

INTERNATIONAL
STANDARD

ISO
8501-1

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СТАНДАРТ

Informative Supplement
Supplément informatif
Информационное
Дополнение
1994-12-15

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

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

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

Supplément informatif à la partie 1: Exemples de clichés
représentatifs du changement d'aspect communiqué à l'acier
décapé avec des abrasifs différents

**Подготовка стальной основы перед нанесением красок
и подобных покрытий — Визуальная оценка чистоты
поверхности —**

Информационное Дополнение к части 1: Фотографии
типичных примеров внешних изменений, происходящих в
стали в результате струйной очистки с помощью различных
абразивных материалов



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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.

The main task of technical committees is to prepare International Standards, but in this case an Informative Supplement to ISO 8501-1 has been published.

This Informative Supplement was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee 12, *Preparation of steel substrates before application of paints and related products*.

ISO 8501 consists at present 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, cut edges and surface imperfections.*

Avant-propos

L'ISO (Organisation internationale de normalisation) est une fédération mondiale d'organismes nationaux de normalisation (comités membres de l'ISO). L'élaboration des Normes internationales est en général confiée aux comités techniques de l'ISO. Chaque comité membre intéressé par une étude a le droit de faire partie du comité technique créé à cet effet. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'ISO participent également aux travaux. L'ISO collabore étroitement avec la Commission électrotechnique internationale (CEI) en ce qui concerne la normalisation électrotechnique.

La tâche principale des comités techniques est d'élaborer des Normes internationales, mais dans le cas présent, il a été publié un Supplément informatif à l'ISO 8501-1.

Ce Supplément informatif a été élaboré par le comité technique ISO/TC 35, *Peintures et vernis*, sous-comité SC 12, *Préparation de subjectiles d'acier avant application de peintures et de produits assimilés*.

L'ISO 8501 comprend les parties suivantes, présentées sous le titre général *Préparation des subjectiles d'acier avant application de peintures et de produits assimilés — Évaluation visuelle de la propreté d'un subjectile*:

- *Partie 1: Degrés de rouille et degrés de préparation des subjectiles d'acier non recouverts et des subjectiles d'acier après décapage sur toute la surface des revêtements précédents*
- *Supplément informatif à la partie 1: Exemple de clichés représentatifs du changement d'aspect communiqué à l'acier décapé avec des abrasifs différents*
- *Partie 2: Degrés de préparation des subjectiles d'acier précédemment revêtus après décapage localisé des couches*
- *Partie 3: Degrés de préparation des soudures, arêtes de coupe et imperfections de surface*

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Предисловие

ИСО (Международная Организация по Стандартизации) является всемирной федерацией национальных организаций по стандартизации (комитетов-членов ИСО). Разработка Международных Стандартов осуществляется техническими комитетами ИСО. Каждый комитет-член, заинтересованный в деятельности, для которой был создан технический комитет, имеет право быть представленным в этом комитете. Международные правительственные и неправительственные организации, имеющие связи с ИСО, также принимают участие в работах. Что касается стандартизации в области электротехники, ИСО работает в тесном сотрудничестве с Международной Электротехнической Комиссией (МЭК).

Основной задачей технических комитетов является разработка Международных Стандартов, однако в данном случае было опубликовано Информационное Дополнение к ИСО 8501-1.

Настоящее Информационное Дополнение было разработано техническим комитетом ИСО/ТК 35, *Краски и лаки*, подкомитет ПК 12, *Подготовка стальной поверхности перед применением красок и других подобных веществ*.

ИСО 8501 состоит из следующих частей, под общим заглавием *Подготовка стальной основы перед нанесением красок и подобных покрытий — Визуальная оценка чистоты поверхности* :

- *Часть 1: Степени ржавости и степени подготовки непокрытой стальной основы и стальной основы после полного удаления прежних покрытий*
- *Информационное Дополнение к части 1: Фотографии типичных примеров внешних изменений, происходящих в стали в результате струйной очистки с помощью различных абразивных материалов*
- *Часть 2: Степени подготовки ранее покрытой стальной основы после локального удаления прежних покрытий*
- *Часть 3: Степени подготовки сварных соединений, кромок стали и дефектов поверхности*

**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

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

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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.

