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A comma is used as the decimal marker.

National foreword

This standard has been prepared by Technical Committee ISO/TC 156 “Corrosion of metals and alloys” (Secretariat: SAC, China) and has been adopted as EN ISO 9227:2012 by Technical Committee CEN/TC 139 “Paints and varnishes” (Secretariat: DIN, Germany) within the scope of the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

The responsible German body involved in its preparation was the *Normenausschuss Materialprüfung* (Materials Testing Standards Committee), Working Committee NA 062-01-71 AA *Korrosion und Korrosionsschutz.*

The DIN Standards corresponding to the International Standards referred to in this document are as follows:

ISO 1456	DIN EN ISO 1456
ISO 1513	DIN EN ISO 1513
ISO 1514	DIN EN ISO 1514
ISO 2808	DIN EN ISO 2808
ISO 3613	DIN EN ISO 3613
ISO 3270	DIN EN 23270
ISO 3668	DIN EN ISO 3668
ISO 4527	DIN EN ISO 4527
ISO 4628-1	DIN EN ISO 4628-1
ISO 4628-2	DIN EN ISO 4628-2
ISO 4628-3	DIN EN ISO 4628-3
ISO 4628-4	DIN EN ISO 4628-4
ISO 4628-5	DIN EN ISO 4628-5
ISO 4628-8	DIN EN ISO 4628-8
ISO 7253	DIN EN ISO 7253
ISO 7599	DIN EN ISO 7599
ISO 8993	DIN EN ISO 8993
ISO 8994	DIN EN ISO 8994
ISO 10289	DIN EN ISO 10289
ISO 15528	DIN EN ISO 15528
ISO 17872	DIN EN ISO 17872

Amendments

This standard differs from DIN EN ISO 9227:2006-10 as follows:

a) the standard has undergone minor revisions.

Previous editions

DIN 50021: 1970-04, 1975-05, 1988-06
DIN 53167: 1972-08, 1985-12
DIN 45646: 1988-07
DIN EN ISO 7235: 1995-09, 2004-02
DIN EN ISO 9227: 2006-10

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National Annex NA
(informative)

Bibliography

DIN EN 23270, *Paints, varnishes and their raw materials — Temperatures and humidities for conditioning and testing*

DIN EN ISO 1456*, Metallic and other inorganic coatings — Electrodeposited coatings of nickel, nickel plus chromium, copper plus nickel and of copper plus nickel plus chromium*

DIN EN ISO 1513, *Paints and varnishes — Examination and preparation of test samples*

DIN EN ISO 1514, *Paints and varnishes — Standard panels for testing*

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

DIN EN ISO 3613, *Metallic and other inorganic coatings — Chromate conversion coatings on zinc, cadmium, aluminium-zinc alloys and zinc-aluminium alloys — Test methods*

DIN EN ISO 3668, *Paints and varnishes — Visual comparison of the colour of paints*

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

DIN EN ISO 4628-1, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 1: General introduction and designation system*

DIN EN ISO 4628-2, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 2: Assessment of degree of blistering*

DIN EN ISO 4628-3, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 3: Assessment of degree of rusting*

DIN EN ISO 4628-4, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 4: Assessment of degree of cracking*

DIN EN ISO 4628-5, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 5: Assessment of degree of flaking*

DIN EN ISO 4628-6, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 6: Assessment of degree of chalking by tape method*

DIN EN ISO 4628-7, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 7: Assessment of degree of chalking by velvet method*

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DIN EN ISO 4628-8, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 8: Assessment of degree of delamination and corrosion around a scribe or other artificial defect*

DIN EN ISO 4628-10, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 10: Assessment of degree of filiform corrosion*

DIN EN ISO 7253, *Paints and varnishes — Determination of resistance to neutral salt spray (fog)* (withdrawn)

DIN EN ISO 7599, *Anodizing of aluminium and its alloys — General specifications for anodic oxidation coatings on aluminium*

DIN EN ISO 8993, *Anodizing of aluminium and its alloys — Rating system for the evaluation of pitting corrosion — Chart method*

DIN EN ISO 8994, *Anodizing of aluminium and its alloys — Rating system for the evaluation of pitting corrosion — Grid method*

DIN EN ISO 10289, *Methods for corrosion testing of metallic and other inorganic coatings on metallic substrates — Rating of test specimens and manufactured articles subjected to corrosion tests*

