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INTERNATIONAL STANDARD

ISO 8501-3

Second edition
2006-03-01

Preparation of steel substrates before application of paints and related products — Visual assessment of surface cleanliness —

Part 3: Preparation grades of welds, edges and other areas with surface imperfections

Préparation des subjectiles d'acier avant application de peintures et de produits assimilés — Évaluation visuelle de la propreté d'un subjectile —

Partie 3: Degrés de préparation des soudures, arêtes et autres zones présentant des imperfections

Reference number
ISO 8501-3:2006(E)

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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 8501-3 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 8501-3:2001). The main changes are:

— revision of the description of preparation grade P1 in Clause 4 and the preparation grades for welding spatter and undercut in Table 1;

— replacement of the phrases “as found”, “as welded”, etc., with “no preparation”;

— deletion of Annex A “Correlation between preparation grades and corrosivity categories”.

ISO 8501 consists of the following parts, under the general title *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*

— *Informative Supplement to Part 1: Representative photographic examples of the change of appearance imparted to steel when blast-cleaned with different abrasives*

— *Part 2: Preparation grades of previously coated steel substrates after localized removal of previous coatings*

— *Part 3: Preparation grades of welds, edges and other areas with surface imperfections*

— *Part 4: Initial surface conditions, preparation grades and flash rust grades in connection with high-pressure water jetting*

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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, 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 given in other documents such as national standards and codes of practice. Users of these International Standards should 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 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.

Imperfections at welds, edges and other areas of steel substrates are generally starting points for corrosion. Such areas are also difficult to protect by application of paints and related products. To assist in achieving efficient corrosion protection, this part of ISO 8501 defines certain imperfections and preparation grades for such areas.

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Preparation of steel substrates before application of paints and related products — Visual assessment of surface cleanliness —

Part 3: Preparation grades of welds, edges and other areas with surface imperfections

1 Scope

This part of ISO 8501 describes preparation grades of welds, edges and other areas, on steel surfaces with imperfections. Such imperfections can become visible before and/or after an abrasive blast-cleaning process.

The preparation grades given in this part of ISO 8501 are to make steel surfaces with imperfections, including welded and fabricated surfaces, suitable for the application of paints and related products.

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 12944-2, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 2: Classification of environments*

ISO 12944-3, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 3: Design considerations*

3 Types of imperfection

This part of ISO 8501 deals with imperfections on:

— welds;

— edges;

— steel surfaces generally.

The various types of imperfection are illustrated and described in Table 1.

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4 Preparation grades

Three preparation grades for making steel surfaces with visible imperfections suitable for the application of paints and related products are as follows:

P1 Light preparation: no preparation or only minimum preparation needs to be carried out before application of paint;

P2 Thorough preparation: most imperfections are remedied;

P3 Very thorough preparation: surface is free of significant visible imperfections.

The significance of visible imperfections should preferably be agreed between all relevant parties, depending on the specific application.

Requirements for the preparation grades are given in Table 1.

NOTE 1 It is important that the preparation methods used to achieve these preparation grades are not deleterious to the integrity of the steel surface or welded areas. For example, strong grinding pressure can result in the formation of heat-affected areas on a steel surface, and removal of defects by grinding can leave sharp edges at the edges of the grind pattern.

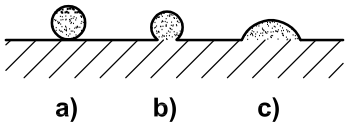
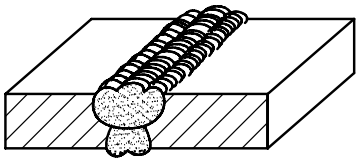
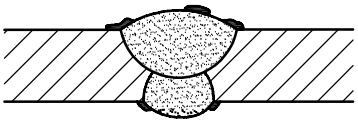
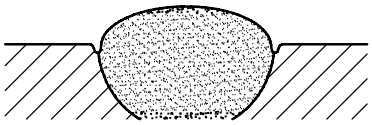
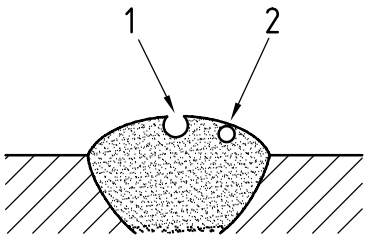
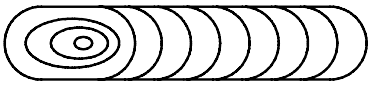
NOTE 2 It is possible that different imperfections on a structure will require different preparation grades. For example, undercut (Table 1, 1.4) might require P3 preparation while all other imperfections might require P2 preparation. This can, in particular, be the case when there are requirements for the aesthetic appearance of the finish. In such cases, P3 could be specified even if there were no apparent corrosivity requirements (see ISO 12944-2).

NOTE 3 A replica, known as NACE standard RP 0178, showing examples of weld imperfections and certain levels of preparation, can be obtained from NACE International, PO Box 218340, Houston, Texas 77218-8340, USA.

