



Handläggande organ	Fastställt	Utgåva	Sida
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## Preparation of steel substrates before application of paints and related products – Surface preparation methods - Part 2: Abrasive blast-cleaning

The International Standard ISO 8504-2:2000 has the status of a Swedish Standard. This document contains the official English version of ISO 8504-2:2000.

This standard replaces the Swedish Standard SS-ISO 8504-2, edition 1.

This part of ISO 8504 is one of two parts giving methods for the preparation of steel surfaces before coating. This part should be used together with ISO 8504-1. Otherwise, it might be difficult to choose the most appropriate preparation method and/or preparation grade for the purpose.

Part 2 (this standard) presents several methods for abrasive blast-cleaning. It deals with the selection of abrasive, describes two distinct types of blast-cleaning including some sub-types of these, and outlines finally the procedure to be followed.

Swedish Standards corresponding to documents referred to in this Standard are listed in "Catalogue of Swedish Standards", issued by SIS. The Catalogue lists, with reference number and year of Swedish approval, International and European Standards approved as Swedish Standards as well as other Swedish Standards.

At the time for publishing of this Swedish Standard applies following about the standards which reference are made to:

- ISO 4628-3:1982, Paints and varnishes – Evaluation of degradation of paint coatings – Designation of intensity, quantity and size of common types of defect – Part 3: Designation of degree of rusting, has been adopted as Swedish standard, SS 18 42 03,

## Behandling av stålytor före beläggning med målarfärg och liknande produkter – Förbehandlingsmetoder – Del 2: Blästring

Den internationella standarden ISO 8504-2:2000 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av ISO 8504-2:2000.

Standarden ersätter SS-ISO 8504-2, utgåva 1.

Denna del av ISO 8504 är en av två delar, vilka anger metoder för behandling av stålytor före beläggning. Denna del bör användas tillsammans med ISO 8504-1. Annars kan det bli svårt att välja den för ändamålet lämpligaste förbehandlingsmetoden och/eller förbehandlingsgraden.

Del 2 (denna standard) presenterar flera blästringmetoder. Den behandlar valet av blästermedel, beskriver två skilda typer av blästring inklusive några varianter av dessa, och anvisar till sist tillvägagångssättet.

Motsvarigheten och aktualiteten i svensk standard till de publikationer som omnämns i denna standard framgår av "Katalog över svensk standard", som ges ut av SIS. I katalogen redovisas internationella och europeiska standarder som fastställts som svenska standarder och övriga gällande svenska standarder.

Vid utgivningen av denna svenska standard gäller följande om de standarder som hänvisas till:

- ISO 4628-3 har överförs till svensk standard SS 18 42 03, Färg och lack – Bedömning av nedbrytning av färgskikt – Beteckning för intensitet, mängd och storlek av vanliga typer av fel – Del 3: Beteckning för rostgrad,

