SLOVENSKI STANDARD
oSIST prEN ISO 12944-3:2016

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Barve in laki - Korozijska zaščita jeklenih konstrukcij z zaščitnimi premaznimi sistemi - 3. del: Upoštevanje vrste in načina oblikovanja konstrukcije (ISO/DIS 12944-3:2016)

Paints and varnishes - Corrosion protection of steel structures by protective coating systems - Part 3: Design considerations (ISO/DIS 12944-3:2016)

Beschichtungsstoffe - Korrosionsschutz von Stahlbauten durch Beschichtungssysteme - Teil 3: Grundregeln zur Gestaltung (ISO/DIS 12944-3:2016)

Peintures et vernis - Anticorrosion des structures en acier par systèmes de revêtement - Partie 3: Conception et dispositions constructives (ISO/DIS 12944-3:2016)

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ICS:

25.220.20	Površinska obdelava	Surface treatment
87.020	Postopki za nanašanje barvnih premazov	Paint coating processes
91.080.10	Kovinske konstrukcije	Metal structures

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Paints and varnishes — Corrosion protection of steel structures by protective coating systems —

Part 3:
Design considerations

Peintures et vernis — Anticorrosion des structures en acier par systèmes de revêtement —

Partie 3: Conception et dispositions constructives

ICS: 87.020

ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

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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 12944-3 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 14, *Protective paint systems for steel structures*.

This second edition cancels and replaces the first edition (ISO12944-3:1998), which has been technically revised.

ISO 12944 consists of the following parts, under the general title *Paints and varnishes — Corrosion protection of steel structures by protective coating systems*:

— *Part 1: General introduction*

— *Part 2: Classification of environments*

— *Part 3: Design considerations*

— *Part 4: Types of surface and surface preparation*

— *Part 5: Protective paint systems*

— *Part 6: Laboratory performance test methods*

— *Part 7: Execution and supervision of paint work*

— *Part 8: Development of specifications for new work and maintenance*

— *Part 9: Protective paint systems and laboratory performance test methods for offshore and related structures*

Annexes A to D of this part of ISO 12944 are for information only.

Introduction

Unprotected steel in the atmosphere, in water and in soil is subjected to corrosion that may lead to damage. Therefore, to avoid corrosion damage, steel structures are normally protected to withstand the corrosion stresses during the service life required of the structure.

There are different ways of protecting steel structures from corrosion. ISO 12944 deals with protection by paint systems and covers, in the various parts, all features that are important in achieving adequate corrosion protection. Additional or other measures are possible but require particular agreement between the interested parties.

In order to ensure effective corrosion protection of steel structures, it is necessary for owners of such structures, planners, consultants, companies carrying out corrosion protection work, inspectors of protective coatings and manufacturers of coating materials to have at their disposal state-of-the-art information in concise form on corrosion protection by paint systems. Such information has to be as complete as possible, unambiguous and easily understandable to avoid difficulties and misunderstandings between the parties concerned with the practical implementation of protection work.

This International Standard - ISO 12944 - is intended to give this information in the form of a series of instructions. It is written for those who have some technical knowledge. It is also assumed that the user of ISO 12944 is familiar with other relevant International Standards, in particular those dealing with surface preparation, as well as relevant national regulations.

Although ISO 12944 does not deal with financial and contractual questions, attention is drawn to the fact that, because of the considerable implications of inadequate corrosion protection, non-compliance with requirements and recommendations given in this standard may result in serious financial consequences.

ISO 12944-1 defines the overall scope of all parts of ISO 12944. It gives some basic terms and definitions and a general introduction to the other parts of ISO 12944. Furthermore, it includes a general statement on health, safety and environmental protection, and guidelines for using ISO 12944 for a given project.

This part of ISO 12944 gives guidance on how to minimize the risk of corrosion by appropriate design measures for steel structures to be coated by protective paint systems.

Paints and varnishes — Corrosion protection of steel structures by protective coating systems — Part 3: Design considerations

1 Scope

This part of ISO 12944 deals with the basic criteria for the design of steel structures to be coated by protective paint systems in order to avoid premature corrosion and degradation of the coating or the structure. It gives examples of appropriate and inappropriate design, indicating how problems of application, inspection and maintenance of paint systems can be avoided. Design measures which facilitate handling and transport of the steel structures are also considered.

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 1461, *Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods*

ISO 8501-1, *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*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in the other parts of ISO 12944 and the following apply.

3.1
design (noun)
way in which a structure is built up, as represented by a detailed plan of the structure, considering corrosion protection

4 General

The objective of designing a structure is to ensure that the structure is suitable for its function, has adequate stability, strength and durability, is constructed at an acceptable cost and is aesthetically pleasing.

The overall design shall be planned to facilitate surface preparation, painting, inspection and maintenance.

The shape of a structure can influence its susceptibility to corrosion. Therefore structures should be designed such that corrosion cannot easily establish a foothold (a corrosion trap) from which it can spread. It is therefore strongly recommended that the designer consults a corrosion protection expert at a very early stage in the design process. Ideally, the corrosion protection system should be selected at that time, with due consideration to the type of service of the structure, its service life and maintenance requirements.

The shapes of the structural elements and the methods used to join them should be such that fabrication, joining and any subsequent treatment will not promote corrosion. Similarly, consideration should be given to the shape of the structure and its elements with respect to the category of its environment (see ISO 12944-2) when specifying a protective paint system.

Designs should be simple and excessive complexity should be avoided. Where steel components are in contact, embedded or enclosed in other building materials, e.g. brickwork, they are no longer accessible, therefore, the corrosion protection measures shall be effective throughout the service life of the structure.

Steelwork to be hot-dip galvanized shall be designed in accordance with the requirements of ISO 1461 and ISO 14713.

5 Basic design criteria for corrosion protection purposes

5.1 General

The surfaces of steel structures exposed to corrosion stresses should be small in extent. The structure should have the smallest possible number of irregularities (e.g. overlaps, corners, edges). Joints should have preferably been made by welding, rather than bolting or rivetting, to achieve a smoother overall surface. Discontinous welds and spot welds should only be used where the corrosion risk is negligible.

5.2 Accessibility

Steel components should be designed to be accessible for the purpose of applying, inspecting and maintaining the protective paint system. This can be facilitated, for example, by the provision of fixed walkways, powered platforms or other auxiliary equipment. The accessories which will be required for carrying out maintenance work safely (e.g. hooks, lugs and anchorages for scaffolding, guide rails for blast-cleaning and paint application vehicles) should be provided at the design stage.

Providing access for maintenance at a later date is difficult and if not included in the design the designer should indicate clearly how it can be provided in the future.

All surfaces of the structure which have to be coated should be visible and within reach of the operator by a safe method. Personnel involved in surface preparation, painting and inspection should be able to move safely and easily on all parts of the structure in conditions of good lighting. Surfaces which are to be treated should be sufficiently accessible to allow the operator adequate space to work in (see Annex A).

Special attention should be paid to ensure access to openings in box members and tanks. The openings shall be of sufficient size to allow safe access for operators and their equipment, including safety equipment (see Annex B). In addition, supplementary ventilation holes should be at a location and of a size which permits the application of the protective paint system.

Narrow spaces between elements should be avoided whenever possible. Where it is not possible to avoid narrow spaces for structural and practical reasons, the advice given in Annex C should be followed.

Components which are at risk to corrosion and are inaccessible after erection should either be made of a corrosion resistant material or have a protective coating system which shall be effective throughout the service life of the structure. Alternatively, an allowance for corrosion (thicker steel) should be considered.