



SLOVENSKI STANDARD
SIST EN 1670:2000
01-maj-2000

Stavbno okovje - Korozijska odpornost - Zahteve in preskusne metode

Building hardware - Corrosion resistance - Requirements and test methods

Schlösser und Baubeschläge - Korrosionsverhalten - Anforderungen und Prüfverfahren

Quincaillerie pour le bâtiment - Résistance a la corrosion - Prescriptions et méthodes d'essai

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English version

Building hardware - Corrosion resistance - Requirements and test methods

Quincaillerie pour le bâtiment - Résistance à la corrosion -
Prescriptions et méthodes d'essai

Schlösser und Baubeschläge - Korrosionsverhalten -
Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 2 August 1998.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 33 "Doors, windows, shutters and building hardware", the secretariat of which is held by AFNOR.

This European Standard is part of a series of European Standards dedicated to building hardware products.

A full contribution to the preparation of this standard has been made by the European Manufacturer's Organisation "ARGE".

Informative annexes are cited in the content list.

Corrosion protection alone is not specified in any of the six essential requirements of the Construction Products Directive but is an implicit requirement for durability. This European Standard provides for the corrosion resistance of all building hardware, classified according to application.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 1999, and conflicting national standards shall be withdrawn at the latest by February 1999.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

0 Introduction

CEN recently inaugurated CEN/TC 262 "Corrosion protection of metallic materials", the first meeting being held in January 1991. The scope agreed for CEN/TC 262 includes the establishment of standards for the evaluation of corrosion likelihood by means of performance tests and of the various systems used for corrosion protection. CEN/TC 33 recognises that developments by CEN/TC 262 may make it necessary to revise this European Standard in a few years' time, replacing it by a new one based solely on the performance testing of building hardware. Although the accelerated corrosion tests currently available are only partly successful in this respect, several members of CEN/TC 33 have expressed their support in principle for such an approach.

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One member of the CEN/TC 33/WG 4/TG 2, predominantly exposed in his region to a continental climate, prefers the sulphur dioxide test with the general condensation of moisture according to ISO 6988 since the salt spray test in accordance to ISO 9227 does not cover the kind of stressing exerted by industrial environments. The majority of others members prefers the salt spray test in accordance with ISO 9227 as well as the corrodokote test according to ISO 4541. Because of these reasons this standard specification can be applied only restrictively within the member bodies confronted with prevailing industrial atmospheric conditions.

1 Scope

This European Standard specifies the requirements for the corrosion resistance of hardware for doors, windows, shutters and curtain walling.

The standard specifies requirements for both coated and uncoated surfaces, four grades (classes) of corrosion resistance being laid down in accordance with the different conditions of use (grades/classes) 1 to 4). A grade (class) 0 is also included for which no requirements have been specified. Requirements for levels of corrosion higher than those laid down for grade (class) 4 have not been included in this standard and are subject to agreement where required.

This standard also applies to the metal fasteners required for fixing building hardware.

The requirements for protective finishes specified in this standard are derived from ISO standards. Where materials are used uncoated or where other finishes are used that are not covered by ISO standards, classification is based on performance in neutral salt spray tests as specified in ISO 9227.

NOTE: The term "grade" used in this European Standard corresponds to the term "class" used in ISO standards.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- | | |
|------------|--|
| ISO 1456 | Metallic coatings - Electrodeposited coatings of nickel plus chromium and of copper plus nickel plus chromium |
| ISO 1458 | Metallic coatings - Electrodeposited coatings of nickel |
| ISO 2081 | Metallic coatings - Electroplated coatings of zinc on iron or steel |
| ISO 4520 | Chromate conversion coatings on electroplated zinc and cadmium coatings |
| 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 7599 | Anodizing of aluminium and its alloys - General specifications for anodic oxide coatings on aluminium |
| ISO 9227 | Corrosion tests in artificial atmospheres - Salt spray tests |

3 Definitions

For the purposes of this standard the following definition applies :

significant surface : Those parts of the surface of a product that are normally visible when the product is installed and can be touched by a ball $20 \text{ mm} \begin{matrix} +1 \\ 0 \end{matrix}$ mm in diameter and those other surfaces on which a specified corrosion resistance is essential to ensure the continuance of correct function.

4 Classification

Requirements are specified for four grades (classes) of corrosion resistance classified as low, moderate, high and very high which may be typified by situations ranging from mild exposure in interior environments that are normally dry to very severe exposure in exterior environments in very polluted localities.

The standard also includes a grade (class) 0 which is applicable to a limited range of products for which a defined corrosion resistance is not relevant.

- Grade (class) 0 : no defined corrosion resistance ;
- grade (class) 1 : low resistance ;
- grade (class) 2 : moderate resistance ;
- grade (class) 3 : high resistance ;
- grade (class) 4 : very high resistance.

See Annex B for the meaning of this classification and its application to particular situations.

