

**SLOVENSKI STANDARD**  
**oSIST prEN ISO 12944-9:2016**  
**01-julij-2016**

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**Barve in laki - Korozijska zaščita jeklenih konstrukcij z zaščitnimi premaznimi sistemi - 9. del: Zaščitni sistemi barv in laboratorijske preskusne metode za konstrukcije ob morju in sorodne konstrukcije (ISO/DIS 12944-9:2016)**

Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 9: Protective paint systems and laboratory performance test methods for offshore and related structures (ISO/DIS 12944-9:2016)

Beschichtungsstoffe - Korrosionsschutz von Stahlbauten durch Beschichtungssysteme - Teil 9: Beschichtungssysteme und Leistungsprüfverfahren im Labor für Bauwerke im Offshorebereich (ISO/DIS 12944-9:2016)

Peintures et vernis - Anticorrosion des structures en acier par systèmes de peinture - Partie 9: Systèmes de peinture protectrice et méthodes d'essai de performance en laboratoire pour structures offshore et connexes (ISO/DIS 12944-9:2016)

**Ta slovenski standard je istoveten z: prEN ISO 12944-9**

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**ICS:**

|           |                                                    |                                               |
|-----------|----------------------------------------------------|-----------------------------------------------|
| 47.020    | Ladjedelništvo in konstrukcije na morju na splošno | Shipbuilding and marine structures in general |
| 87.020    | Postopki za nanašanje barvnih premazov             | Paint coating processes                       |
| 91.080.13 | Jeklene konstrukcije                               | Steel structures                              |

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# DRAFT INTERNATIONAL STANDARD

## ISO/DIS 12944-9

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

Part 9:

### Protective paint systems and laboratory performance test methods for offshore and related structures

*Peintures et vernis — Anticorrosion des structures en acier par systèmes de peinture —**Partie 9: Systèmes de peinture protectrice et méthodes d'essai de performance en laboratoire pour structures offshore et connexes*

ICS: 87.040

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#### 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.

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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## 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 12944-9 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 14, *Protective paint systems for steel structures*.

This first edition cancels and replaces the second edition (ISO 20340:2009) 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 paint 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*

## Introduction

Offshore and related structures require specific attention in order to be able to withstand the severe corrosion stresses to which they are exposed during their service life and to minimize the risk of failures that would impact safety, operating costs or capital cost.

In order to establish sufficient corrosion protection and ensure optimum performance of the coating, it is necessary to specify the requirements for the protective paint system(s) along with the relevant laboratory performance tests to assess its (their) likely durability.

In order to achieve the same performance as indicated by testing, proper application of the paint is essential. Close attention needs to be given to the execution of the work.

In ISO 12944, relevant requirements are given for:

- atmospheric-corrosivity categories (Part 2);
- suitable design properties (Part 3);
- type of surface and surface preparation (Part 4);
- application of the paint and the execution and supervision of the paint work during the construction and installation of the structure (Part 7);
- development of a specification (Part 8).

This International Standard (ISO 12944-9) covers the requirements for new work and any repairs necessary before start-up. It may also be used in relation to maintenance where complete refurbishment is carried out and the underlying metal substrate is completely exposed by abrasive blast-cleaning (see 4.4).

It does not address maintenance in general where methods of surface preparation other than abrasive blast-cleaning are typically used.

# Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 9: Protective paint systems and laboratory performance test methods for offshore and related structures

## 1 Scope

This International Standard deals with performance requirements for protective paint systems for offshore and related structures (i.e. those exposed to the marine atmosphere, as well as those immersed in sea or brackish water). Such structures are exposed to environments of corrosivity category CX (offshore) and immersion category Im4 as defined in ISO 12944-2, with special stresses as given in 4.3 and Annex B of ISO 12944-2:1998.

This International Standard deals with structures, made of carbon or low-alloy steel, it does not cover Cd/Bi Cr and Zn/Bi Cr surfaces. It also does not cover surfaces under insulation or concrete.

This International Standard places emphasis on high-durability paint systems, with the aim of minimizing maintenance and hence reducing safety considerations and environmental impact.

The temperature range applicable for these paint systems is considered to be between  $-20\text{ }^{\circ}\text{C}$  and  $+120\text{ }^{\circ}\text{C}$ , and the performance testing is aimed at verifying suitability of the paint systems for this temperature range. The use of paint systems outside this temperature range shall be subject to agreement by the end user. Such agreement may include testing at the applicable temperatures.

The paint systems for submerged service (Im4) are aimed at ambient operating temperatures up to a maximum of  $50\text{ }^{\circ}\text{C}$ . For higher operating temperatures, specific evaluation and performance documentation is needed. The selection of performance requirements should be considered in conjunction with the cathodic-protection design parameters.

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This International Standard includes:

- the test methods to be used to determine the composition of the separate components of the protective paint system;
- the laboratory performance test methods for the assessment of the likely durability of the protective paint system;
- the criteria to be used to evaluate the results of performance tests.

