



**SLOVENSKI STANDARD**  
**oSIST prEN ISO 12944-:2017**  
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**Barve in laki - Korozijska zaščita jeklenih konstrukcij z zaščitnimi premaznimi sistemi - 6. del: Laboratorijske preskusne metode (ISO/DIS 12944-6:2017)**

Paints and varnishes - Corrosion protection of steel structures by protective coating systems - Part 6: Laboratory performance test methods (ISO/DIS 12944-6:2017)

Beschichtungsstoffe - Korrosionsschutz von Stahlbauten durch Beschichtungssysteme - Teil 6: Laborprüfungen zur Bewertung von Beschichtungssystemen (ISO/DIS 12944-6:2017)

Peintures et vernis - Anticorrosion des structures en acier par systèmes de peinture - Partie 6: Essais de performance en laboratoire (ISO/DIS 12944-6:2017)

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

### Part 6: Laboratory performance test methods

*Peintures et vernis — Anticorrosion des structures en acier par systèmes de revêtement —  
Partie 6: Essais de performance en laboratoire*

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## ISO/DIS 12944-6:2017(E)

### 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.

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.

International Standard ISO 12944-6 was prepared by Technical Committee ISO/TC 35, Paints and varnishes, Subcommittee SC 14, Protective paint systems for steel structures.

ISO 12944 consists of the following parts, under the general title Paints and varnishes — Protective paint systems for steel structures:

- 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

Annex A of this part of ISO 12944 forms an integral part of this part of ISO 12944. Annex B is for information only.

## Introduction

Unprotected steel in the atmosphere, in water and in soil is subject 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.

ISO 12944-6 provides a way of assessing paint systems by means of laboratory tests in order to be able to select the most suitable.

Cyclic testing according to ISO 12944-9 is introduced within this edition of ISO 12944-6. It is currently used in C5 VH/ H and C4 VH. In case of C5 H and C4 VH the test regime including salt spray and condensation test can still be used as alternative to cyclic test. For the future it is intended to remove salt spray and condensation tests as alternative tests for C5 H and C4 VH.





# Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 6: Laboratory performance test methods

## 1 Scope

This part of ISO 12944 specifies laboratory test methods and test conditions for the assessment of paint systems for the corrosion protection of carbon steel structures.

The test results are to be considered as an aid in the selection of suitable paint systems and not as exact information for determining durability.

This part of ISO 12944 covers protective paint systems designed for application to uncoated steel, hot dip galvanized steel according to ISO 1461 and steel surfaces with thermal-sprayed metallic coating according to ISO 2063.

This part of ISO 12944 does not apply to protective paint systems for electroplated or painted steel.

The environments for corrosivity categories C2 to C5 and Im1 to Im3 defined in ISO 12944-2 are 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 554, *Standard atmospheres for conditioning and/or testing — Specifications*

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

ISO 1513, *Paints and varnishes — Examination and preparation of samples for testing*

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

ISO 2409, *Paints and varnishes — Cross-cut test*

ISO 2808, *Paints and varnishes — Determination of film thickness*

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

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

ISO 4628-1, *Paints and varnishes — Evaluation of degradation of paint coatings — Designation of intensity, quantity and size of common types of defect — Part 1: General principles and rating schemes*

ISO 4628-2, *Paints and varnishes — Evaluation of degradation of paint coatings — Designation of intensity, quantity and size of common types of defect — Part 2: Designation of degree of blistering*

ISO 4628-3, *Paints and varnishes — Evaluation of degradation of paint coatings — Designation of intensity, quantity and size of common types of defect — Part 3: Designation of degree of rusting*

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ISO 4628-4, *Paints and varnishes — Evaluation of degradation of paint coatings — Designation of intensity, quantity and size of common types of defect — Part 4: Designation of degree of cracking*

ISO 4628-5, *Paints and varnishes — Evaluation of degradation of paint coatings — Designation of intensity, quantity and size of common types of defect — Part 5: Designation of degree of flaking*

ISO 6270-1, *Paints and varnishes — Determination of resistance to humidity — Part 1: Condensation (single-sided exposure)*

ISO 7384, *Corrosion tests in artificial atmospheres — General requirements*

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 12944-2:1998, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 2: Classification of environments*

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

ISO 12944-5:1998, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 5: Protective paint systems*

ISO/DIS 12944-9, *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 15528, *Paints, varnishes and raw materials for paints and varnishes — Sampling*

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

**3 Definitions**

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

**3.1 artificial ageing**  
 procedure designed to accelerate the ageing of a paint system, i.e. to reduce the corrosion-protective efficiency more rapidly than by natural weathering

## 4 General

### 4.1 Relationship between artificial ageing and natural exposure

The selection of a paint system for a specific situation should preferably be based on experience from the use of the system in similar cases. The reason is that the durability of a paint system depends on many external factors such as the environment, the design of the structure, the surface preparation, and the application and drying procedures.

The durability is of course also linked to the chemical and physical characteristics of the system, e.g. the type of binder and the dry-film thickness. These characteristics can be evaluated by artificial ageing tests. Of primary interest is resistance to water or moisture, and to salt fog, as an indication of wet adhesion and the barrier properties. The ageing tests and durations specified hereafter have been selected to ensure, with a high probability, that paint systems really do have the characteristics needed for the durability required in the intended application.

However, results from artificial ageing tests shall be used with caution. It shall be clearly understood that artificial ageing will not necessarily have the same effect as natural exposure. Many factors have an influence on the progress of degradation and, in the laboratory it is not possible to accelerate all of them in the proper way. It is therefore difficult to make a reliable ranking of paint systems of very different compositions from artificial ageing tests in the laboratory. This can sometimes lead to efficient protective paint systems being rejected because they cannot pass these tests. It is recommended that natural-exposure trials always be undertaken so that, in the long term, such anomalies can be resolved.

### 4.2 Additional performance tests

Additional tests are recommended if

- a) more information is needed on corrosion protection behaviour;
- b) chemical resistance is required;
- c) mechanical resistance is required;
- d) cathodic protection is applied.

Additional test methods may be agreed between the interested parties.

## 5 Tests

### 5.1 Test panels

#### 5.1.1 Carbon steel substrates

The test panels shall be made of the same type of steel as used in practice, unless otherwise agreed. The minimum panel size shall be 150 mm × 75 mm. The panel thickness will depend on the test, but shall be 3 mm at least. Unless otherwise agreed, the panel surface shall be prepared by blast-cleaning to minimum surface preparation grade Sa 2½ as defined in ISO 8501-1. The surface roughness (profile) shall correspond to “medium (G)” as defined in ISO 8503-1. It can be checked by using a comparator as defined in ISO 8503-2. The panels shall not be curved. In all other respects, test panels shall comply with ISO 7384.

#### 5.1.2 Hot dip galvanized steel substrates

The test panels shall be made of the hot dip galvanized steel in accordance with the ISO 1461, unless otherwise agreed. Size and thickness shall be as for carbon steel substrates. Surface preparation shall be as agreed between the interested parties. Suitable surface preparation methods are given in ISO 12944-4 and in ISO 12944-5, Annex B. The thickness of the zinc layer shall be determined and documented in the test report.