

**Teraspindade ettevalmistamine enne värvide ja nendega seotud materjalide pealekandmist. Pritspuhastatud teraspinna kareduse iseloomustus. Osa 3: ISO pinnaprofiilikomparaatorite kalibreerimise ja pinnaprofiili määramise meetod. Fookustava mikroskoobi meetod**

Preparation of steel substrates before application of paints and related products - Surface roughness characteristics of blast-cleaned steel substrates - Part 3: Method for the calibration of ISO surface profile comparators and for the determination of surface profile - Focusing microscope procedure

**EESTI STANDARDI EESSÕNA****NATIONAL FOREWORD**

Käesolev Eesti standard EVS-EN ISO 8503-3:1999 sisaldab Euroopa standardi EN ISO 8503-3:1995 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 12.12.1999 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 19.05.2010.

Standard on kättesaadav Eesti standardiorganisatsioonist.

This Estonian standard EVS-EN ISO 8503-3:1999 consists of the English text of the European standard EN ISO 8503-3:1995.

This standard is ratified with the order of Estonian Centre for Standardisation dated 12.12.1999 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.

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**ICS 25.220.10**

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Descriptors: Coating, surface roughness parameters, steel, surface profile comparators.

English version

Preparation of steel substrates before application of paints and related products  
**Surface roughness characteristics of blast-cleaned  
steel substrates**

Part 3: Method for the calibration of ISO surface profile comparators and  
for the determination of surface profile; focusing microscope procedure  
(ISO 8503-3:1988)

Préparation des subjectiles d'acier avant  
appliacion de peintures et de produits  
assimilés; caractéristiques de rugosité  
des subjectiles d'acier décapés. Partie 3:  
Méthode pour étalonner les échantillons  
de comparaison viso-tactile ISO et pour  
caractériser un profil de surface; utilisation  
d'un microscope optique  
(ISO 8503-3:1988)

Vorbereitung von Stahloberflächen vor  
dem Auftragen von Beschichtungsstoffen;  
Rauheitskenngrößen von gestrahlten  
Stahloberflächen. Teil 3: Verfahren zur  
Kalibrierung von ISO-Rauheitsvergleichs-  
mustern und zur Bestimmung der  
Rauheit; Mikroskopverfahren  
(ISO 8503-3:1988)

This European Standard was approved by CEN on 1995-03-14 and is identical to the ISO Standard as referred to.

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**CEN**

European Committee for Standardization  
Comité Européen de Normalisation  
Europäisches Komitee für Normung

**Central Secretariat: rue de Stassart 36, B-1050 Brussels**

## Foreword

International Standard

ISO 8503-3:1988 Preparation of steel substrates before application of paints and related products; surface roughness characteristics of blast-cleaned steel substrates; method for the calibration of ISO surface profile comparators and for the determination of surface profile; focusing microscope procedure,

which was prepared by ISO/TC 35 'Paints and varnishes' of the International Organization for Standardization, has been adopted by Technical Committee CEN/TC 139 'Paints and varnishes' as a European Standard.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, and conflicting national standards withdrawn, by November 1995 at the latest.

In accordance with the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard:

Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

## Endorsement notice

The text of the International Standard ISO 8503-3:1988 was approved by CEN as a European Standard without any modification.

NOTE: Normative references to international publications are listed in Annex ZA (normative).

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## 0 Introduction

The performance of protective coatings of paint and related products applied to steel is significantly affected by the state of the steel surface immediately prior to painting. The principal factors that are known to influence this performance are

- a) the presence of rust and mill scale;
- b) the presence of surface contaminants, including salts, dust, oils and greases;
- c) the surface profile.

International Standards ISO 8501, ISO 8502 and ISO 8503 have been prepared to provide methods of assessing these factors, while ISO 8504 provides guidance on the preparation methods that are available for cleaning steel substrates, indicating the capabilities of each in attaining specified levels of cleanliness.

These International Standards do not contain recommendations for the protective coating systems to be applied to the steel surface. Neither do they contain recommendations for the surface quality requirements for specific situations even though surface quality can have a direct influence on the choice of protective coating to be applied and on its performance. Such recommendations are found in other documents such as national standards and codes of practice. It will be necessary for the users of these International Standards to ensure that the qualities specified are

- compatible and appropriate both for the environmental conditions to which the steel will be exposed and for the protective coating system to be used;
- within the capability of the cleaning procedure specified.

The four International Standards referred to above deal with the following aspects of preparation of steel substrates :

ISO 8501 — *Visual assessment of surface cleanliness*;

ISO 8502 — *Tests for the assessment of surface cleanliness*;

ISO 8503 — *Surface roughness characteristics of blast-cleaned steel substrates*;

ISO 8504 — *Surface preparation methods*.

Each of these International Standards is in turn divided into separate parts.

The optical microscope is one of the most widely used instruments for measuring surface profile. The method can be used by any laboratory equipped with a good microscope that has a calibrated focusing mechanism meeting the requirements of 5.1. This procedure may also be used to determine the profile of a substrate after abrasive blast-cleaning either directly or from a replica.

