BRITISH STANDARD

BS EN
13523-8:2002

Coil coated metals — Test methods —

Part 8: Resistance to salt spray (fog)

The European Standard EN 13523-8:2002 has the status of a British Standard

ICS 17.040.20; 25.220.60

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National foreword

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Summary of pages

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Tôles prélaquées - Méthodes d'essai - Partie 8: Résistance au brouillard salin

Bandbeschichtete Metalle - Prüfverfahren - Teil 8: Beständigkeit gegen Salzsprühnebel

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Foreword

This document EN 13523-8:2002 has been prepared by 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of an identical text or by endorsement, at the latest by January 2003, and conflicting national standards shall be withdrawn at the latest by January 2003.

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1 Scope

This Part of EN 13523 defines terms of the procedure for determining the resistance to salt spray (fog) of an organic coating on a metallic substrate.

For steel neutral salt spray (fog) is usually used, and for aluminium acetic acid salt spray (fog).

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 (including amendments).

EN 13523-0:2001, *Coil coated metals — Test methods — Part 0: General introduction and list of test methods.*

EN 13523-7:2001, *Coil coated metals — Test methods — Part 7: Resistance to cracking on bending (T-bend test).*

prEN 13523-19[1)], *Coil coated metals — Test methods — Part 19: Panel design and method for atmospheric exposure testing.*

EN 23270:1991, *Paints and varnishes and their raw materials — Temperatures and humidities for conditioning and testing (ISO 3270:1984).*

EN ISO 3696:1995, *Water for analytical laboratory use — Specifications and test methods (ISO 3696:1987).*

ISO 4628-2:1982, *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 7253:1996, *Paints and varnishes — Determination of resistance to neutral salt spray (fog).*

ISO 9227:1990, *Corrosion tests in artificial atmospheres — Salt spray tests.*

[1)] In preparation.

IEC 60454-2, *Specifications for pressure-sensitive adhesive tapes for electrical purposes — Part 2: Methods of test.*

3 Terms and definitions

For the purposes of this Part of EN 13523, the terms and definitions given in EN 13523-0:2001 apply.

4 Principle

A test specimen is exposed to a salt spray (fog) for a specified period of time and assessed for possible corrosion expressed by a degree of delamination or corrosion creep and a degree of blistering.

5 Apparatus and materials

5.1 Salt spray cabinet, in accordance with ISO 7253:1996 and ISO 9227:1990, calibrated in accordance with ISO 7253:1996, annex C.

5.2 Test solution, as specified in 5.2.1 or 5.2.2 respectively.

5.2.1 For neutral salt spray fog, the test solution shall be prepared by dissolving sodium chloride in water of at least grade 3 purity as defined in EN ISO 3696:1995 to produce a concentration of (50 ± 5) g/l. The sodium chloride shall be white, of minimum assay 99,6 % (by mass), and substantially free from copper and nickel; it shall contain not more than 0,1 % (by mass) of sodium iodide. If the pH of the solution 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. The pH of the test solution shall be adjusted so that the pH of sprayed solution collected within the salt spray cabinet (5.1) is between 6,5 and 7,2. Any necessary adjustment to the pH shall be made by additions of solutions of either hydrochloric acid or sodium bicarbonate of analytical grade.

5.2.2 For acetic acid salt spray (fog), add a sufficient amount of glacial acetic acid to the sodium chloride solution (5.2.1) to ensure that the pH of sprayed solution collected within the salt spray cabinet (5.1) is between 3,1 and 3,3. If the pH of the solution initially prepared is 3,0 to 3,1, the pH of the sprayed solution is likely to be within the specified limits.

NOTE Under normal conditions, the level of glacial acetic acid required is approximately 0,3 % (by mass).

5.3 Cutting tool, with a hard metal tip (according to Clemen). The scratch shall have an upwards-broadening cross section which shows a width of approx. 1 mm of the substrate.

NOTE If the substrate is zinc- or zinc-alloy coated steel, the scratch is then to the zinc coating, and not further, to the steel.