## 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 1514, *Paints and varnishes — Standard panels for testing*

ISO 1517, *Paints and varnishes — Surface-drying test — Ballotini method*<sup>1)</sup>

ISO 2063, *Thermal spraying — Metallic and other inorganic coatings — Zinc, aluminium and their alloys*

ISO 2811 (all parts), *Paints and varnishes — Determination of density*

ISO 2812-2, *Paints and varnishes — Determination of resistance to liquids — Part 2: Water immersion method*

ISO 3233, *Paints and varnishes — Determination of percentage volume of non-volatile matter by measuring the density of a dried coating*

ISO 3251, *Paints, varnishes and plastics — Determination of non-volatile-matter content*

ISO 3270, *Paints and varnishes and their raw materials — Temperatures and humidities for conditioning and testing*

ISO 3549, *Zinc dust pigments for paints — Specifications and test methods*

ISO 3679, *Determination of flash point — Rapid equilibrium closed cup method*

ISO 4624, *Paints and varnishes — Pull-off test for adhesion*

ISO 4628 (Parts 2 to 6), *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance*

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*

ISO 8503-1, *Preparation of steel substrates before application of paints and related products — Surface roughness characteristics of blast-cleaned steel substrates — Part 1: Specifications and definitions for ISO surface profile comparators for the assessment of abrasive blast-cleaned surfaces*

ISO 8503-2, *Preparation of steel substrates before application of paints and related products — Surface roughness characteristics of blast-cleaned steel substrates — Part 2: Method for the grading of surface profile of abrasive blast-cleaned steel — Comparator procedure*

ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests*

ISO 11507:2007, *Paints and varnishes — Exposure of coatings to artificial weathering — Exposure to fluorescent UV lamps and water*

ISO 12944-2:1998, *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*

ISO 12944-4, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 4: Types of surface and surface preparation*

ISO 12944-5, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 5: Protective paint systems*

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<sup>1)</sup> Under revision as ISO 9117-3.

## ISO/DIS 12944-9:2016(E)

ISO 12944-6, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 6: Laboratory performance test methods*

ISO 12944-7, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 7: Execution and supervision of paint work*

ISO 12944-8, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 8: Development of specifications for new work and maintenance*

ISO 14680-2, *Paints and varnishes — Determination of pigment content — Part 2: Ashing method*

ISO 15711:2003, *Paints and varnishes — Determination of resistance to cathodic disbonding of coatings exposed to sea water*

ISO 19840, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Measurement of, and acceptance criteria for, the thickness of dry films on rough surfaces*

ASTM D 6580, *Standard Test Method for the Determination of Metallic Zinc Content in Both Zinc Dust Pigment and in Cured Films of Zinc-Rich Coatings*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

#### 3.1 offshore and related structures

permanently installed or moored structures with high requirements for long-term integrity

NOTE Typical examples are oil and gas production facilities.

#### 3.2 coat

continuous layer of a coating material resulting from a single application

#### 3.3 corrosion

physicochemical interaction between a metal and its environment that results in changes in the properties of the metal and that can often lead to impairment of the function of the metal, the environment or the technical system of which these form a part

#### 3.4 durability

expected life of a protective paint system to the first major maintenance painting

#### 3.5 paint

pigmented coating material in liquid, paste or powder form that, when applied to a substrate, forms an opaque film having protective, decorative or specific technical properties

#### 3.6 protective coating system

sum total of the coats of metal materials and/or paints or related products that are to be applied, or which have been applied, to a substrate to provide corrosion protection

#### 3.7 protective paint system

sum total of the coats of paints or related products that are to be applied, or have been applied, to a substrate to provide corrosion protection

**3.8****substrate**

surface to which a coating material is applied or is to be applied

**3.9****nominal dry film thickness****NDFT**

dry film thickness specified for each coat or for the whole coating system

**3.10****dry film thickness****DFT**

thickness of a coat or coating system remaining on the surface after hardening

NOTE The DFT is measured in accordance with ISO 19840.

**3.11****product technical-data sheet****product TDS**

document designed to provide information on a specific paint product

NOTE 1 The type of information typically includes product uses, features, service properties, application properties, application instructions, packaging information and information on storage and handling.

NOTE 2 See 5.4 for specifically required minimum information.

**3.12****material safety data sheet****MSDS**

document designed to provide information regarding the health and safety aspects of a paint product or thinner

NOTE The MSDS typically includes information concerning generic material identification, hazardous ingredients, physical data, fire and explosion data, health hazards, reactivity data, spill or leak procedures, special protection requirements and other special precautions.

**3.13****qualification**

process for the evaluation of protective paint systems using test criteria which allow the selection of suitable paint systems for distinct environmental exposure conditions

NOTE The process comprises:

- description of the paint system (for an example, see Table 2);
- application testing (see Clause 7);
- laboratory performance testing and assessment of the results (see Clause 8);
- full identification of the paints (see Subclause 5.5.2 and Annex C).

**3.14****shelf life**

period from the date of manufacture during which the paint can be transported and stored in undamaged and unopened packaging without any influence on its application or performance providing the ambient conditions are within the limits recommended by the paint manufacturer

NOTE 1 After exceeding this period, the paint is subject to re-inspection.

NOTE 2 Water-borne products have to be protected from freezing at all times during transportation and storage.