INTERNATIONAL STANDARD

ISO 27831-1

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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

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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 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*

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.

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

Part 1: Ferrous metals and alloys

WARNING — This part of ISO 27831 may not be compliant with some countries' health, safety and environmental legislation. It calls for the use of substances and/or procedures that may be injurious to health if adequate safety measures are not taken. This part of ISO 27831 does not address any health hazards, safety or environmental matters, or legislation associated with its use. It is the responsibility of the user of this part of ISO 27831 to establish appropriate health, safety and environmentally acceptable practices and take appropriate action to comply with any national, regional and/or international regulations. Compliance with this part of ISO 27831 does not, of itself, confer immunity from legal obligations.

1 Scope

This part of ISO 27831 specifies processes for the cleaning of the surfaces of ferrous metals and their alloys to remove any irrelevant or unwanted deposits or other material at any stage of manufacture, storage or service and for the preparation of these surfaces for further treatment. It does not cover cleaning operations associated with the preliminary removal of heavy deposits of oil, grease or dirt accumulated during operational service, preparations for welding or the cleaning of electrical contacts. However, many of the processes included in this part of ISO 27831 may be used for these operations at the discretion of the users of this part of ISO 27831.

This part of ISO 27831 covers processes which are needed for the preparation of metal surfaces prior to the application of the following surface coatings:

— electrodeposited metal coatings;

— autocatalytic metal coatings (autocatalytic and displacement types);

— conversion coatings;

— hot-dipped coatings;

— sprayed metal coatings;

— diffusion coatings;

— coatings produced by vitreous enamelling;

— coatings produced by physical vapour deposition of aluminium and cadmium;

— powder coatings.

This part of ISO 27831 describes processes for carrying out the following treatments:

— degreasing;

— descaling;

— pickling;

— de-rusting;

— chemical smoothing;

— electropolishing.

This part of ISO 27831 relates the processes described above to the following metals:

— non-corrosion-resisting steels, cast irons and pure irons;

— corrosion-resisting and heat-resisting steels.

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 2064, *Metallic and other inorganic coatings — Definitions and conventions concerning the measurement of thickness*

ISO 2080, *Metallic and other inorganic coatings — Surface treatment, metallic and other inorganic coatings — Vocabulary*

ISO 4527, *Metallic coatings — Autocatalytic (electroless) nickel-phosphorus alloy coatings — Specification and test methods*

ISO 9587, *Metallic and other inorganic coatings — Pretreatment of iron or steel to reduce the risk of hydrogen embrittlement*

ISO 9588, *Metallic and other inorganic coatings — Post-coating treatments of iron or steel to reduce the risk of hydrogen embrittlement*

ISO 22778, *Metallic coatings — Physical vapour-deposited coatings of cadmium on iron and steel — Specification and test methods*

ISO 22779, *Metallic coatings — Physical vapour-deposited coatings of aluminium — Specification and test methods*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 2064, ISO 2080, ISO 9587, ISO 9588, ISO 22778 and ISO 22779 apply.