5.4 Transparent pressure-sensitive adhesive tape, 25 mm wide, with an adhesion strength of (10 ± 1) N per 25 mm width when tested in accordance with IEC 60454-2.

5.5 Sharp drill bit, of diameter approximately 5 mm for creating the hole.

5.6 Appropriate pressing (bending) apparatus, as described in prEN 13523-19, 5.2, or EN 13523-7:2001, 5.1.2.

6 Sampling

See EN 13523-0:2001.

7 Test specimens

7.1 General

See EN 13523-0:2001.

Design of the specimens:

- there are two options (7.2 and 7.3) both having the following in common:
- the protection of edges is optional;
- the reverse side shall be protected to stop any corrosive influence from the reverse side to the front side. The protection to the reverse side shall be applied before the drilling of the hole;
- scribe the front face of the test specimens by means of the cutting tool (5.3). The scribe shall extend down just through the organic coating and not through any metallic layer. The scribed indentation shall exhibit a vee-shaped profile and shall expose at least 0,2 mm of the substrate. The use of any other cutting tool other than described in 5.3 is not permitted;
- make a hole, of diameter approximately 5 mm, at 25 mm from the bottom edge, at the centre, using the sharp drill bit (5.5). Start the hole on the test coating so that the burr occurs on the opposite side to the coating under test.

7.2 Option 1 (see Figure 1)

The test specimen consists of a single flat panel of 200 mm × 150 mm. The 200 mm shall be in the rolling direction of the substrate (see prEN 13523-19).

Make two scribes at 90° to each other. The scribes shall be 40 mm in length with the vertical scribe central to the horizontal but separated by 10 mm. The horizontal scribe shall be at 50 mm from the bottom edge, the vertical scribe at 60 mm from it.

Make a 90° variable radius bend 25 mm from and parallel to the left 200 mm edge. The variable radius is bent from 1T to ≥ 3T as defined in EN 13523-7:2001, 8.2.2.

When the test specimen is exposed the bend is at the left side and the tightest radius at the bottom of the specimen.

7.3 Option 2 (see Figure 2)

The test specimen shall be of suitable size of at least 125 mm × 150 mm, the 150 mm shall be in rolling direction.

Two diagonal scribes are carried out crossing each other in the middle of the specimen and extending to within 15 mm from the edges in order to reach over the bend.

Make a variable radius bend 25 mm from the left or right longest edge, in accordance with EN 13523-7:2001, 8.3. The variable radius is bent from 1T to ≥ 3T but other bend radii can be agreed between the interested parties depending on the end use of the product. The tightest radius is at the bottom of the specimens.

8 Procedure

8.1 Operating conditions

Condition the test specimens for at least 24 hours under laboratory ambient conditions of temperature and humidity.

Maintain the cabinet temperature at (35 ± 2) °C.

Pre-heat the compressed air to the required temperature and saturate it (see ISO 7253:1996 or ISO 9227:1990) before being expanded in the atomiser. The preferred temperature conditions are between 46 °C and 49 °C.

Control the amount of condensate generated during operation so that 80 cm² horizontal surface collect between 1,0 ml and 2,0 ml of condensate per hour.

Expose the test specimens at an angle of between 15° and 25° to the vertical. The specimens shall not influence each other.

NOTE It is recommended to change the position of the individual specimens weekly to facilitate a more uniform exposure in the cabinet.

Include a reference specimen at the same time for exposure to ensure consistent corrositivity of the cabinet.

8.2 Exposure of test specimens

Place the test specimens in the cabinet and expose for the specified or agreed period of time.

Unless otherwise specified or agreed, expose coated steel specimens to neutral salt spray (fog) and coated aluminium specimens to acetic acid salt spray (fog).

8.3 Assessment

Assess the resistance of the coating to salt spray at ambient temperature. For a more accurate assessment, as required for instance in case of dispute, the temperature shall be (23 ± 2) °C and the relative humidity (50 ± 5) %, in accordance with EN 23270:1991.

8.3.1 Blistering

Examine the whole surface of each test specimen for blistering as described in ISO 4628-2:1982 immediately after removal of the test specimen from the cabinet and after having washed it and wiped off surface moisture with a soft tissue.

