

**Hardmetals - Metallographic determination of
microstructure - Part 1: Photomicrographs and
description**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN ISO 4499-1:2010 sisaldab Euroopa standardi EN ISO 4499-1:2010 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 31.08.2010 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 12.05.2010.

Standard on kättesaadav Eesti standardiorganisatsioonist.

This Estonian standard EVS-EN ISO 4499-1:2010 consists of the English text of the European standard EN ISO 4499-1:2010.

This standard is ratified with the order of Estonian Centre for Standardisation dated 31.08.2010 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.

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English Version

**Hardmetals - Metallographic determination of microstructure -
Part 1: Photomicrographs and description (ISO 4499-1:2008)**

Métaux-durs - Détermination métallographique de la
microstructure - Partie 1: Prises de vue
photomicrographiques et description (ISO 4499-1:2008)

Hartmetalle - Metallographische Bestimmung der
Mikrostruktur - Teil 1: Gefügebilder und Beschreibung (ISO
4499-1:2008)

This European Standard was approved by CEN on 30 April 2010.

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Foreword

The text of ISO 4499-1:2008 has been prepared by Technical Committee ISO/TC 119 "Powder metallurgy" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 4499-1:2010.

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of an identical text or by endorsement, at the latest by November 2010, and conflicting national standards shall be withdrawn at the latest by November 2010.

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.

This document supersedes EN 24499:1993.

ISO 4499-1, together with ISO 4499-2, cancels and replaces ISO 4499:1978, which has been technically revised.

In ISO 4499-2, a new section has been added for the quantitative measurement of the WC grain size of hardmetals. ISO 4499-3 and ISO 4499-4 are additional parts that will deal with the microstructures of hardmetals containing cubic carbides and Ti (C, N)-based hardmetals, and miscellaneous microstructural features, such as defects and non-stoichiometric phases (e.g. carbon and eta-phase). ISO 4499-3 and ISO 4499-4 are currently in development.

In standard WC/Co hardmetals the density is generally controlled so that only two phases WC and Co are present. The Co phase is an alloy and contains some W and C in solid solution. The WC phase is stoichiometric. If the composition is either high or low in total carbon content then it is possible to see a third phase in the structure. For a high C content this is graphite; for a low C content it is eta phase (η), typically an M_6C or $M_{12}C$ carbide where M is (CoW). Metallographic determination of these phases will be outlined in ISO 4499-3.

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*

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of ISO 4499-1:2008 has been approved by CEN as a EN ISO 4499-1:2010 without any modification.

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Hardmetals — Metallographic determination of microstructure —

Part 1: Photomicrographs and description

1 Scope

This part of ISO 4499 specifies the methods of metallographic determination of the microstructure of hardmetals using photomicrographs.

2 Normative references

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

ISO 3878:1983, *Hardmetals — Vickers hardness test*

ISO 4499-2, *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

α -phase

tungsten carbide

3.2

β -phase

binder phase (for example, based on Co, Ni, Fe)

3.3

γ -phase

carbide having a cubic lattice (for example, TiC, TaC) which may contain other carbides (for example WC) in solid solution

4 Apparatus

4.1 Metallographic microscope, permitting observations at magnifications up to 1 500 \times .

4.2 Scanning electron microscope for magnification over 1 500 \times .

4.3 Equipment for preparation of testpiece sections.