

Method for

Salt spray corrosion tests in artificial atmospheres

Committees responsible for this British Standard

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- Aluminium Federation
- British Gas plc
- British Steel Industry
- Department of Trade and Industry (National Physical Laboratory)
- Department of Transport (Transport and Road Research Laboratory)
- Electricity Industry in United Kingdom
- Institute of Corrosion
- Institution of Structural Engineers
- Society of Chemical Industry
- United Kingdom Atomic Energy Authority
- The Welding Institute

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National foreword

This British Standard has been prepared under the direction of the Iron and Steel and Non-ferrous Metals Standards Policy Committees. It is identical with ISO 9227:1990 “*Corrosion tests in artificial atmospheres — Salt spray tests*” published by the International Organization for Standardization (ISO). This British Standard supersedes BS 5466-1:1977, BS 5466-2:1977 and BS 5466-3:1977, which are withdrawn.

NOTE *Typographical error.* In footnote⁴⁾ of clause 5.1.1 “faultness” should read “faultless”.

Cross-references

International standard	Corresponding British Standard
ISO 4540:1980	BS 5466 Methods for corrosion testing of metallic coatings Part 6:1982 Rating of results of corrosion tests on electroplated coatings cathodic to the substrate (Identical)

The Technical Committee has reviewed the provisions of ISO 1462, ISO 3574 and ISO 6372-1, to which reference is made in the text, and has decided that they are acceptable for use in conjunction with this standard.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 8, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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 corrosion protection 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, anodic oxide and conversion coatings.

The neutral salt spray test applies to

- metals and their alloys;
- certain metallic coatings (anodic and cathodic)¹⁾;
- certain conversion coatings¹⁾;
- certain anodic oxide coatings¹⁾;
- organic coatings on metallic materials.

The acetic acid salt spray test is especially useful for testing decorative coatings of copper + nickel + chromium or nickel + chromium. It has also been found suitable for testing anodic oxide coatings on aluminium.

The copper-accelerated acetic acid salt spray test is useful for testing decorative coatings of copper + nickel + chromium or nickel + chromium; it has also been found suitable for testing anodic coatings on aluminium.²⁾

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

¹⁾ See annex B.

²⁾ Attention is drawn to the fact that no satisfactory basis for comparison can be derived from this test with regard to the respective quality of nickel + chromium coatings and copper + nickel + chromium coatings, because the reagent used contains a copper ion which promotes corrosion in the presence of nickel but is without influence on copper.

ISO 1462:1973, *Metallic coatings — Coatings other than those anodic to the basis metal — Accelerated corrosion tests — Method for the evaluation of the results.*

ISO 3574:1986, *Cold-reduced carbon steel sheet of commercial and drawing qualities.*

ISO 4540:1980, *Metallic coatings — Coatings cathodic to the substrate — Rating of electroplated test specimens subjected to corrosion tests.*

ISO 6372-1:1989, *Nickel and nickel alloys — Terms and definitions — Part 1: Materials.*

3 Test solutions

3.1 Preparation of the sodium chloride solution

Dissolve a sufficient mass of sodium chloride in distilled or deionized water with a conductivity not higher than 20 $\mu\text{S}/\text{cm}$ at $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ to produce a concentration of $50\text{ g/l} \pm 5\text{ g/l}$. The sodium chloride concentration of the sprayed solution collected shall be $50\text{ g/l} \pm 5\text{ g/l}$. The specific gravity range for a $50\text{ g/l} \pm 5\text{ g/l}$ solution is 1,025 5 to 1,040 0 at $25\text{ }^{\circ}\text{C}$.

The sodium chloride shall contain less than 0,001 % (*m/m*) of copper and less than 0,001 % (*m/m*) of nickel as determined by atomic absorption spectrophotometry or another analytical method of similar sensitivity. It shall not contain more than 0,1 % (*m/m*) of sodium iodide or more than 0,5 % (*m/m*) of total impurities calculated for dry salt.

NOTE 1 If the pH of the prepared solution, measured at $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$, is outside the range 6,0 to 7,0, investigate the presence of undesirable impurities in the salt and/or the water.

3.2 pH adjustment

Adjust the pH of the salt solution to the desired value on the basis of the pH of the sprayed solution collected.

3.2.1 NSS test

Adjust the pH of the salt solution (3.1) so that the pH of the sprayed solution collected within the test cabinet (4.1) is between 6,5 to 7,2. Check the pH using electrometric measurement at $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$, or, in routine checks, with a short-range pH paper which can be read in increments of 0,3 pH units or less. Make any necessary correction by adding hydrochloric acid or sodium hydroxide solution of analytical grade.