This method is based on that developed in the USA by the Steel Structures Painting Council. It entails averaging a series of maximum peak-to-valley measurements obtained by focusing a specified microscope — first on the highest peak and then on the lowest valley in the same field of view, noting the distance of movement of the stage (or objective).

This method has the disadvantage of requiring a series of tedious measurements, but good precision and agreement between laboratories and between operators can be obtained by specifying closely the field of view and depth of field of the microscope. To avoid a widespread divergence in measuring profile within and between laboratories, this method requires a significant number of measurements as well as correct calibration, proper focus movement, standardized depth of field and field diameter of the microscope necessary to measure properly both coarse and fine profiles under a single set of conditions.

ISO 8503-4 describes the procedure using a stylus instrument. ISO 8503-1 specifies the requirements for ISO surface profile comparators and ISO 8503-2 describes their use. The many abrasive blast-cleaning procedures in common use are described in ISO 8504-2.

## 1 Scope and field of application

**1.1** This part of ISO 8503 specifies the focusing microscope and describes the procedure for calibrating ISO surface profile comparators complying with the requirements of ISO 8503-1.

**1.2** This part of ISO 8503 is also applicable to the determination of the surface profile, within the range  $\bar{h}_v = 20$  to  $200\ \mu\text{m}$ , of essentially planar blast-cleaned steel. The determination may be carried out on a representative section of the blast-cleaned substrate or, if direct observation of the surface is not feasible, on a replica of the surface (see annex E).

NOTE — Where appropriate, this procedure may be used for assessing the roughness profile of other abrasive blast-cleaned substrates.

An alternative procedure is described in ISO 8503-4.

## 2 References

ISO 4618, *Paints and varnishes — Vocabulary*.

ISO 8503, *Preparation of steel substrates before application of paints and related products — Surface roughness characteristics of blast-cleaned steel substrates*

— Part 1 : *Specifications and definitions for ISO surface profile comparators for the assessment of abrasive blast-cleaned surfaces.*

— Part 2 : *Method for the grading of surface profile of abrasive blast-cleaned steel — Comparator procedure.*

— Part 4 : *Method for the calibration of ISO surface profile comparators and for the determination of surface profile — Stylus instrument procedure.*

ISO 8504-2, *Preparation of steel substrates before application of paints and related products — Surface preparation methods — Part 2 : Abrasive blast-cleaning.*<sup>1)</sup>

## 3 Definitions

For the purpose of this part of ISO 8503, the definitions given in ISO 4618 and ISO 8503-1 apply.

## 4 Principle

Observation of the test surface over a specified field of view using a specified microscope. Adjustment of the microscope, by movement of the objective (or the stage), to focus on the highest peak within the field of view. Determination of the distance  $h_v$  moved by the objective (or the stage) in order to focus on the lowest valley within the same field of view.

Repetition of the procedure to obtain values for a further 19 different fields of view and calculation of the arithmetic mean of the distance  $h_v$  between the highest peak and lowest valley in each field of view as the mean maximum peak-to-valley height  $\bar{h}_v$ .

## 5 Apparatus

**5.1 Optical microscope**, having a fine focus adjustment with little or no backlash (play) (see clause A.5 in annex A). The adjustment shall give fine control of the movement of the objective or stage and shall be fitted with a graduated vernier scale having a scale value of not more than  $1\ \mu\text{m}$ . The microscope shall have an objective lens with a numerical aperture of not less than 0,5 together with an eyepiece lens to give a field of view greater than 0,5 mm in diameter. The field of view may be reduced by the use of a circular eyepiece reticle or by a stop in the lamphouse.

NOTE — Advice concerning the use of the microscope is given in annexes A and D. Annex A describes a procedure for determining the microscope backlash. Annex D explains the significance of the defined variables for the microscope. (See also the note to 5.2.)

**5.2 Light source**, fitted to the microscope (5.1) to illuminate the test surface perpendicular to its plane. Light filters may be used to minimize glare.

NOTE — These requirements for the apparatus (5.1 and 5.2) are generally met by microscopes for metallurgical purposes.

## 6 Test surfaces

### 6.1 ISO surface profile comparator

Visually check that each segment of the ISO surface profile comparator (see ISO 8503-1) that is to be calibrated is undamaged. Lightly clean the surface with a dry, fine bristle brush to remove any particles of dust and then, using a similar brush, wash the surface with petroleum spirit, 40/60 (commercial grade), to remove oil and grease residues. Allow to dry before carrying out the calibration.

Calibrate each segment of the comparator as described in clause 7.

### 6.2 Blast-cleaned steel substrates/replica

Visually check that the surface that is to be measured is undamaged. Lightly clean the surface with a dry, fine bristle brush to remove any particles of dust and then, using a similar brush, wash the surface with petroleum spirit, 40/60 (commercial grade), to remove oil and grease residues. Allow to dry before carrying out the procedure.

Determine the surface profile as described in clause 7.

NOTE — If a replica (see annex E) is to be measured, clean it only with a dry brush.

## 7 Procedure for measurement of maximum peak-to-valley height $h_v$

**7.1** Locate the test surface (clause 6) under the objective of the microscope (5.1) so that the measurements are taken on a test area not less than 5 mm from any edge. Adjust the light

1) At present at the stage of draft.