INTERNATIONAL STANDARD ISO 3769

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION •МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Metallic coatings — Acetic acid salt spray test (ASS test)

Revêtements métalliques — Essai au brouillard salin acétique (Essai ASS)

First edition — 1976-11-01

UDC 669.058 : 620.193.25

Ref. No. ISO 3769-1976 (E)

Descriptors : metal coatings, tests, corrosion tests, salt spray tests.

Price based on 3 pages

FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up 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.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 3769 was drawn up by Technical Committee ISO/TC 107, *Metallic and other non-organic coatings*, and was circulated to the Member Bodies in May 1975.

It has been approved by the Member Bodies of the following countries :

Australia
Austria
Bulgaria
Chile
Czechoslovakia
France
Germany
Hungary
Ireland
Israel
Italy
Japan
Korea, Rep. of
Mexico
Netherlands
New Zealand
Poland
Portugal
Romania
South Africa, Rep. of
Spain
Sweden
Switzerland
Turkey
United Kingdom
U.S.A.
U.S.S.R.
Yugoslavia

No Member Body expressed disapproval of the document.

Printed in Switzerland

Metallic coatings — Acetic acid salt spray test (ASS test)

0 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 results obtained in the test should not be regarded as a *direct guide to the corrosion resistance of the tested* coatings in all environments where these coatings may be used. Also, performance of different coatings in the test should not be taken as a direct guide to the relative corrosion resistance of these coatings in service.

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the apparatus, the reagent and the procedure to be used in conducting the acetic acid salt spray test for assessment of the quality of metal coatings made in accordance with the requirements of coating or product specifications.

The detailed requirements of the method have no significance other than to ensure that comparable results are obtained by different laboratories testing the same coating or product. The method 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 aluminium.

This International Standard does not specify the type of test specimen, the exposure periods to be used for a particular product or the interpretation of results. Such details are provided in the appropriate coating or product specifications.

2 TEST SOLUTION

2.1 The test solution shall be prepared by dissolving sodium chloride in distilled or de-ionized water to produce a concentration of 50 ± 5 g/l. The sodium chloride shall be white and shall give a colourless solution in water. It shall be substantially free from copper and nickel and shall not contain more than 0,1 % of sodium iodide and not more than 0,4 % of total impurities calculated for dry salt. If the pH of the solution as prepared is outside the range 6,0 to 7,0, the presence of undesirable impurities in the salt or the water or both shall be investigated.

2.2 A sufficient amount of glacial acetic acid shall be added to the salt solution to ensure that the pH of samples of sprayed solution collected in the test cabinet (see 3.1.4) will be between 3,1 and 3,3. If the pH of the solution as initially prepared is 3,0 to 3,1, the pH of the sprayed solution is likely to be within the specified limits. All pH values shall be measured electrometrically at 25 °C, but a short-range pH paper which can be read in increments of 0,1 pH unit or less and which has been calibrated against electrometric measurements may be used in routine checks. Any necessary correction shall be made by additions of solutions of glacial acetic acid or sodium hydroxide of analytical grade.

2.3 The solution shall be filtered before it is placed in the reservoir of the apparatus, in order to remove any solid matter which might block the apertures of the spraying devices.

3 APPARATUS

3.1 The apparatus shall comprise the following components :

3.1.1 A spray cabinet made of, or lined with, material resistant to corrosion by the sprayed solution. The cabinet shall have a capacity of not less than 0,2 m^3 and preferably not less than 0,4 m^3 since, with smaller volumes, difficulties are experienced in ensuring even distribution of spray. The upper parts shall be so shaped that drops of sprayed solution accumulated on them do not fall on specimens being tested.

The size and shape of the cabinet shall be such that the quantity of solution collected in the cabinet is within the limits stated in 6.2.

3.1.2 Means of supplying and controlling heat, adequate to maintain the cabinet and its contents at the specified temperature (see 6.1). The temperature shall be controlled by a thermostat element placed either within the cabinet at least 100 mm from the walls or in a water jacket on the cabinet. In either case the thermometer, capable of being read from the outside, shall be placed within the cabinet at least 100 mm from the walls.