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*, provides written specifications and representative photographic examples of a number of rust grades and preparation grades. Fourteen of these photographic examples, A Sa 2½ to D Sa 3, show steel surfaces that have been subjected to dry blast-cleaning with abrasives containing quartz sand.

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The basis of this Informative Supplement is that many different abrasives are used for blast-cleaning. Since some abrasive remains impacted on a blast-cleaned surface, the colour of the abrasive affects the appearance of the surface. Generally, the use of dark-coloured abrasives, such as copper refinery or coal furnace slags, will result in an overall darker, duller appearance than if sand is used. Some hard, metallic abrasives, although themselves not coloured black, will also create a darker appearance due to the shadows formed by the deep-sided pitting on the blast-cleaned surface.

In addition, the use of quartz sand as an abrasive is subject to a number of prohibitive regulations in many countries and its use for the photographic representations in ISO 8501-1:1988 should not be taken as general approval for its use.

This Informative Supplement provides representative photographic examples of mild steel of rust grade C, blast-cleaned to preparation grade Sa 3, using six different (metallic and non-metallic) abrasives that are in common use. For comparison, a photographic representation of the original steel surface, i.e. the surface before preparation, is also included.

NOTE 1 This Informative Supplement to ISO 8501-1 contains the text in the three official languages of ISO, namely English, French and Russian. It also contains the following annexes giving the equivalent text in other languages, published under the responsibility of the respective body indicated:

Annex A: Swedish (SIS)

Annex B: German (DIN)

Annex C: Dutch (NNI)

Annex D: Italian (UNI)

Annex E: Spanish (AENOR)

Annex F: Portuguese (IPQ)

Annex G: Arabic (SASO)

Annex H: Japanese (JISC)

Annex J: Chinese (CSBTS)

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1 Scope

This Informative Supplement to ISO 8501-1 provides representative photographic examples of the colour changes imparted to steel that is dry blast-cleaned to ISO 8501-1, preparation grade Sa 3, with different metallic and non-metallic abrasives.

It should be read in conjunction with ISO 8501-1.

2 References

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 after overall removal of previous coatings.*

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

ISO 11124-2:1993, *Preparation of steel substrates before application of paints and related products — Specifications for metallic blast-cleaning abrasives — Part 2: Chilled-iron grit.*

ISO 11124-3:1993, *Preparation of steel substrates before application of paints and related products — Specifications for metallic blast-cleaning abrasives — Part 3: High-carbon cast-steel shot and grit.*

ISO 11125-3:1993, *Preparation of steel substrates before application of paints and related products — Test methods for metallic blast-cleaning abrasives — Part 3: Determination of hardness.*

ISO 11126-3:1993, *Preparation of steel substrates before application of paints and related products — Specifications for non-metallic blast-cleaning abrasives — Part 3: Copper refinery slag.*

ISO 11126-4:1993, *Preparation of steel substrates before application of paints and related products — Specifications for non-metallic blast-cleaning abrasives — Part 4: Coal furnace slag.*

3 Procedure for visual assessment of steel substrates

Place the appropriate photograph given in ISO 8501-1 close to, and in the plane of, the steel surface to be assessed.

Record the assessment as the grade nearest in appearance to that of the steel surface.

If the appearance of the surface to be assessed is different from that illustrated in ISO 8501-1 use the examples given in this Informative Supplement as a guide to the change in colour depth and tone that may be due to the abrasive used to prepare the surface.

The examples illustrated in this Informative Supplement meet the written descriptions of ISO 8501-1, preparation grade Sa 3.

In all cases, compliance shall be assessed against the written descriptions for the preparation grades given in ISO 8501-1.

NOTE 2 ISO 8501-1 gives a written description of the surface appearance after the cleaning operation together with representative photographic examples.

4 Photographs

The representative photographic examples given in this Informative Supplement have been prepared by blast-cleaning mild steel of rust grade C to preparation grade Sa 3, as specified in ISO 8501-1, with six different abrasives that are in common use. A photograph of the original steel surface is included for visual comparison purposes.

The abrasives were chosen to provide a "Medium" surface profile as described in ISO 8503-2. The photograph was obtained by progressively masking a single mild-steel plate into strips and blast-cleaning the rust grade C surface thus exposed with a different abrasive for each strip to preparation grade Sa 3. Care was taken to protect previously prepared strips when blast-cleaning other strips. The plate was photographed shortly after completion of the blast-cleaning in order to avoid deterioration of the freshly prepared surfaces.

