
Irish Standard
I.S. EN ISO 4499-3:2016

# Hardmetals - Metallographic determination of microstructure - Part 3: Measurement of microstructural features in Ti (C, N) and WC/cubic carbide based hardmetals (ISO 4499-3:2016)

**I.S. EN ISO 4499-3:2016**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

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## National Foreword

I.S. EN ISO 4499-3:2016 is the adopted Irish version of the European Document EN ISO 4499-3:2016, Hardmetals - Metallographic determination of microstructure - Part 3: Measurement of microstructural features in Ti (C, N) and WC/cubic carbide based hardmetals (ISO 4499-3:2016)

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN ISO 4499-3

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English Version

# Hardmetals - Metallographic determination of microstructure - Part 3: Measurement of microstructural features in Ti (C, N) and WC/cubic carbide based hardmetals (ISO 4499-3:2016)

Métaux-durs - Détermination métallographique de la microstructure - Partie 3: Mesure des caractéristiques des microstructures des métaux-durs à base de carbures Ti (C, N) et WC/cubiques (ISO 4499-3:2016)

Hartmetalle - Metallographische Bestimmung der Mikrostruktur - Teil 3: Messung von mikrostrukturellen Merkmalen in Hartmetallen auf Basis von Ti (C, N) und WC/kubischem Carbid (ISO 4499-3:2016)

This European Standard was approved by CEN on 4 February 2016.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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## European foreword

This document (EN ISO 4499-3:2016) has been prepared by Technical Committee ISO/TC 119 "Powder metallurgy".

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2016, and conflicting national standards shall be withdrawn at the latest by September 2016.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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## Endorsement notice

The text of ISO 4499-3:2016 has been approved by CEN as EN ISO 4499-3:2016 without any modification.

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I.S. EN ISO 4499-3:2016

INTERNATIONAL STANDARD

**ISO 4499-3**

First edition
2016-02-15

# Hardmetals — Metallographic determination of microstructure —

## Part 3: Measurement of microstructural features in Ti (C, N) and WC/cubic carbide based hardmetals

*Métaux-durs — Détermination métallographique de la microstructure —*

*Partie 3: Mesure des caractéristiques des microstructures des métaux-durs à base de carbures Ti (C, N) et WC/cubiques*

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# Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information.

The committee responsible for this document is ISO/TC 119, *Powder metallurgy*, Subcommittee SC 4, *Sampling and testing methods for hardmetals*.

ISO 4499 consists of the following parts, under the general title *Hardmetals — Metallographic determination of microstructure*:

— *Part 1: Photomicrographs and description*

— *Part 2: Measurement of WC grain size*

— *Part 3: Measurement of microstructural features in Ti(C,N) and WC/cubic carbide based hardmetals*

— *Part 4: Characterisation of porosity, carbon defects and eta-phase content*

# Introduction

This part of ISO 4499 essentially covers the following topics:

— materials types and phases to be measured including the following:

  — Ti(C, N) cermets;

  — WC/Cubic carbide hardmetals;

— preparation methods to highlight differences between conventional WC/Co hardmetals and materials containing cubic phases;

— linear analysis techniques to acquire sufficient statistically meaningful data for phase quantification;

— analysis method to calculate representative average values;

— reporting to comply with modern quality requirements.

# Hardmetals — Metallographic determination of microstructure —

# Part 3: Measurement of microstructural features in Ti (C, N) and WC/cubic carbide based hardmetals

## 1 Scope

This part of ISO 4499 gives guidelines for the measurement of microstructural features in Ti(C,N) based hardmetals and WC/Co hardmetals that contain additional cubic carbides by metallographic techniques only using optical or electron microscopy. It is intended for sintered hardmetals (also called cemented carbides or cermets) containing primarily inorganic carbides and nitrides as the hard phase. It is also intended for measuring the phase size and distribution by the linear intercept technique.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4499–1:2008, *Hardmetals — Metallographic determination of microstructure — Part 1: Photomicrographs and description*

ISO 4499–2:2008, *Hardmetals — Metallographic determination of microstructure — Part 2: Measurement of WC grain size*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

**3.1**
**nano**
with carbonitride or cubic carbide phase size <0,2 µm, respectively

Note 1 to entry: Measured by the mean-linear-intercept method described in ISO 4499-2.

**3.2**
**ultrafine**
with carbonitride or cubic carbide phase size 0,2 µm to 0,5 µm, respectively

Note 1 to entry: Measured by the mean-linear-intercept method described in ISO 4499-2.

**3.3**
**submicron**
with carbonitride or cubic carbide phase size 0,5 µm to 0,8 µm, respectively

Note 1 to entry: Measured by the mean-linear-intercept method described in ISO 4499-2.