This is a preview of "ISO 27831-1:2008". Click here to purchase the full version from the ANSI store.

First edition
2008-10-15

Metallic and other inorganic coatings — Cleaning and preparation of metal surfaces —

Part 1: Ferrous metals and alloys

Revêtements métalliques et autres revêtements inorganiques — Nettoyage et préparation des surfaces métalliques —

Partie 1: Métaux ferreux et alliages

Reference number
ISO 27831-1:2008(E)

© ISO 2008

This is a preview of "ISO 27831-1:2008". Click here to purchase the full version from the ANSI store.

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.



COPYRIGHT PROTECTED DOCUMENT

© ISO 2008

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

© ISO 2008 – All rights reserved

This is a preview of "ISO 27831-1:2008". Click here to purchase the full version from the ANSI store.

Contents

Page

Foreword ... vi
Introduction ... vii
1 Scope ... 1
2 Normative references ... 2
3 Terms and definitions ... 2
4 Essential information to be supplied by the purchaser to the processor ... 3
5 Requirements ... 3
6 Standard cleaning methods ... 4
7 Non-corrosion-resisting steels, cast irons and pure irons ... 5
7.1 Non-corrosion-resisting steels ... 5
7.1.1 Selection of method of cleaning ... 5
7.1.2 Stress relief heat treatment ... 5
7.1.3 General degreasing and cleaning ... 5
7.1.3.1 Steels of tensile strength up to 1 000 MPa ... 5
7.1.3.2 Steels of tensile strength in the range 1 000 MPa to 1 400 MPa ... 5
7.1.3.3 Steels of tensile strength in the range 1 400 MPa to 1 800 MPa ... 5
7.1.3.4 Steels of tensile strength over 1 800 MPa ... 6
7.1.4 Preparation prior to electroplating ... 6
7.1.5 Preparation prior to autocatalytic nickel plating ... 7
7.1.6 Preparation prior to phosphate treatment ... 7
7.1.7 Preparation prior to sherardizing ... 7
7.1.8 Preparation prior to hot-dip galvanizing ... 8
7.1.8.1 Steel items other than castings ... 8
7.1.8.2 Steel castings ... 8
7.1.9 Preparation prior to metal spraying ... 8
7.1.9.1 Spraying for protection against corrosion and high-temperature oxidation ... 8
7.1.9.2 Spraying for reclamation (recycling) purposes ... 8
7.1.10 Preparation prior to the application of diffusion coatings ... 8
7.1.11 Preparation prior to vitreous enamelling ... 9
7.1.11.1 Conventional enamelling method ... 9
7.1.11.2 Alternative enamelling method ... 9
7.1.12 Preparation prior to hot tinning ... 10
7.1.12.1 Preparation for ordinary mild-steel surfaces ... 10
7.1.12.2 Preparation of non-reactive mild-steel surfaces (TRI process) ... 10
7.1.13 Preparation prior to physical vapour deposition of cadmium and aluminium ... 10
7.2 Cast irons ... 10
7.2.1 General degreasing and cleaning ... 10
7.2.2 Preparation prior to electroplating ... 10
7.2.3 Preparation prior to autocatalytic nickel plating ... 10
7.2.4 Preparation prior to phosphating and the application of other conversion coatings ... 10
7.2.5 Preparation prior to hot tinning ... 11
7.2.5.1 “Direct chloride” method (TRI process) ... 11
7.2.5.2 Preparation prior to electroplating with a readily tin-platable metal ... 11
7.2.6 Preparation prior to hot-dip galvanizing ... 11
7.2.7 Preparation prior to metal spraying ... 11
7.2.8 Preparation prior to diffusion coating ... 12
7.2.9 Preparation prior to vitreous enamelling ... 12
8 Corrosion-resisting and heat-resisting steels ... 12

© ISO 2008 – All rights reserved

This is a preview of "ISO 27831-1:2008". Click here to purchase the full version from the ANSI store.

8.1 Corrosion-resisting steels 12
8.1.1 Stress-relieving heat treatment 12
8.1.2 General degreasing and cleaning 12
8.1.3 Preparation prior to electroplating 12
8.1.4 Preparation prior to autocatalytic nickel plating 12
8.1.5 Preparation prior to metal spraying 12
8.1.5.1 Preparation for metal spraying 12
8.1.5.2 Spraying for reclamation (recycling) purposes 13
8.1.6 Preparation prior to vitreous enamelling — Austenitic steels 13
8.2 Heat-resisting steels 13

9 Pretreatment of metals prior to powder coating 14
9.1 General degreasing and cleaning 14
9.2 Preparation of non-corrosion-resisting steels 14
9.3 Preparation of corrosion-resisting steels 14

