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

GB/T 3488.1-2024

Replacing GB/T 3488.1-2014

**Hardmetals - Metallographic determination of microstructure -
Part 1: Photomicrographs and description
(English Translation)**

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is Part 1 of GB/T 3488 Metallographic Determination of Microstructure of Cemented Carbide.

Lower part.

--- Part 1: Metallographic photographs and description;

--- Part 2: Measurement of WC grain size;

--- Part 3: Metallographic determination of the microstructure of Ti(C,N) and WC cubic carbide based cemented carbides;

--- Part 4: Metallographic determination of porosity, uncombined carbon defects and decarburization.

This document replaces GB/T 3488.1-2014 "Metallographic determination of microstructure of cemented carbide - Part 1: Metallographic photographs and tracings" Compared with GB/T 3488.1-2014, in addition to structural adjustments and editorial changes, the main technical changes are as follows.

a) Added the instrument and equipment "Electron Backscatter Diffractometer (EBSD)" (see Chapter 4);

b) The reference to ISO 3878:1983 has been deleted (see 6.1.4.1 of the 2014 edition).

This document is equivalent to ISO 4499-1:2020 "Metallographic determination of the microstructure of cemented carbides - Part 1: Metallographic photographs and tracings"

"Statement".

Introduction

Metallographic determination of cemented carbide microstructure is one of the key indicators to judge the internal quality of cemented carbide.

In 1983, my country adopted ISO 4499:1978 "Metallographic determination of microstructure of cemented carbide" and formulated GB/T 3488-

1983 Metallographic Determination of Cemented Carbide Microstructure. With the continuous development of my country's cemented carbide industry, the metallographic determination of cemented carbide microstructure has been studied.

In 2014, according to the new changes and new requirements of relevant standards at home and abroad, my country adopted ISO 4499-1:2008 "Metallographic determination of cemented carbide microstructure Part 1: Metallographic photographs and description", formulated GB/T 3488.1-2014 Metallographic determination of cemented carbide microstructure - Part 1: Metallographic photographs and description. In 2018, my country adopted ISO 4499-2.

2008 "Metallographic determination of cemented carbide microstructure Part 2: Measurement of WC grain size", formulated GB/T 3488.2-2018 Metallographic determination of cemented carbide microstructure Part 2: Measurement of WC grain size.

ISO 4499-3:2016 Metallographic determination of the microstructure of cemented carbides Part 3: Ti(C,N) and WC cubic carbide-based cemented carbides Metallographic determination of the microstructure of cemented carbide Part 3: Metallographic determination of the microstructure of cemented carbide Metallographic determination of the microstructure of (C, N) and WC cubic carbide-based cemented carbides. In 2022, my country will adopt ISO 4499-4:2016.

The Metallographic Determination of Cemented Carbide Microstructure Part 4: Metallographic Determination of Porosity, Uncombined Carbon Defects and Decarburization Phases was established.

GB/T 3488.4-2022 Metallographic determination of microstructure of cemented carbide Part 4: Porosity, uncombined carbon defects and decarburization phase Metallographic Determination.

GB/T 3488 Metallographic Determination of Microstructure of Cemented Carbide consists of four parts.

--- Part 1: Metallographic photographs and descriptions, the purpose is to standardize the metallographic sample preparation and corrosion methods of cemented carbide, is cemented carbide Basic operating standards for metallographic structure measurement and

judgment;

--- Part 2: Measurement of WC grain size, the purpose is to standardize the measurement method of cemented carbide WC grain and size, the method is recommended to use the intercept method is used and the WC grain size level is defined. The standard unifies the industry's cemented carbide grain size method;

--- Part 3: Metallographic determination of the microstructure of Ti(C,N) and WC cubic carbide-based cemented carbides, with the aim of standardizing the carbonitriding Method for measuring the size of hard phase and binder phase in titanium cemented carbide and cemented carbide containing cubic carbide. The recommended method is the intercept method.

The measurement of cemented carbide structure size is a supplement to the measurement of cemented carbide structure size.

--- Part 4: Metallographic determination of porosity, uncombined carbon defects and decarburized phases. The purpose is to standardize the metallographic porosity and the method for determining the decarburized phase and detailed regulations for reporting grades were made, unifying the detection standards for porosity and carbon-deficient phases within the industry.

This document specifies the method of measuring the microstructure of cemented carbide using metallographic photographs, clarifies the instruments and equipment required for the measurement, and describes in detail the Understand the specific steps of metallographic sample preparation, including cutting, mounting, rough grinding, fine grinding, polishing, cleaning, etching, etc., and provide different grain grades of light the microscope and scanning electron microscope photos fully reflect the current detection technology level of various domestic production enterprises, which is convenient for production and suitable for application.

Metallographic determination of cemented carbide microstructure Part 1: Metallographic photographs and descriptions

1 Scope

This document specifies the method for determining the microstructure of cemented carbides using metallographic photographs.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version

(including all amendments) applies to this document.

ISO 4499-2 Metallographic determination of the microstructure of cemented carbides - Part 2: Determination of WC grain size Note. GB/T 3488.2-2018 Metallographic determination of microstructure of cemented carbide Part 2: Measurement of WC grain size (ISO 4499-2. 2008, IDT)

3 Terms and Definitions

The following terms and definitions apply to this document.

alpha-phase

Tungsten carbide.

beta-phase

Adhesive phase (e.g. based on Co, Fe, Ni).

gamma-phase

Carbides with a cubic lattice (such as TiC, TaC) can contain other carbides (such as WC) in the form of solid solution.

4 Instruments and Equipment

4.1

Metallographic microscope. Magnification up to 1500 times.

4.2

Scanning electron microscope. Magnification greater than 1500 times.

4.3

Electron backscatter diffractometer (EBSD).

4.4

Equipment for preparing test specimens.

5 Preparation of sample sections

The cross section of the sample used for metallographic examination should be free of grinding marks and polishing scratches, and care should be taken to avoid particle peeling to avoid damage to the microstructure.