

STANDARDS AUSTRALIA

RECONFIRMATION

OF

AS 2331.3.13—2006

Methods of test for metallic and related coatings

Method 3.13: Corrosion and related property tests—Wet (salt fog)/dry/humidity

RECONFIRMATION NOTICE

Technical Committee MT-009 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

Certain documents referenced in the publication may have been amended since the original date of publication. Users are advised to ensure that they are using the latest versions of such documents as appropriate, unless advised otherwise in this Reconfirmation Notice.

Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 20 March 2017.

The following are represented on Technical Committee MT-009:

Australasian Institute of Surface Finishing
Australian Chamber of Commerce and Industry
Australian Industry Group
Australian Steel Institute
Bureau of Steel Manufacturers of Australia
Galvanizers Association of Australia
Galvanizing Association of New Zealand
New Zealand Metal Roofing Manufacturers

NOTES

Australian Standard®

Methods of test for metallic and related coatings

Method 3.13: Corrosion and related property tests—Wet (salt fog)/dry/humidity

PREFACE

This Standard was prepared by the Australian members of the Joint Standards Australia/Standards New Zealand Committee MT-009, Metal Finishing.

After consulting with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian Standard rather than an Australian/New Zealand Standard.

The objective of this Standard is to specify a method for corrosion salt fog cycle testing of paints on metals.

This Standard is Part 3.13 of a series of Standards covering the methods of test for metallic and related coatings.

During the preparation of this Standard cognisance was taken of ISO 3270, *Paints and varnishes and their raw materials—Temperatures and humidities for conditioning and testing* and ISO 11997-1, *Paints and varnishes—Determination of resistance to cyclic corrosion conditions, Part 1: Wet (salt fog)/dry/humidity*.

The term ‘normative’ has been used in this Standard to define the application of the appendix to which it applies. A ‘normative’ appendix is an integral part of a Standard.

METHOD

1 SCOPE

This Standard specifies a method for the determination of the resistance of painted coatings to one of five defined cycles of wet (salt fog)/dry/humidity conditions using specified solutions.

This practice is limited to the methods of obtaining, measuring and controlling exposure conditions, and procedures. For the evaluation of results refer to AS 1247.

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

- 1247 Metallic coatings—Rating of test specimens and manufactured articles subject to corrosion tests

AS

2331 Methods of test for metallic and related coatings

2331.0 Part 0: Method selection guide

2483 Metal finishing—Recommended sampling plans for the inspection and testing of coatings (ISO 4519:1980, MOD)

4108 Metal finishing—Glossary of terms in electroplating and related processes

ISO

2808 Paints and varnishes—Determination of film thickness

3696 Water for analytical laboratory use—Specification and test methods

3 DEFINITIONS

For the purpose of this Standard, the definitions given in AS 4108 apply.

4 PRINCIPLE

A coated test panel is exposed to a cyclic wet (salt fog), drying and humidity test schedule and the effects of exposure are evaluated by criteria agreed in advance between the purchaser and the supplier.

NOTE: These criteria are usually of a subjective nature.

5 APPARATUS**5.1 General**

The salt fog test solution is specified in Appendix A.

NOTE: Ordinary laboratory apparatus and glassware may be used.

5.2 Spray cabinet

The spray cabinet shall be made from or lined with materials which are resistant to corrosion by the sprayed solution, and shall have a roof which prevents condensed moisture dripping onto the test specimens. The cabinet shall have a capacity of not less than 0.4 m³ in order to ensure even distribution of the spray.

The size and shape of the cabinet shall be such that the salt fog deposition rate is within the limits given in Appendices A, B, C, D and E.

Cabinets with a volume greater than 2 m³ are difficult to operate unless careful consideration is given to their design and construction.

The number and the position of the atomizers and baffles required to produce an even spray distribution within the limits specified shall be in accordance with Appendices A, B, C, D and E.

The number of collecting devices required to monitor the spray as required in Clause 5.6.

The heating, insulation and means of temperature control shall be such as required to produce a uniform temperature within the cabinet at all positions where test specimens are exposed.

The temperature inside the cabinet shall be controlled to within the limits of $\pm 2^{\circ}\text{C}$.

If the cabinet has been used for a spray test, or for any other purpose, using a solution differing from that specified for the current test cycle, it shall be thoroughly cleaned before use.

5.3 Hot-air blowers

The blowers shall be capable of maintaining the cabinet and its contents at the specified temperatures and achieving the required heating rates. The temperature shall be controlled by a thermostat element placed within the cabinet at least 100 mm from the walls of the cabinet.