8.3.2 Corrosion creep

8.3.2.1 For category 1 coatings as defined in EN 13523-0:2001

Measure corrosion creep as follows: after drying at ambient temperature and within 24 h of removal from the cabinet, apply an adhesive tape (5.4) along one scribe mark, smooth the tape into place over the area of the scribe and for a distance of at least 20 mm beyond each end of the scribe. To ensure good contact with the coating, rub the tape firmly with a fingertip. The colour of the coating seen through the tape is a useful indication of overall contact.

Within 5 min of applying the tape, remove the tape by holding the free end and pulling it off steadily in 0,5 s to 1 s at an angle that is as close as possible to 60° to the panel.

Resistance to pick-off is evaluated after removal of tape: no loss of adhesion is allowed.

Retain the tape for reference purposes, for example by attaching it to a sheet of transparent film.

Corrosion creep shall be measured perpendicularly from the scribe mark to the edge of the undetached coating and expressed as an average distance for the whole length of the scribe.

Alternatively, corrosion creep can be measured in accordance with 8.3.2.2. In case of dispute, corrosion creep shall be measured using the method described in this sub-clause.

8.3.2.2 For category 2 coatings as defined in EN 13523-0:2001

Measure corrosion creep as follows: remove the loosened coating (if any) adjacent to the scribe marks by scraping with a blunt knife blade or suitable similar tool.

Corrosion creep shall be measured perpendicularly from the scribe mark to the edge of the undetached coating and expressed as an average distance for the whole length of the scribe.

9 Expression of results

Express the result as follows:

on the general surface:

— degree of blistering

at the cut edges:

— degree of blistering

— delamination or corrosion creep (in millimetres)

at the scribe:

— degree of blistering

— delamination or corrosion creep (in millimetres)

at the hole:

— degree of blistering

— delamination or corrosion creep (in millimetres)

at the bend:

— degree of blistering;

other defects.

10 Precision

The concept of precision is not applicable to this Part of this European Standard.

11 Test report

The test report shall contain at least the following information:

a) all details necessary to identify the product tested;

b) a reference to this Part of EN 13523 (EN 13523-8);

c) the type of the test (neutral or acetic acid salt spray), the substrate and the design of the specimen;

d) the details of the protection of the back side and the edges (see clause 7);

e) the duration of the exposure;

f) the results of the test, as indicated in clause 9;

g) any deviation from the test method specified;

h) the date of the test.

