique condition of the Japanese market.

The vertical lines on both sides and dotted underlines indicate changes from the corresponding International Standard. A list of modifications with the explanations is given in Annex JA.

1 Scope

This Standard specifies methods for determination of the copper content of copper and copper alloys. Copper and copper alloy products covered by this Standard include wrought products, copper billets and cakes, ingots for castings and castings.

NOTE The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 1554 : 1976 *Wrought and cast copper alloys — Determination of copper content — Electrolytic method* (MOD)

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

2 Normative references

Part or all of the provisions of the following standards, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS H 1012 *General rules for chemical analysis of copper and copper alloys*

JIS K 0211 *Technical terms for analytical chemistry (General part)*

JIS K 0212 *Technical terms for analytical chemistry (optical part)*

JIS K 0215 *Technical terms for analytical chemistry (Analytical instrument part)*

JIS Z 8401 *Rounding of numbers*

3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in **JIS H 1012**, **JIS K 0211**, **JIS K 0212** and **JIS K 0215** apply.

4 General requirements

General requirements of analytical methods shall be in accordance with **JIS H 1012**. Rounding of numbers shall be in accordance with Rule A of **JIS Z 8401**.

5 Classification of determination methods

Determination of copper content shall be in accordance with one of the following methods.

For copper and copper alloys specified in Japanese Industrial Standards (**JISs**), the applicable determination method for each alloy number or symbol of grade shall be as given in Table 1. If a new alloy is specified in a **JIS** together with its alloy number or symbol of grade, the determination method to be applied may be left to the manufacturer's choice.

- a) **Copper electrogravimetric analysis by decomposition with nitric acid and sulfuric acid** This method applies to samples not less than 50.0 % (mass fraction) in copper content and not containing elements that generate insoluble residues in electrolyte, and samples having a low content of impurities that electrodeposit together with copper. However, this method does not apply to samples whose relevant **JIS** product standard specifies selenium and/or bismuth in chemical composition requirements.

In the case where silver is contained in the sample, the silver that electrodeposits together with copper shall be determined as copper.

- b) **Copper electrogravimetric analysis by decomposition with nitric acid, hydrofluoric acid and boric acid** This method applies to samples not less than 50.0 % (mass fraction) in copper content. However, this method does not apply to samples whose relevant **JIS** product standard specifies selenium and/or bismuth in chemical composition requirements.

- c) **Copper electrogravimetric analysis by separation with selenium and bismuth** This method applies to samples 58.0 % (mass fraction) to 91.0 % (mass fraction) in copper content, whose relevant **JIS** product standard specifies selenium and/or bismuth in chemical composition requirements.

Table 1 Alloy number or symbol of grade, and applicable determination method (1/8)

Alloy number or symbol of grade	Relevant standard (informative)	Determination method		
		Copper electrogravimetric analysis by decomposition with nitric acid and sulfuric acid	Copper electrogravimetric analysis by decomposition with nitric acid, hydrofluoric acid and boric acid	Copper electrogravimetric analysis by separation with selenium and bismuth
C 1011	JIS H 2123 JIS H 3510	○	—	—

Table 1 (continued) (2/8)

Alloy number or symbol of grade	Relevant standard (informative)	Determination method		
		Copper electrogravimetric analysis by decomposition with nitric acid and sulfuric acid	Copper electrogravimetric analysis by decomposition with nitric acid, hydrofluoric acid and boric acid	Copper electrogravimetric analysis by separation with selenium and bismuth
C 1020 C 1020 B C 1020 W	JIS H 2123 JIS H 3100 JIS H 3140 JIS H 3250 JIS H 3260 JIS H 3300	○	—	—
C 1100 C 1100 B C 1100 W	JIS H 2123 JIS H 3100 JIS H 3140 JIS H 3250 JIS H 3260 JIS H 3300	○	—	—
C 1201 C 1201 B C 1201 W	JIS H 2123 JIS H 3100 JIS H 3250 JIS H 3260 JIS H 3300	○	—	—
C 1220	JIS H 2123 JIS H 3100 JIS H 3300 JIS H 3320 JIS H 3330	○	—	—
C 1220 B	JIS H 3250			
C 1220 W	JIS H 3260			
C 1260	JIS H 3300	○	—	—
C 1565	JIS H 3300	○	—	—
C 1700	JIS H 3130	○	—	—
C 1720	JIS H 3130 JIS H 3270	○	—	—
C 1751	JIS H 3130	○	—	—
C 1862	JIS H 3300	—	○	—
C 1990	JIS H 3130	—	○	—
C 2051	JIS H 3100	○	○	—
C 2100	JIS H 3100	○	○	—
C 2100 W	JIS H 3260			
C 2200	JIS H 3100 JIS H 3300	○	○	—
C 2200 W	JIS H 3260			
C 2300	JIS H 3100 JIS H 3300	○	○	—
C 2300 W	JIS H 3260			