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- ISO 8501-1:1988, Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings, has been adopted as Swedish standard SS 05 59 00 (Rostgradsboken),
- ISO 8501-1:1988/Suppl.:1994, Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after removal of previous coatings – Informative Supplement to part 1: Representative photographic examples of the change of appearance imparted to steel when blast-cleaned with different abrasives, has been adopted as Swedish standard SS 05 59 00 T1,
- ISO 8501-2:1994, Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 2: Preparation grades of previously coated steel substrates after localized removal of previous coatings, has been adopted as Swedish standard SS-ISO 8501-2,
- ISO 8501-3:–, Preparation of steel substrate before application of paints and related products – Visual assessment of surface cleanliness – Part 3: Preparation grades of welds, cut edges and other areas with surface imperfections, has still not been published as International Standard,
- ISO/TR 8502-1:1991, Preparation of steel substrates before application of paints and related products – Tests for the assessment of surface cleanliness – Part 1: Field test for soluble iron corrosion products, has been adopted as Swedish standard SS-ISO 8502-1,
- ISO 8502-2:1992, Preparation of steel substrates before application of paints and related products – Tests for the assessment of surface cleanliness – Part 2: Laboratory determination of chloride on cleaned surfaces, has been adopted as Swedish standard SS-ISO 8502-2,
- ISO 8502-3:1992, Preparation of steel substrates before application of paints and related products – Tests for the assessment of surface cleanliness – Part 3: Assessment of dust on steel surface prepared for painting (pressure-sensitive tape method), has been adopted as Swedish standard, SS-ISO 8502-3,
- ISO 8502-9:1998, Preparation of steel substrates before application of paint and related products – Tests for the assessment of surface cleanliness – Part 9: Field method for the con-
- ISO 8501-1 har överförts till svensk standard SS 05 59 00, Behandling av stålytor före beläggning med målningsfärg och liknande produkter – Visuellt utvärdering av ytrenhet – Del 1: Rostgrader och förbehandlingsgrader för obelagt stål och för stål, från vars hela yta tidigare beläggning avlägsnats (Rostgradsboken),
- ISO 8501-1:1988/Suppl.:1994 har överförts till svensk standard SS 05 59 00 T1, Behandling av stålytor före beläggning med målningsfärg och liknande produkter – Visuellt utvärdering av ytrenhet – Del 1: Rostgrader och förbehandlingsgrader för obelagt stål och för stål, från vars hela yta tidigare beläggning avlägsnats – Icke bindande tillägg till Del 1: Representativa fotografiska exempel på förändringar av stålets utseende genom förbehandling med olika blästermedel,
- ISO 8501-2 har överförts till svensk standard, SS-ISO 8501-2, Behandling av stålytor för beläggning med målningsfärg och liknande produkter – Visuellt utvärdering av ytrenhet – Del 2: Förbehandlingsgrader för tidigare belagda stålytor efter lokalt avlägsnande av tidigare målningsfärg,
- ISO 8501-3 har ännu inte utgivits som internationell standard,
- ISO/TR 8502-1 har överförts till svensk standard SS-ISO/TR 8502-1, Behandling av stålytor med målningsfärg och liknande produkter – Provning för utvärdering av ytrenhet – Del 1: Fältbestämning av lösliga korrosionsprodukter innehållande järn,
- ISO 8502-2 har överförts till svensk standard SS-ISO 8502-2, Behandling av stålytor med målningsfärg och liknande produkter – Provning för utvärdering av ytrenhet – Del 2: Laboratoriebestämning av klorid på rengjorda ytor,
- ISO 8502-3 har överförts till svensk standard SS-ISO 8502-3, Behandling av stålytor med målningsfärg och liknande produkter – Provning för utvärdering av ytrenhet – Del 3: Utvärdering av damm på stålytor, vilka förbehandlats för målning (metod med självhäftande tejp),
- ISO 8502-9 har överförts till svensk standard SS-ISO 8502-9, Behandling av stålytor för beläggning med målarfärg och liknande produkter – Provning för utvärdering av ytrenhet –

ductometric determination of water-soluble salts, has been adopted as Swedish standard SS-ISO 8502-9,

- ISO 8502-10:1999, Preparation of steel substrates before application of paints and related products – Tests for the assessment of surface cleanliness – Part 10: Field method for the titrimetric determination of water-soluble chloride, has been adopted as Swedish standard SS-ISO 8502-10,
- ISO 8503-1:1988, 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, has been endorsed as EN ISO 8503-1:1995, which has been adopted as Swedish standard SS-ISO 8503-1,
- ISO 8503-2:1988, Preparation of steel substrates before application of paints and related products – Surface roughness characteristics of blast-cleaned steel substrates – Part 2: Method for the grading of surface profile of abrasive blast-cleaned steel – Comparator procedure, has been endorsed as EN ISO 8503-2:1995, which has been adopted as Swedish standard SS-ISO 8503-2,
- ISO 8504-1:2000, Preparation of steel substrates before application of paints and related products – Surface preparation methods – Part 1: General principles, has been adopted as Swedish standard SS-ISO 8504-1,
- ISO 8504-3:1993, Preparation of steel substrates before application of paints and related products – Surface preparation methods – Part 3: Hand- and power-tool cleaning, has been adopted as Swedish standard SS-ISO 8504-3,
- ISO 11124 (all parts), Preparation of steel substrates before application of paints and related products – Specifications for metallic blast-cleaning abrasives
  - Part 1: General introduction and classification,
  - Part 2: Chilled-iron grit,
  - Part 3: High-carbon cast-steel shot and grit,
  - Part 4: Low-carbon cast-steel shot, –
  - Part 5: Cut steel wire.