5.4 Means for spraying the salt solution

The apparatus for spraying the salt solution shall comprise a supply of clean compressed air at a controlled pressure, a reservoir to contain the solution to be sprayed, and one or more atomizers made of metal resistant to the solution. The compressed-air supply to each atomizer shall be passed through a filter to remove all traces of oil or solid matter, shall be at a suitable pressure depending upon 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 as shown in Appendices A, B, C, D and E.

The reservoir containing 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 flow to the atomizers.

The atomizers shall be made of inert material, for example, glass or plastic.

NOTE: 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.

5.5 Drying-air supply

Drying air for the drying cabinet shall be 20% to 30% relative humidity for cycles A and D and of 30% to 70% relative humidity for cycles B, C and E. The air shall be passed through a filter to remove all traces of oil or solid matter and shall have a flow rate sufficient to ensure that, at the start of a dry phase, no drops of moisture are visible on the panels after the drying time specified for cycles A and D and after 45 min for cycles B, C and E. The panels shall not be dried by heaters inside the cabinet walls.

NOTE: It is common practice to vent the cabinet to the atmosphere outside the laboratory.

5.6 Collecting devices

At least two collecting devices of a chemical inert material shall be used.

The collecting devices shall be placed in the zone of the cabinet where the test panels are placed, one close to the spray atomizer(s) and one remote from the spray atomizer(s). They shall be placed so that only spray and not liquid falling from test panels or parts of the cabinet is collected. The number of collecting devices shall be at least twice the number of atomizers.

NOTE: Glass funnels with the stems inserted into graduated cylinders have been found to be suitable collecting devices. Funnels with a diameter of 100 mm have a collecting area of approximately 80 cm².

5.7 Test panel racks

Racks shall be constructed from inert non-metallic material such as glass, plastic or suitably coated wood.

Exceptionally, test panels may be suspended. In this case, the material used shall be synthetic fibre, cotton thread or other inert insulating material; on no account shall metallic material be used. All racks shall be placed at the same level in the cabinet so that the solution cannot drip from panels or racks at one level onto other panels placed below.

5.8 Control equipment

The control equipment shall provide wet (salt fog)/dry/humidity cycles for the times and temperatures specified in Appendices A, B, C, D and E.

6 SAMPLING

Unless otherwise specified or agreed by the purchaser and/or supplier the selection of the sample shall be in accordance with AS 2483. Representative samples shall be taken from the full width of the coated metal to be tested, of sufficient size to carry out the required tests, (see Clause 7).

7 TEST SPECIMENS

7.1 General

The number and type of test specimens and their shape and dimensions, shall be selected in accordance with the specification covering the product items under test. Unless otherwise agreed, flat specimens shall be 150 mm × 75 mm.

If test specimens are cut from a larger coated item, 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, cut edges shall be adequately protected with a suitable medium that is stable under the conditions of the test, such as paint, wax or adhesive tape.

Test specimens shall be thoroughly cleaned before testing. The cleaning method employed shall depend on the nature of the surface and the contaminants, and shall not include the use of any abrasives or solvents that could attack the coating.

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

7.2 Control specimen

The exposure of at least one control specimen shall be used for every test.

The control specimen shall have known durability and be of similar composition to the test specimen.

NOTES:

- 1 It is preferable to have two control materials; one of higher durability and one of lower durability.
- 2 It is recommended that at least three replicates of each specimen be tested, to compensate for variation within the chamber and variation between specimens.

7.3 Drying and conditioning

Dry (or stove) and age (if applicable) each coated test panel for the specified time under the specified conditions, and then, unless otherwise specified, condition them at a temperature and relative humidity as defined in Clause 7.4 for at least 16 h, with free circulation of air and without exposing them to direct sunlight.

The test procedure shall then be carried out as soon as possible.

7.4 Temperatures and humidities for conditioning and testing

The standard conditions shall be $23 \pm 2^\circ\text{C}$ and $50 \pm 5\%$ relative humidity.

7.5 Conditioning

The period of conditioning shall be specified in the particular test method under consideration, refer to Clause 7.3.

The products to be tested shall be placed in the conditioning atmosphere so that they reach equilibrium with the atmosphere as soon as possible. The relevant parts of the apparatus shall also be placed in the conditioning atmosphere so that they reach equilibrium. The products shall be protected from direct sunlight. The atmosphere should be clean.

Test panels that are placed in a humidity cabinet shall be separated from each other and from the walls of the enclosure by a distance of at least 20 mm.