5 Requirements

5.1 General requirements

Dependent upon the hardware surface protection the requirement of one of the grades (classes) given in 5.2 to 5.7 shall be met.

The following requirements shall not apply to grade (class) 0 finishes for which no defined corrosion resistance is relevant.

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5.2 Electrodeposited nickel plus chromium

If coated with electrodeposited nickel plus chromium or with copper plus nickel plus chromium the requirements of the appropriate service condition number is ISO 1456 shall be met as follows :

- grade (class) 1 : ISO 1456 service condition number 1 (mild) ;
- grade (class) 2 : ISO 1456 service condition number 2 (moderate) ;

- grade (class) 3 : ISO 1456 service condition number 3 (severe) ;
- grade (class) 4 : ISO 1456 service condition number 4 (exceptionally severe).

5.3 Electrodeposited nickel

If coated with electrodeposited nickel the requirements of the appropriate service condition number of ISO 1458 shall be met as follows :

- grade (class) 1: ISO 1458 service condition number 1 (mild) ;
- grade (class) 2: ISO 1458 service condition number 2 (moderate) ;
- grade (class) 3: ISO 1458 service condition number 3 (severe) ;
- grade (class) 4: not applicable ; such grade (class) is not covered by ISO 1458.

NOTE: Some people are susceptible to an allergic reaction if in prolonged contact with uncoated nickel plate. This can be avoided by coating nickel plate with a suitable clear varnish.

5.4 Electrodeposited zinc on iron or steel

If coated with electroplated zinc on iron or steel, the requirements of the appropriate classification code of ISO 2081 plus a chromate conversion coating meeting the requirements of the class of ISO 4520 specified to match that classification, shall be met as follows :

- grade (class) 1 : ISO 2081 classification code Fe/Zn5 + ISO 4520 class 1A, 1B, 2C or 2D ;
- grade (class) 2 : ISO 2081 classification code Fe/Zn8 + ISO 4520 class 1A, 1B, 2C or 2D ;
- grade (class) 3 : ISO 2081 classification code Fe/Zn12 + ISO 4520 class 2C or 2D ;
- grade (class) 4 : as specified for grade (class) 3 with the additional requirement that the minimum local thickness of zinc shall be 16 μm .

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5.5 Anodized oxide coating on aluminium

If coated with an anodized oxide coating on aluminium the requirements of the appropriate grade (class) of ISO 7599 shall be met as follows :

- grade (class) 1 : ISO 7599 class AA 5 ;
- grade (class) 2 : ISO 7599 class AA 10 ;
- grade (class) 3 : ISO 7599 class AA 10 ;
- grade (class) 4 : ISO 7599 class AA 15.

NOTE: Aluminium foundry alloys that contain a high proportion of alloying elements such as copper, zinc or silicon are subject to anodizing problems when anodized to film thicknesses greater than 8 μm (notably darkening of or striations in the anodic film). However, film thicknesses in the range of 5 μm to 10 μm may be suitable for service in grade (class) 2 or grade (class) 3 situations when frequent cleaning of the anodized surface can be guaranteed, when the fitting can easily be replaced or when some deterioration of the surface finish can be accepted. Otherwise such foundry alloys which have been anodized to a film thickness less than 10 μm should not be specified for fittings intended for service in situations other than grade (class) 1.

5.6 Other coatings or uncoated hardware

If uncoated or protected with a surface coating not specified in 5.2 to 5.5 the article shall be exposed to a neutral salt spray test in accordance with ISO 9227, the grades (classes) for corrosion resistance being given below :

- grade (class) 1 : 24 h $\begin{matrix} +1 \\ 0 \end{matrix}$ h ;

- grade (class) 2 : 48 h $\begin{matrix} +2 \\ 0 \end{matrix}$ h ;

- grade (class) 3 : 96 h $\begin{matrix} +4 \\ 0 \end{matrix}$ h ;

- grade (class) 4 : 240 h $\begin{matrix} +4 \\ 0 \end{matrix}$ h.

5.7 Acceptance conditions

Coated finishes shall withstand exposure for the time specified without corrosion of the base metal substrate visible to unaided normal or corrected vision excepting an average of one spot per 650 mm^2 of significant surface and without any spots larger than 1,5 mm in any direction.

The degree of blistering of organic coatings shall be not worse than density 2 and the size of any blisters shall not exceed size 3 as both designated in ISO 4628-2.

Uncoated metals shall show no sign of tarnish, visible to unaided normal or corrected vision as blackening or discoloration of the surface.

NOTE 1: Corrosion of the base metal substrate should not be confused with surface corrosion of its finish. In the case of steel substrates, corrosion is rust of a reddish brown appearance. Corrosion of aluminium or zinc alloy substances is white and corrosion of brass or bronze substrates is green.

After any corrosion test required by the relevant clause, the product shall be capable of functioning normally.