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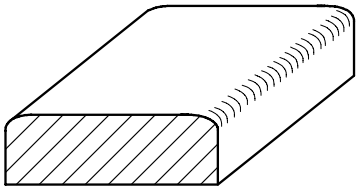
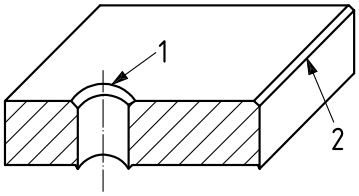
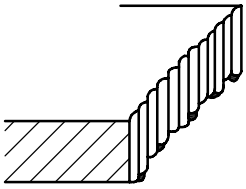
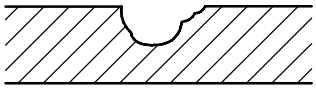
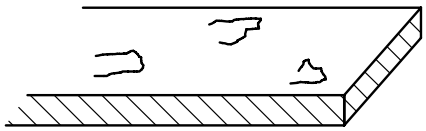
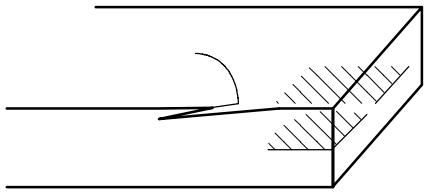
Table 1 — Imperfections and preparation grades

Type of imperfection		Preparation grades		
Description	**Illustration**	**P1**	**P2**	**P3**
1 Welds				
1.1 Welding spatter		Surface shall be free of all loose welding spatter [see a)]	Surface shall be free of all loose and lightly adhering welding spatter [see a) and b)] Welding spatter shown in c) may remain	Surface shall be free of all welding spatter
1.2 Weld ripple/profile		No preparation	Surface shall be dressed (e.g. by grinding) to remove irregular and sharp-edged profiles	Surface shall be fully dressed, i.e. smooth
1.3 Welding slag		Surface shall be free from welding slag	Surface shall be free from welding slag	Surface shall be free from welding slag
1.4 Undercut		No preparation	Surface shall be free from sharp or deep undercuts	Surface shall be free from undercuts
1.5 Weld porosity	 **Key** 1 visible 2 invisible (might open after abrasive blast cleaning)	No preparation	Surface pores shall be sufficiently open to allow penetration of paint, or dressed out	Surface shall be free from visible pores
1.6 End craters		No preparation	End craters shall be free from sharp edges	Surface shall be free from visible end craters

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Table 1 — (*continued*)

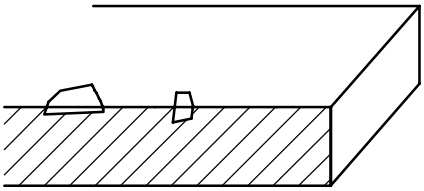
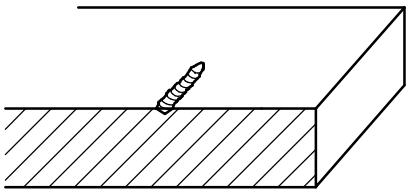
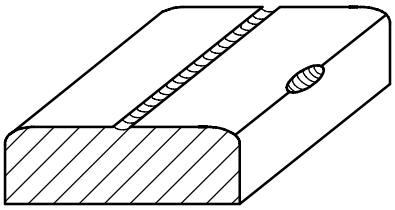
Type of imperfection		Preparation grades		
Description	**Illustration**	**P1**	**P2**	**P3**
2 Edges				
2.1 Rolled edges		No preparation	No preparation	Edges shall be rounded with a radius of not less than 2 mm (see ISO 12944-3)
2.2 Edges made by punching, shearing, sawing or drilling	 **Key** 1 punching 2 shearing	No part of the edge shall be sharp; the edge shall be free from fins	No part of the edge shall be sharp; the edge shall be free from fins	Edges shall be rounded with a radius of not less than 2 mm (see ISO 12944-3)
2.3 Thermally cut edges		Surface shall be free of slag and loose scale	No part of the edge shall have an irregular profile	Cut face shall be removed and edges shall be rounded with a radius of not less than 2 mm (see ISO 12944-3)
3 Surfaces generally				
3.1 Pits and craters		Pits and craters shall be sufficiently open to allow penetration of paint	Pits and craters shall be sufficiently open to allow penetration of paint	Surface shall be free of pits and craters
3.2 Shelling NOTE In English-language usage, the terms “slivers” and “hackles” are also used to describe this type of imperfection.		Surface shall be free from lifted material	Surface shall be free from visible shelling	Surface shall be free from visible shelling
3.3 Roll overs/roll laminations/cut laminations		Surface shall be free from lifted material	Surface shall be free from visible roll-overs/ laminations	Surface shall be free from visible roll-overs/ laminations

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Table 1 (*continued*)

Type of imperfection		Preparation grades		
Description	**Illustration**	**P1**	**P2**	**P3**
3.4 Rolled-in extraneous matter		Surface shall be free from rolled-in extraneous matter	Surface shall be free from rolled-in extraneous matter	Surface shall be free from rolled-in extraneous matter
3.5 Grooves and gouges formed by mechanical action		No preparation	The radius of grooves and gouges shall be not less than 2 mm	Surface shall be free from grooves, and the radius of gouges shall be greater than 4 mm
3.6 Indentations and roll marks		No preparation	Indentations and roll marks shall be smooth	Surface shall be free from indentations and roll marks

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