DIN EN ISO 15528, *Paints, varnishes and raw materials for paints and varnishes — Sampling*

DIN EN ISO 17872, *Paints and varnishes — Guidelines for the introduction of scribe marks through coatings on metallic panels for corrosion testing*

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Corrosion tests in artificial atmospheres - Salt spray tests (ISO 9227:2012)

Essais de corrosion en atmosphères artificielles - Essais aux brouillards salins (ISO 9227:2012)

Korrosionsprüfungen in künstlichen Atmosphären - Salzsprühnebelprüfungen (ISO 9227:2012)

This European Standard was approved by CEN on 14 May 2012.

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Foreword

This document (EN ISO 9227:2012) has been prepared by Technical Committee ISO/TC 156 “Corrosion of metals and alloys” in collaboration with Technical Committee CEN/TC 139 “Paints and varnishes” the secretariat of which is held by DIN.

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 November 2012, and conflicting national standards shall be withdrawn at the latest by November 2012.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 9227:2006.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 9227:2012 has been approved by CEN as a EN ISO 9227:2012 without any modification.

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Introduction

There is seldom a direct relation between resistance to the action of salt spray and resistance to corrosion in other media, because several factors influencing the progress of corrosion, such as the formation of protective films, vary greatly with the conditions encountered. Therefore, the test results should not be regarded as a direct guide to the corrosion resistance of the tested metallic materials in all environments where these materials might be used. Also, the performance of different materials during the test should not be taken as a direct guide to the corrosion resistance of these materials in service.

Nevertheless, the method described gives a means of checking that the comparative quality of a metallic material, with or without corrosion protection, is maintained.

Salt spray tests are generally suitable as corrosion protection tests for rapid analysis for discontinuities, pores and damage in organic and inorganic coatings. In addition, for quality control purposes, comparison can be made between specimens coated with the same coating. As comparative tests, however, salt spray tests are only suitable if the coatings are sufficiently similar in nature.

It is often not possible to use results gained from salt spray testing as a comparative guide to the long-term behaviour of different coating systems, since the corrosion stress during these tests differs significantly from the corrosion stresses encountered in practice.

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1 Scope

This International Standard specifies the apparatus, the reagents and the procedure to be used in conducting the neutral salt spray (NSS), acetic acid salt spray (AASS) and copper-accelerated acetic acid salt spray (CASS) tests for assessment of the corrosion resistance of metallic materials, with or without permanent or temporary corrosion protection.

It also describes the method employed to evaluate the corrosivity of the test-cabinet environment.

It does not specify the dimensions of test specimens, the exposure period to be used for a particular product, or the interpretation of results. Such details are provided in the appropriate product specifications.

The salt spray tests are particularly useful for detecting discontinuities, such as pores and other defects in certain metallic, organic, anodic oxide and conversion coatings.

The neutral salt spray test is the test method in which a 5 % sodium chloride solution in the pH range from 6,5 to 7,2 is atomized under a controlled environment. It particularly applies to:

— metals and their alloys,

— metallic coatings (anodic and cathodic),

— conversion coatings,

— anodic oxide coatings, and

— organic coatings on metallic materials.

The acetic acid salt spray test is the test method in which a 5 % sodium chloride solution with the addition of glacial acetic acid in the pH range from 3,1 to 3,3 is atomized under a controlled environment. It is especially useful for testing decorative coatings of copper + nickel + chromium, or nickel + chromium. It has also been found suitable for testing anodic coatings on aluminum.

The copper-accelerated acetic acid salt spray test is the test method in which a 5 % sodium chloride solution with the addition of copper chloride and glacial acetic acid in the pH range from 3,1 to 3,3 is atomized under a controlled environment. It is useful for testing decorative coatings of copper + nickel + chromium, or nickel + chromium. It has also been found suitable for testing anodic coatings on aluminum.

The salt spray methods are all suitable for checking that the comparative quality of a metallic material, with or without corrosion protection, is maintained. They are not intended to be used for comparative testing as a means of ranking different materials relative to each other with respect to corrosion resistance.

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

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

ISO 3574, *Cold-reduced carbon steel sheet of commercial and drawing qualities*

ISO 8407, *Corrosion of metals and alloys — Removal of corrosion products from corrosion test specimens*

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