



# SLOVENSKI STANDARD SIST EN ISO 4516:2003

01-december-2003

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## Kovinske in druge anorganske prevleke - Preskusi mikrotrdote po Vickersu in Knoopu (ISO 4516:2002)

Metallic and other inorganic coatings - Vickers and Knoop microhardness tests (ISO 4516:2002)

Metallische und andere anorganische Überzüge - Mikrohärteprüfungen nach Vickers und Knoop (ISO 4516:2002)

Revetements métalliques et autres revêtements inorganiques - Essais de microdureté Vickers et Knoop (ISO 4516:2002)

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Kovinske prevleke

Metallic coatings

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN ISO 4516**

June 2002

ICS 25.220.40

English version

**Metallic and other inorganic coatings - Vickers and Knoop  
microhardness tests (ISO 4516:2002)**

Revêtements métalliques et autres revêtements  
inorganiques - Essais de microdureté Vickers et Knoop  
(ISO 4516:2002)

Metallische und andere anorganische Überzüge -  
Mikrohärteprüfungen nach Vickers und Knoop (ISO  
4516:2002)

This European Standard was approved by CEN on 8 June 2002.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

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 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

**Management Centre: rue de Stassart, 36 B-1050 Brussels**

EN ISO 4516:2002 (E)

<b>CORRECTED 2002-07-31</b>
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## Foreword

This document (ISO 4516:2002) has been prepared by Technical Committee ISO/TC 107 "Metallic and other inorganic coatings" in collaboration with Technical Committee CEN/TC 262 "Metallic and other inorganic coatings", the secretariat of which is held by BSI.

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 December 2002, and conflicting national standards shall be withdrawn at the latest by December 2002.

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

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**Endorsement notice**

The text of the International Standard ISO 4516:2002 has been approved by CEN as a European Standard without any modifications.

NOTE Normative references to International Standards are listed in annex ZA (normative).

## Annex ZA (normative)

### Normative references to international publications with their relevant European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE Where an International Publication has been modified by common modifications, indicated by (mod.), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN</u>	<u>Year</u>
ISO 1463	1982	Metallic and oxide coatings — Measurement of coating thickness — Microscopical method	EN ISO 1463	1994
ISO 6507-1	1997	Metallic materials — Vickers hardness test — Part 1: Test method	EN ISO 6507-1	1997

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# INTERNATIONAL STANDARD

**ISO**  
**4516**

Second edition  
2002-06-15

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## **Metallic and other inorganic coatings — Vickers and Knoop microhardness tests**

*Revêtements métalliques et autres revêtements inorganiques — Essais de  
microdureté Vickers et Knoop*

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**ISO 4516:2002(E)****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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 4516 was prepared by Technical Committee ISO/TC 107, *Metallic and other inorganic coatings*, Subcommittee SC 2, *Test methods*.

This second edition cancels and replaces the first edition (ISO 4516:1980), which has been technically revised.

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# Metallic and other inorganic coatings — Vickers and Knoop microhardness tests

## 1 Scope

This International Standard describes the application of the Vickers and Knoop micro-indentation tests for determining the microhardness of metallic and other inorganic coatings. This method is applicable where indenter forces generally need to be below 10 N such as for electrodeposited coatings, autocatalytic coatings, sprayed coatings and anodic coatings on aluminium. It is applicable to measurements normal to the coated surface as described in 7.4 and to measurements on cross-sections as described in 7.3.

NOTE 1 Attention is drawn to ISO 4545, ISO 6507-1, ISO 6507-2 and ISO 6507-3, which describe Knoop and Vickers hardness testing of metallic materials. Other International Standards for instrumental indentation testing, the verification of microindentation testing instruments and for the verification of reference blocks to be used with such instruments are currently being developed (e.g. ISO 14577 Parts 1 to 4).

NOTE 2 Usually for hardness measurements of coating test forces in the microhardness range in accordance with ISO 6507-1 are used. However since the largest possible test force should be selected, test forces of the low force and hardness ranges may also be used.

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## 2 Normative references

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The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 1463, *Metallic and oxide coatings — Measurement of coating thickness — Microscopical method*

ISO 6507-1, *Metallic materials — Vickers hardness test — Part 1: Test method*

ISO 9002, *Quality systems — Model for quality assurance in production, installation and servicing*

## 3 Principle

A testing instrument slowly lowers an indenter vertically on to the test surface and holds it there for a specified time under a specified load (see 6.2). The tolerance of the applied test force is within 1 % of that specified.

An indenter is forced into the coating and the diagonal(s) of the indentation left in the surface after removal of the indenter is measured using a microscope. The indenter is applied such that the resultant indentation does not contain artefacts of the loading apparatus or procedure but rather is characteristic of the coating.

A number, known as the Vickers or Knoop hardness number, is derived from this measurement using the symbols and designations given in clause 4.