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**YS**

**NON-FERROUS METALS INDUSTRY STANDARD OF  
THE PEOPLE'S REPUBLIC OF CHINA**

**中华人民共和国有色金属行业标准**

YS/T 347-2004

Replace YS/T 347-1994

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**Copper and copper alloys—Estimation of  
average grain size**

**铜及铜合金 平均晶粒度测定方法**

**Issued on June 17, 2004**

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## Foreword

This Standard is amendment of YS/T 347 -1994 *estimation of grain size of single-phase copper alloys*.

This Standard adopts international standard ISO 2624:1990 and American Standard ASTM E 112:1996 without equivalence.

Comparing with former version, the main amendments are the followings:

—The Standard name is amended.

—Increase grain size expression way “level” so as to get the same grain size expression as other materials.

—“Nominal diameter” is taken as the value of average diameter of grain, which is the same as international standard.

—The comparison method increases pictures of partial grain size level, making grading more detailed.

This Standard replace YS/T 347—1994.

Annex A of this Standard are Normative.

This Standard was proposed by and shall be under the jurisdiction of China Nonferrous Metals Standardization Technical Committee.

This Standard is drafted by Zhejiang Bada Copper Industry Co. Ltd.

Main drafters of this standard: Zhang Zhiqiang, Dong Fuwei, Lu Junpan, Mei Hengxing, Zhang Jinhua and Wang Tingfang.

This Standard is interpreted by the China Nonferrous Metals Standardization Technical Committee.

The historical version replaced by this Standard is as follows:

—YB 797—1971;

—YS/T 347—1994.

# Copper and copper alloys—Estimation 01 average grain size

## 1 Scope

This standard rules detailed ways to estimate grain size of copper and copper alloys by comparison method, area-method and intercept method. Generally, comparison method can be used in measuring. When there is objection, intercept method will be used as arbitration method. This standard is applicable to estimating grain size of single-phase or single phase-based copper and copper alloys which are in annealed condition.

## 2 Normative references

The articles contained in the following documents have become this document when they are quoted herein. For the dated documents so quoted, all subsequent modifications (Including all corrections) or revisions made thereafter do not apply to this standard. However, the parties that reach an agreement according to this standard are encouraged to study whether the latest versions of these documents may be used. For the undated documents so quoted, the latest versions (including all modification sheets) apply to this document.

YS/T 449 Copper and copper alloys inspection method of microstructure for cast and wrought products

## 3 Definition and symbol

### 3.1

#### 晶粒度 grain size

It is the unit to estimate the grain size of basal body. Generally, “nominal diameter ( $d_n$ )” is used to express “average grain diameter” of copper and copper alloys grain size.

### 3.2

#### 晶粒级别指数 G grain degree class index number

Under 100 times of amplification factor, the relation between n (the number of grains contained in area of 645. 16 mm<sup>2</sup>) and G is as the formula (1):

$$n = 2^{G-1} \dots\dots\dots ( 1 )$$

Note: G value can be found out in table 3.

### 3.3

#### Alphabetic symbol

Refer alphabetic symbol collection used in this standard to table 1.

**Table 1**

Symbol	Name and description	Unit
G	Grading index of grain	
n	Number of grains contained in 645. 16 mm <sup>2</sup> of measuring area	
n <sub>g</sub>	Number of grains contained in 5,000 mm <sup>2</sup> of measuring area	
n <sub>1</sub>	Number of grains in measuring circle	

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