The parts 1 – 4 have been endorsed as EN ISO 11124 in 1997 and have been adopted as Swedish standards. Part 5 is under preparation as International Standards,

Del 9: Fältmetod för konduktometrisk bestämning av vattenlösliga salter,

- ISO 8502-10 har överförts till svensk standard SS-ISO 8502-10, Behandling av stålytor före beläggning med målarfärg och liknande produkter – Provning för utvärdering av ytrenhet – Del 10: Fältmetod för bestämning av vattenlöslig klorid genom titrering,
- ISO 8503-1 har ikraftsatts som EN ISO 8503-1, vilken har överförts till svensk standard SS-EN ISO 8503-1, Behandling av stålytor med målningsfärg och liknande produkter – Karakterisering av ytråhet hos blåstrade stålunderlag – Del 1: Specifikationer och definitioner för ISO ytprofilkomparatorer för klassning av blåstrade stålytor,
- ISO 8503-2 har ikraftsatts som EN ISO 8503-2, vilken har överförts till svensk standard SS-EN ISO 8503-2, Behandling av stålytor före målning med målningsfärg och liknande produkter – Karakterisering av ytråhet hos blåstrade stålunderlag – Del 2: Metod för klassning av ytprofil hos blåstrat stål – Komparatormetod,
- ISO 8504-1 har överförts till svensk standard SS-ISO 8504-1, Behandling av stålytor med målarfärg och liknande produkter – Förbehandlingsmetoder – Del 1: Allmänna principer,
- ISO 8504-3 har överförts till svensk standard SS-ISO 8504-3, Behandling av stålytor med målningsfärg och liknande produkter – Förbehandlingsmetoder – Del 3: Manuell bearbetning och maskinbearbetning,
- ISO 11124, delarna 1 – 4 har ikraftsatts som EN-ISO 11124 och har överförts till svensk standard SS-EN ISO 11124, Behandling av stålytor före beläggning med målningsfärg och liknande produkter – Specifikationer för metalliska blästermedel
  - Del 1: Allmän inledning och klassificering,
  - Del 2: Tackjärnsgritt,
  - Del 3: Högkolhaltig stålshott och stål gritt,
  - Del 4: Lågkolhaltig stålshott.

Del 5 håller på att utformas som internationell standard,

- ISO 11126 (all parts), Preparation of steel substrates before application of paints and related products – Specifications for non-metallic blast-cleaning abrasives
  - Part 1: General introduction and classification
  - Part 3: Copper refinery slag
  - Part 4: Coal furnace slag
  - Part 5: Nickel refinery slag
  - Part 6: Iron furnace slag
  - Part 7: Fused aluminium oxide
  - Part 8: Olivine sand
  - Part 9: Staurolite
  - Part 10: Almandite garnet.

The parts 1 – 8 have been endorsed as EN ISO 11124 in 1997 and have been adopted as Swedish standards. Parts 9 and 10 are under preparation as International Standards.

- ISO 11126, delarna 1 – 8 har ikraftsatts som EN ISO 11126 och har överförts till svensk standard SS-EN ISO 11126, Behandling av stålytor före beläggning med målningsfärg och liknande produkter – Specifikationer för icke-metalliska blästermedel
  - Del 1: Allmän inledning och klassificering inkl. teknisk rättelse 1:1997 och 2:1997
  - Del 3: Kopparslagg
  - Del 4: Aluminiumsilikat
  - Del 5: Nickelslagg
  - Del 6: Masugnsslagg
  - Del 7: Smält aluminiumoxid
  - Del 8: Olivinsand.

Delarna 9 och 10 är under utformning som internationell standard.

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## ISO 8504-2:2000(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.

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 part of ISO 8504 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 8504-2 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 8504-2:1992), which has been updated and editorially revised.

ISO 8504 consists of the following parts, under the general title *Preparation of steel substrates before application of paints and related products — Surface preparation methods*:

- *Part 1: General principles*
- *Part 2: Abrasive blast-cleaning*
- *Part 3: Hand- and power-tool cleaning*

Further parts are planned.