3.1.3 Means of spraying the salt solution, comprising a supply of clean air of controlled pressure and humidity, a reservoir to contain the solution to be sprayed and one or more atomizers made of inert material.

The compressed air supply to the atomizers shall be passed through a filter to remove all traces of oil or solid matter and shall be at a pressure of 70 to 170 kPa1). In order to prevent evaporation of water from the sprayed droplets the air shall be humidified before entering the atomizer by passage through a saturation tower containing water at a temperature several degrees higher than that of the cabinet. The appropriate temperature depends on the pressure used and on the type of atomizer nozzle and shall be adjusted so that the rate of collection of spray in the cabinet and the concentration of the collected spray are kept within the specified limits (see 6.2).

The reservoir to contain the solution to be sprayed shall be a tank made of material resistant to the solution and shall be provided with means of maintaining a constant level of the solution in the reservoir.

The atomizers shall be made of inert material, for example glass or plastics material. Baffles may be used to prevent direct impingement of spray on the test specimens and the use of adjustable baffles is helpful in obtaining uniform distribution of spray throughout the cabinet.

3.1.4 At least two suitable collecting devices, which shall be funnels of glass or other chemically inert material with the stems inserted into graduated cylinders or other containers. Funnels with a diameter of 100 mm have a collecting area of approximately 80 cm^2. The collecting devices shall be placed in the zone of the cabinet where the test specimens are placed, one close to an inlet of spray and one remote from an inlet. They shall be so placed that only spray and not liquid falling from specimens or from part of the cabinet is collected.

3.2 If the equipment has been used for a spray test or for any other purpose with solution differing from that specified for the test to be carried out, it shall be thoroughly cleaned before use.

4 TEST SPECIMENS

4.1 The number and type of test specimens, their shape and their dimensions shall be selected according to the specification covering the coating or product being tested. When not so specified, details concerning the specimens shall be mutually agreed between the interested parties.

4.2 The specimens shall be thoroughly cleaned before testing. The method employed shall depend on the nature of the surface and of the contaminants and shall not include the use of any abrasives or solvants which may attack the surface of the specimens.

Care shall be taken that specimens are not recontaminated after cleaning by excessive or careless handling.

4.3 If test specimens are cut from a larger coated article, the cutting shall be carried out in such a way that the coating is not damaged in the area adjacent to the cut. Unless otherwise specified, the cut edges shall be adequately protected by coating them with a suitable medium, stable under the conditions of the test, such as paint, wax or adhesive tape.

5 METHOD OF EXPOSURE OF TEST SPECIMENS

5.1 The specimens shall be so placed in the cabinet that they are not in the direct line of travel of spray from the atomizer. Baffles may be used to prevent direct impact of the sprayed solution on the specimens.

5.2 The angle at which the sample is exposed in the cabinet is very important. The surface shall, in principle, be flat and placed in the cabinet facing upwards at an angle as close as possible to 20° to the vertical. This angle shall in all cases be within the limits 15° to 30°.

In the case of irregular surfaces, for example entire components, these limits shall be adhered to as closely as possible.

5.3 The specimens shall be so arranged that they do not come into contact with one another or with the cabinet and that surfaces to be tested are exposed to free circulation of spray. Specimens may be placed at different levels within the cabinet as long as the solution cannot drip from specimens or their support at one level onto other specimens placed below.

5.4 The support for the specimens shall be made of inert non-metallic material such as glass, plastics or suitably coated wood. If it is necessary to suspend test specimens, the material used shall on no account be metallic and shall be synthetic fibre, cotton thread or other inert insulating material.

6 OPERATING CONDITIONS

6.1 The temperature inside the cabinet shall be 35 ± 2 °C with the minimum possible fluctuation throughout the cabinet during the test.

6.2 The solution collected in each of the collecting devices (see 3.1.4) shall have a sodium chloride concentration of 50 ± 10 g/l and a pH value in the range 3.1 to 3.3 (see 2.2).

---

1) 1 kPa = 1 kN/m^2 ≈ 0,01 atm