Dimension in millimetres

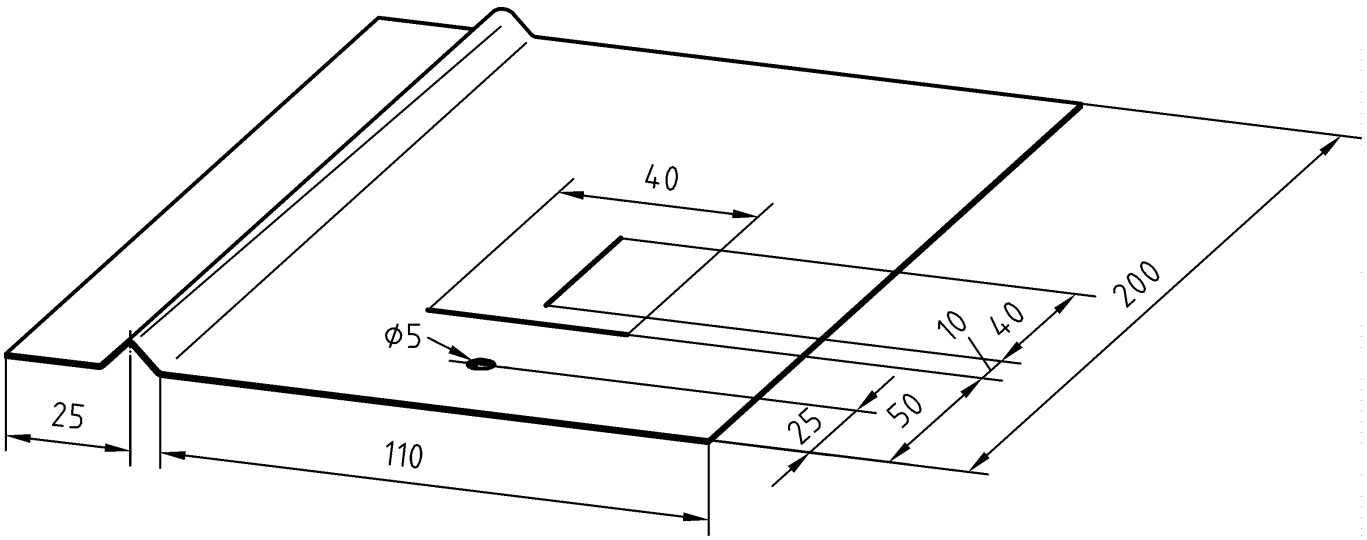

Figure 1 - Test specimen in accordance with 7.2 (option 1)

Dimension in millimetres

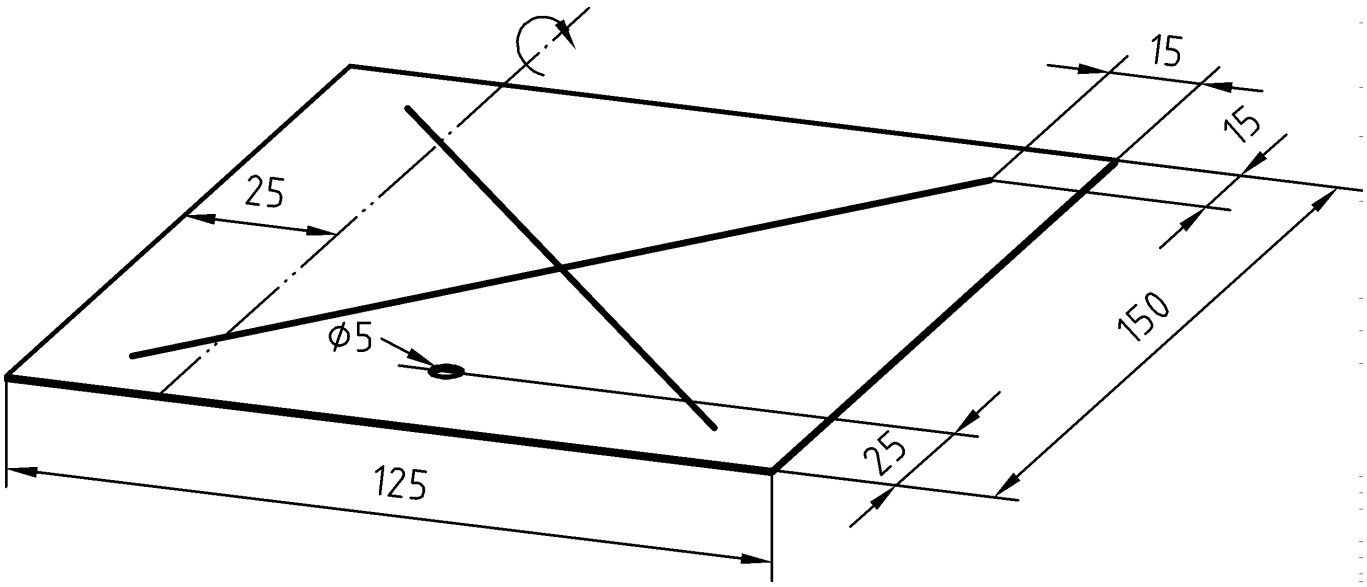

Figure 2 - Test specimen in accordance with 7.3 (option 2)

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EN 10169-1:1996, *Continuously organic coated (coil coated) steel flat products — Part 1: General information (definitions, materials, tolerances, test methods).*

ENV 10169-2:1999, *Continuously organic coated (coil coated) steel flat products — Part 2: Products for building exterior applications.*

prEN 10169-3:2001, *Continuously organic coated (coil coated) steel flat products — Part 3: Products for building interior applications.*

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