10 Cleaning and preparation processes 14
10.1 Process A — Organic-solvent degreasing and cleaning 14
10.1.1 General 14
10.1.2 Method A1 — Hot solvent, not water-rinsable 15
10.1.3 Method A2 — Cold solvent, not water-rinsable 15
10.1.4 Method A3 — Hot solvent, water-rinsable 15
10.1.5 Method A4 — Cold solvent, water-rinsable 15
10.1.6 Method A5 — Petroleum fuel based mixtures containing emulsifying agents 15
10.1.7 Method A6 — Ultrasonic cleaning 16
10.2 Process B — Alkaline degreasing 16
10.2.1 General 16
10.2.2 Method B1 — General-purpose alkaline degreasing 16
10.2.3 Method B2 — Mild alkaline degreasing 16
10.2.4 Method B3 — Cathodic alkaline degreasing 16
10.3 Process C — Acid emulsion cleaning 16
10.4 Process D — Abrasive cleaning 17
10.4.1 General 17
10.4.2 Method D1 — Coarse-abrasive blasting 17
10.4.3 Method D2 — Fine-abrasive blasting 17
10.4.4 Method D3 — Scouring 17
10.4.5 Method D4 — Tumbling 17
10.4.6 Method D5 — Wire brushing 17
10.5 Process E — Caustic-alkali descaling 18
10.5.1 Method E1 — Sodium hydride descaling 18
10.5.2 Method E2 — Alkali permanganate descaling 18
10.6 Process F — Acid pickling without electrolysis 18
10.6.1 General 18
10.6.2 Method F1 18
10.6.3 Method F2 18
10.6.4 Method F3 18
10.6.5 Method F4 19
10.6.6 Method F5 19
10.7 Process G — Acid dipping 19
10.7.1 General 19
10.7.2 Method G1 19
10.7.3 Method G2 19
10.8 Process H — Anodic pickling 20
10.8.1 General 20
10.8.2 Method H1 20
10.8.3 Method H2 20
10.8.4 Method H3 20
10.9 Process J — Acid de-rusting 20
10.10 Process K — Alkaline de-rusting 21
10.10.1 General 21
10.10.2 Method K1 (for light rust) 21

 © ISO 2008 – All rights reserved

This is a preview of "ISO 27831-1:2008". Click here to purchase the full version from the ANSI store.

10.10.3 Method K2 (for heavy rust) 21
10.10.4 Method K3 (for heavy rust) 22
10.11 Process L — Chemical smoothing and electropolishing of steels 22
10.11.1 Method L1 — Chemical smoothing process (for non-corrosion-resisting steels) 22
10.11.2 Method L2 — Electropolishing of corrosion-resisting steels 22
10.12 Process M — Passivation and removal of surface contamination from corrosion-resisting steels and surface preparation prior to electroplating 23
10.12.1 Method M1 — Passivation 23
10.12.2 Method M2 — Test for surface contamination 23
10.12.3 Method M3 — Alternative test for surface contamination 23
10.12.4 Method M4 — Preparation of corrosion-resisting steels prior to electroplating 24

Annex A (informative) **Maintenance of organic and vapour degreasing baths** 25

Annex B (informative) **The control of acidity in vapour cleaning baths** 26

Annex C (normative) **Method for the determination of oxidizable material in sulfuric acid** 27

Bibliography 28

© ISO 2008 – All rights reserved

This is a preview of "ISO 27831-1:2008". Click here to purchase the full version from the ANSI store.

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 27831-1 was prepared by Technical Committee ISO/TC 107, *Metallic and other inorganic coatings*, Subcommittee SC 3, *Electrodeposited coatings and related finishes*.

ISO 27831 consists of the following parts, under the general title *Metallic and other inorganic coatings — Cleaning and preparation of metal surfaces*:

— *Part 1: Ferrous metals and alloys*

— *Part 2: Non-ferrous metals and alloys*

© ISO 2008 – All rights reserved

This is a preview of "ISO 27831-1:2008". Click here to purchase the full version from the ANSI store.

Introduction

The adhesion of deposited coatings depends upon the efficiency of degreasing and cleaning processes used on the substrate surface. The removal of grease, oil and dirt and all other forms of contamination left from fabrication processes or due to corrosion/erosion of surfaces in storage or in service is essential for successful production of a pristine, chemically clean active surface for deposition of coatings.

The surface contaminants can be

— corrosion products, mould sand or mould release agents on ferrous and non-ferrous castings;

— corrosion products and mill scales on hot-rolled steel sheet, girders, etc. (broken mill scale is cathodic to the underlying substrate);

— oil and rolling lubricant on cold-rolled steel sheet;

— rolling lubricant on e.g. cold-rolled aluminium sheet;

— corrosion products on delivery or during storage on hot-dip-galvanized steel sheet or angle bars/brackets;

— other undesirable materials from storage and handling.

The difficulty of coating these surfaces is well known.

Cleaning processes for removing surface contaminants are varied, depending, among other things, on the identification and classification of the soil as well as the size and shape of the substrate, the degree of cleanliness required, the availability of the facilities needed, the cost of the processes used and their impact on the environment, and the nature of subsequent processes to which the substrate is going to be subjected.

ISO 27831 includes cleaning processes ranging from mechanical methods (which give the least degree of cleanliness) to chemical and ultrasonic methods (which give a higher degree of surface preparation) and substrate conditioning by glow discharge plasma (sputter cleaning) for vapour deposition.

ISO 27831 describes practices for cleaning a variety of metals and metal alloys prior to the application of a range of coatings or without any coating requirements.

The cleaning processes described in ISO 27831-1 and ISO 27831-2 are indicative only of those most commonly used in practice. However, there are numerous formulations of solutions and numerous proprietary processes available which are not included in ISO 27831-1 or ISO 27831-2. Wherever possible, references to particular processes have been made. For references concerning all other processes included in either part of ISO 27831, the publications given in the Bibliography in the respective part should be consulted.

ISO 27831-1 covers ferrous metals and their alloys, whilst ISO 27831-2 covers non-ferrous metals and their alloys. For ISO 27831-2 to be usable, as far as possible, as a “stand-alone” document, Clauses 1 to 6 of ISO 27831-1 have been included in it as Clauses 1 to 6 and the numbering of the other clauses follows the same sequence as in ISO 27831-1. Additionally, since some of the cleaning and preparation processes specified for ferrous materials in ISO 27831-1 can also be used for non-ferrous metals, the cleaning and preparation processes follow the same sequence, using the same designations, as in ISO 27831-1.

© ISO 2008 – All rights reserved