Annex A of this part of ISO 8504 is for information only.

## 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 system 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 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 below 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 primary objective of surface preparation is to ensure the removal of deleterious matter and to obtain a surface that permits satisfactory adhesion of the priming paint to steel. It should also assist in reducing the amounts of contaminants that initiate corrosion.

This part of ISO 8504 describes abrasive blast-cleaning methods. It should be read in conjunction with ISO 8504-1.

Abrasive blast-cleaning is a most effective method for mechanical surface preparation. It is widely applicable because this method of surface preparation has a number of versatile features listed below.

- a) The method allows a high production rate.
- b) The equipment can be stationary or mobile and is adaptable to the objects to be cleaned.

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- c) The method is applicable to most types and forms of steel surface.
- d) Many different surface states can be produced, for example different preparation grades and surface profiles.
- e) Effects such as cleaning, peening, roughening, levelling and lapping can be produced.
- f) It is possible to remove selectively partly failed coatings, leaving sound coatings intact.



# Preparation of steel substrates before application of paints and related products — Surface preparation methods —

## Part 2: Abrasive blast-cleaning

**WARNING** — The procedures described in this part of ISO 8504 are intended to be carried out by suitably trained and/or supervised personnel. The substances and procedures used in these methods may be injurious to health if adequate precautions are not taken. Attention is drawn in the text to certain specific hazards. This part of ISO 8504 refers only to the technical suitability of the methods and does not absolve the user from statutory obligations relating to health and safety.

### 1 Scope

This part of ISO 8504 describes abrasive blast-cleaning methods for the preparation of steel surfaces before coating with paints and related products. It also contains information on the effectiveness of the individual methods and their fields of application.

ISO 8504 is applicable to new and corroded steel surfaces and to steel surfaces that are uncoated or have been previously coated with paints and related products. For limitations, see note 2.

NOTE 1 These methods are essentially intended for hot-rolled steel to remove mill scale, rust, etc., but could also be used for cold-rolled steel of sufficient thickness to withstand the deformation caused by the impact of abrasive.

NOTE 2 There are several items that should be included in the purchaser's procurement documents to supplement this part of ISO 8504. Items that should be considered as a part of surface preparation before coating are edge grinding, removal of grease and oil, porosity of welds, removal of weld spatter, removal of burrs and other sharp edges, grinding of welds, filling of pits and other surface imperfections that may cause premature failure of the coating system (see ISO 8501-3 for more information) and the removal of water-soluble contaminants.

### 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 8504. For dated references, subsequent amendments to, or revisions of any of these publications do not apply. However, parties to agreements based on this part of ISO 8504 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 4628-3:1982, *Paints and varnishes — Evaluation of degradation of paint coatings — Designation of intensity, quantity and size of common types of defect — Part 3: Designation of degree of rusting.*

ISO 8501-1:1988, *Preparation of steel substrates before application of paints and related products — Visual assessment of surface cleanliness — Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings.*

ISO 8501-1:1988/Suppl:1994, *Preparation of steel substrates before application of paints and related products — Visual assessment of surface cleanliness — Part 1: Rust grades and preparation grades of uncoated steel*

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*substrates and of steel substrates after overall removal of previous coatings — Informative Supplement: Representative photographic examples of the change of appearance imparted to steel when blast-cleaned with different abrasives.*

ISO 8501-2:1994, *Preparation of steel substrates before application of paints and related products — Visual assessment of surface cleanliness — Part 2: Preparation grades of previously coated steel substrates after localized removal of previous coatings.*

ISO 8501-3:—<sup>1)</sup>, *Preparation of steel substrates before application of paints and related products — Visual assessment of surface cleanliness — Part 3: Preparation grades of welds, cut edges and other areas with surface imperfections.*

ISO/TR 8502-1:1991, *Preparation of steel substrates before application of paints and related products — Tests for the assessment of surface cleanliness — Part 1: Field test for soluble iron corrosion products.*

