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**BS EN ISO 8503-3:2012**



BSI Standards Publication

# **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

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This British Standard is the UK implementation of . It supersedes BS EN ISO 8503-3:1995 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee STI/21, Surface preparation of steel.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Préparation des subjectiles d'acier avant application de peintures et de produits assimilés - Caractéristiques de rugosité des subjectiles d'acier décapés - Partie 3: Méthode d'étalonnage des comparateurs viso-tactiles ISO et de classification d'un profil de surface - Utilisation d'un microscope optique (ISO 8503-3:2012)

Vorbereitung von Stahloberflächen vor dem Auftragen von Beschichtungsstoffen - Rauheitskenngrößen von gestrahlten Stahloberflächen - Teil 3: Verfahren zur Kalibrierung von ISO-Rauheitsvergleichsmustern und zur Bestimmung der Rauheit - Mikroskopverfahren (ISO 8503-3:2012)

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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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## Foreword

This document (EN ISO 8503-3:2012) has been prepared by Technical Committee ISO/TC 35 "Paints and varnishes" in collaboration with Technical Committee CEN/TC 139 "Paints and varnishes" the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by August 2012, and conflicting national standards shall be withdrawn at the latest by August 2012.

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 ISO 8503-3:1995.

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, Turkey and the United Kingdom.

### Endorsement notice

The text of ISO 8503-3:2012 has been approved by CEN as a EN ISO 8503-3:2012 without any modification.

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 8503-3 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 12, *Preparation of steel substrates before application of paints and related products*.

This second edition cancels and replaces the first edition (ISO 8503-3:1988), which has been editorially updated.

ISO 8503 consists of the following parts, under the general title *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 3: Method for the calibration of ISO surface profile comparators and for the determination of surface profile — Focusing microscope procedure*
- *Part 4: Method for the calibration of ISO surface profile comparators and for the determination of surface profile — Stylus instrument procedure*
- *Part 5: Replica tape method for the determination of the surface profile*

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## 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 (all parts), ISO 8502 (all parts) and ISO 8503 (all parts) have been prepared to provide methods of assessing these factors, while ISO 8504 (all parts) provides guidance on the preparation methods which are available for cleaning steel substrates, indicating the capabilities of each in attaining specified levels of cleanliness.

These International Standards do not contain provisions for the protective coating systems to be applied to the steel surface, nor for the surface quality provisions 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 provisions are found in other documents, such as national standards and codes of practice.

It is 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 is 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.

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 which has a calibrated focusing mechanism meeting the requirements of 5.1. This procedure can 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 (now the Society for Protective Coatings). 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 lens).

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.

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# 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

## 1 Scope

This part of ISO 8503 specifies the optical microscope and describes the procedure for calibrating ISO surface profile comparators conforming to the requirements of ISO 8503-1.

This part of ISO 8503 is also applicable to the determination of the surface profile, within the range  $\overline{h}_y = 20 \mu\text{m}$  to  $200 \mu\text{m}$ , of essentially planar blast-cleaned steel. The determination can 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 can be used for assessing the roughness profile of other abrasive blast-cleaned substrates.

An alternative procedure is described in ISO 8503-4.

## 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 8503-1, *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*

## 3 Terms and definitions

For the purposes of this document, the definitions given in ISO 8503-1 apply.

## 4 Principle

The test surface is observed over a specified field of view using a specified microscope. The microscope is adjusted, by movement of the objective lens (or the stage), to focus on the highest peak within the field of view. The distance,  $h_y$ , moved by the objective lens (or the stage) in order to focus on the lowest valley within the same field of view is determined.

The procedure is repeated to obtain values for a further 19 different fields of view, and calculation, of the arithmetic mean of the distance,  $h_y$ , between the highest peak and lowest valley in each field of view, as the mean maximum peak-to-valley height,  $\overline{h}_y$ , is performed.