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The photograph illustrates the differences in surface appearance, including colour, that are obtained when the same substrate is prepared by blast-cleaning with different abrasive materials to the same preparation grade. The photograph illustrates the surface appearance typically obtained using each abrasive under the conditions described above but it should be noted that variations may be obtained in practice.

The high-carbon cast-steel shot abrasive used was of grade S 100 as specified in ISO 11124-3. The chilled-iron grit abrasive was in accordance with grade G 070 of ISO 11124-2. The two steel grit abrasives were in accordance with grade G 070 of ISO 11124-3. Their hardnesses, determined by the method described in ISO 11125-3, are stated in the captions to the relevant parts of the photograph. Copper refinery slag and coal furnace slag abrasives are specified in ISO 11126-3 and ISO 11126-4 respectively.

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Original mild-steel plate Rust grade C
High-carbon cast-steel shot Grade S 100 Vickers hardness 390 HV to 530 HV
Steel grit Grade G 070 Vickers hardness 390 HV to 530 HV
Steel grit Grade G 070 Vickers hardness 700 HV to 950 HV
Chilled-iron grit Grade G 070
Copper refinery slag
Coal furnace slag

Figure 1 – Layout and sequence of the appended representative photographic examples

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

Partie 1:

Degrés de rouille et degrés de préparation des subjectiles d'acier non recouverts et des subjectiles d'acier après décapage sur toute la surface des revêtements précédents

Supplément informatif à la partie 1: Exemples de clichés représentatifs du changement d'aspect communiqué à l'acier décapé avec des abrasifs différents

Introduction

L'efficacité des revêtements de peinture et produits assimilés de protection appliqués sur de l'acier est nettement affectée par l'état du subjectile juste avant l'application de la peinture. Les principaux facteurs connus affectant cette efficacité sont

- a) la présence de rouille et de calamine;
- b) la présence d'agents contaminants de surface, tels que sels, poussières, huiles, graisses;
- c) le profil de surface.

Les Normes internationales ISO 8501, ISO 8502 et ISO 8503 ont été élaborées afin de fournir des méthodes pour évaluer ces facteurs, alors que l'ISO 8504 fournit des directives sur les méthodes de préparation existantes

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pour le nettoyage des subjectiles d'acier, avec les possibilités de chacune de parvenir aux niveaux de propreté prescrits.

Ces Normes internationales ne proposent aucune recommandation pour les systèmes de revêtement de protection à appliquer sur le subjectile d'acier. Elles ne proposent pas non plus de recommandations quant aux exigences sur la qualité du subjectile dans des cas particuliers, bien que ce facteur puisse avoir une influence directe sur le revêtement à appliquer et sur son efficacité. On trouvera de telles recommandations dans d'autres documents tels que les normes nationales ou les codes d'utilisation. Il conviendra que les utilisateurs de ces Normes internationales s'assurent que les qualités prescrites sont

- compatibles et adaptées tant à l'environnement auquel le subjectile sera exposé qu'aux revêtements de protection à utiliser;
- dans les limites des possibilités du mode de nettoyage prescrit.

Les quatre Normes internationales auxquelles il est fait référence ci-dessus traitent des aspects suivants de la préparation des subjectiles d'acier:

ISO 8501 — *Évaluation visuelle de la propreté d'un subjectile;*

ISO 8502 — *Essais pour l'évaluation de la propreté d'un subjectile;*

ISO 8503 — *Caractéristiques de rugosité des subjectiles d'acier décapés;*

ISO 8504 — *Méthodes de préparation des surfaces.*

Chacune de ces Normes internationales est à son tour divisée en parties séparées.

L'ISO 8501-1:1988, *Préparation des subjectiles d'acier avant application de peintures et de produits assimilés — Évaluation visuelle de la propreté d'un subjectile — Partie 1: Degrés de rouille et degrés de préparation des subjectiles d'acier non recouverts et des subjectiles d'acier après décapage sur toute la surface des revêtement précédents*, fournit des spécifications écrites et des exemples de clichés représentatifs d'un certain nombre de degrés de rouille et degrés de préparation. Quatorze clichés (de A Sa 2½ à D Sa 3) montrent des subjectiles d'acier ayant subi un décapage à sec à l'aide d'abrasifs contenant du sable de quartz.