ISO 8502-2:1992, *Preparation of steel substrates before application of paints and related products — Tests for the assessment of surface cleanliness — Part 2: Laboratory determination of chloride on cleaned surfaces.*

ISO 8502-3:1992, *Preparation of steel substrates before application of paints and related products — Tests for the assessment of surface cleanliness — Part 3: Assessment of dust on steel surfaces prepared for painting (pressure-sensitive tape method).*

ISO 8502-9:1998, *Preparation of steel substrates before application of paints and related products — Tests for the assessment of surface cleanliness — Part 9: Field method for the conductometric determination of water-soluble salts.*

ISO 8502-10:1999, *Preparation of steel substrates before the application of paints and related products — Tests for the assessment of surface cleanliness — Part 10: Field method for the titrimetric determination of water-soluble chloride.*

ISO 8503-1:1988, *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.*

ISO 8503-2:1988, *Preparation of steel substrates before application of paints and related products — Surface roughness characteristics of blast-cleaned steel substrates — Part 2: Method for the grading of surface profile of abrasive blast-cleaned steel — Comparator procedure.*

ISO 8504-1:2000, *Preparation of steel substrates before application of paints and related products — Surface preparation methods — Part 1: General principles.*

ISO 8504-3:1993, *Preparation of steel substrates before application of paints and related products — Surface preparation methods — Part 3: Hand- and power-tool cleaning.*

ISO 11124 (all parts), *Preparation of steel substrates before application of paints and related products — Specifications for metallic blast-cleaning abrasives.*

ISO 11126 (all parts), *Preparation of steel substrates before application of paints and related products — Specifications for non-metallic blast-cleaning abrasives.*

NOTE The titles of all parts of ISO 11124 and of ISO 11126 are listed in annex A for information.

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1) To be published.

### 3 Terms and definitions

For the purposes of this part of ISO 8504, the following terms and definitions apply:

#### 3.1

##### **abrasive blast-cleaning**

impingement of a high-kinetic-energy stream of abrasive on to the surface to be prepared

**NOTE** The abrasive is typically propelled either by centrifugal force or by a high-velocity stream of fluid such as air or water to remove rust, mill scale, existing coatings and other contaminants and expose the substrate. The cleaned surface has a characteristic secondary profile dependent on the blast-cleaning conditions, the properties of the abrasive, the initial condition of the surface and the properties of the steel being blast-cleaned. The initial surface roughness or primary profile may be altered by the abrasive blast-cleaning procedure. Surface profiles are assessed using the method described in ISO 8503-2. When selecting a surface preparation method, it is necessary to consider the preparation grade required to give a level of surface cleanliness and, if required, a surface profile (roughness), such as coarse, medium or fine (see ISO 8503-1 and ISO 8503-2), appropriate to the coating system to be applied to the steel surface. Since the cost of surface preparation is usually in proportion to the level of cleanliness, a preparation grade appropriate to the purpose and type of coating system or a coating system appropriate to the preparation grade which can be achieved should be chosen.

#### 3.2

##### **blast-cleaning abrasive**

solid material intended to be used for abrasive blast-cleaning

#### 3.3

##### **shot**

particles that are predominantly round, that have a length of less than twice the maximum particle width and that do not have edges, broken faces or other sharp surface defects

#### 3.4

##### **grit**

particles that are predominantly angular, that have fractured faces and sharp edges and that are less than half-round in shape

#### 3.5

##### **cylindrical particles**

sharp-edged particles, having a diameter-to-length ratio of 1:1, cut so that their faces are approximately at right angles to their centreline

### 4 Abrasives

#### 4.1 Materials and types

**4.1.1** A wide variety of natural and synthetic solid materials and several liquids are used for abrasive blast-cleaning. Solid materials commonly in use for the preparation of steel surfaces before coating are given in Table 1. Each material provides a characteristic performance and surface finish.

When selecting a blast-cleaning abrasive, the following factors relating to its initial condition shall be considered:

- sub-group and type (see Table 1);
- indication of chemical composition;
- range of particle size (see 4.1.2);
- particle hardness (for example Vickers, Rockwell or Mohs, or as measured by another appropriate method).

International Standards for metallic and non-metallic blast-cleaning abrasives are listed for information in annex A.