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Table 1 (continued) (3/8)

Alloy number or symbol of grade	Relevant standard (informative)	Determination method		
		Copper electrogravimetric analysis by decomposition with nitric acid and sulfuric acid	Copper electrogravimetric analysis by decomposition with nitric acid, hydrofluoric acid and boric acid	Copper electrogravimetric analysis by separation with selenium and bismuth
C 2400	JIS H 3100	○	○	—
C 2400 W	JIS H 3260			
C 2600	JIS H 3100 JIS H 3300 JIS H 3320	○	○	—
C 2600 B	JIS H 3250			
C 2600 W	JIS H 3260			
C 2680	JIS H 3100 JIS H 3320	○	○	—
C 2700	JIS H 3300	○	○	—
C 2700 B	JIS H 3250			
C 2700 W	JIS H 3260			
C 2720	JIS H 3100	○	○	—
C 2720 W	JIS H 3260			
C 2800	JIS H 3300	○	○	—
C 2800 B	JIS H 3250			
C 2800 W	JIS H 3260			
C 2801	JIS H 3100	○	○	—
C 3501 W	JIS H 3260	—	○	—
C 3531 B	JIS H 3250	—	○	—
C 3601 B	JIS H 3250	—	○	—
C 3601 W	JIS H 3260			
C 3602 B	JIS H 3250	—	○	—
C 3602 W	JIS H 3260			
C 3603 B	JIS H 3250	—	○	—
C 3603 W	JIS H 3260			
C 3604 B	JIS H 3250	—	○	—
C 3604 W	JIS H 3260			
C 3605 B	JIS H 3250	—	○	—
C 3710	JIS H 3100	—	○	—
C 3712 B	JIS H 3250	—	○	—
C 3713	JIS H 3100	—	○	—
C 3771 B	JIS H 3250	—	○	—
C 4250	JIS H 3100	—	○	—
C 4430	JIS H 3300 JIS H 3320	—	○	—
C 4450	JIS H 3100 JIS H 3320	—	○	—
C 4621	JIS H 3100	—	○	—
C 4622 B	JIS H 3250	—	○	—
C 4640	JIS H 3100	—	○	—

Table 1 (continued) (4/8)

Alloy number or symbol of grade	Relevant standard (informative)	Determination method		
		Copper electrogravimetric analysis by decomposition with nitric acid and sulfuric acid	Copper electrogravimetric analysis by decomposition with nitric acid, hydrofluoric acid and boric acid	Copper electrogravimetric analysis by separation with selenium and bismuth
C 4641 B	JIS H 3250	—	○	—
C 5010	JIS H 3300	—	○	—
C 5015	JIS H 3300	—	○	—
C 5050	JIS H 3110	—	○	—
C 5071	JIS H 3110 JIS H 3270	—	○	—
C 5102	JIS H 3110 JIS H 3270	—	○	—
C 5111	JIS H 3110 JIS H 3270	—	○	—
C 5191	JIS H 3110 JIS H 3270	—	○	—
C 5210	JIS H 3130	—	○	—
C 5212	JIS H 3110 JIS H 3270	—	○	—
C 5240	JIS H 3130	—	○	—
C 5341	JIS H 3270	—	○	—
C 5441	JIS H 3270	—	○	—
C 6140	JIS H 3100	○	○	—
C 6161	JIS H 3100	○	○	—
C 6161 B	JIS H 3250			
C 6191 B	JIS H 3250	○	○	—
C 6241 B	JIS H 3250	○	○	—
C 6280	JIS H 3100	○	○	—
C 6782 B	JIS H 3250	—	○	—
C 6783 B	JIS H 3250	—	○	—
C 6801 B	JIS H 3250	—	—	○
C 6802 B	JIS H 3250	—	—	○
C 6803 B	JIS H 3250	—	—	○
C 6804 B	JIS H 3250	—	—	○
C 6810 B	JIS H 3250	—	○	—
C 6820 B	JIS H 3250	—	○	—
C 6870	JIS H 3300	—	○	—
C 6871	JIS H 3300	—	○	—
C 6872	JIS H 3300	—	○	—
C 6931 B	JIS H 3250	—	○	—
C 6932 B	JIS H 3250	—	○	—
C 7060	JIS H 3100 JIS H 3300 JIS H 3320	○	○	—
C 7100	JIS H 3300	○	○	—