BRITISH STANDARD

BS EN
13523-8:2010

Coil coated metals — Test methods

Part 8: Resistance to salt spray (fog)

ICS 25.220.60

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee STI/27, Paint systems for metallic substrates.

A list of organizations represented on this committee can be obtained on request to its secretary.

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EUROPEAN STANDARD

NORME EUROPÉENNE

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EN 13523-8

March 2010

ICS 25.220.60

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English Version

Coil coated metals - Test methods - Part 8: Resistance to salt spray (fog)

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 13523-8:2010) 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of an identical text or by endorsement, at the latest by September 2010, and conflicting national standards shall be withdrawn at the latest by September 2010.

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 13523-8:2002.

The main technical changes are:

a) the text was revised editorially and the normative references were updated;

b) specifying the cutting tool and detailing how to make the scribes;

c) specifying the direction of cut to control the influence of burrs and cut edges;

d) the hole in the test panel was made optional;

e) the text was modified to give a clearer description of panel preparation before evaluation;

f) the method for evaluation of corrosion creep was modified.

EN 13523, *Coil coated metals — Test methods*, consists of the following parts:

— *Part 0: General introduction and list of test methods*

— *Part 1: Film thickness*

— *Part 2: Specular gloss*

— *Part 3: Colour difference — Instrumental comparison*

— *Part 4: Pencil hardness*

— *Part 5: Resistance to rapid deformation (impact test)*

— *Part 6: Adhesion after indentation (cupping test)*

— *Part 7: Resistance to cracking on bending (T-bend test)*

— *Part 8: Resistance to salt spray (fog)*

— *Part 9: Resistance to water immersion*

— *Part 10: Resistance to fluorescent UV radiation and water condensation*

— *Part 11: Resistance to solvents (rubbing test)*

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— *Part 12: Resistance to scratching*

— *Part 13: Resistance to accelerated ageing by the use of heat*

— *Part 14: Chalking (Helmen method)*

— *Part 15: Metamerism*

— *Part 16: Resistance to abrasion*

— *Part 17: Adhesion of strippable films*

— *Part 18: Resistance to staining*

— *Part 19: Panel design and method of atmospheric exposure testing*

— *Part 20: Foam adhesion*

— *Part 21: Evaluation of outdoor exposed panels*

— *Part 22: Colour difference — Visual comparison*

— *Part 23: Colour stability in humid atmospheres containing sulfur dioxide*

— *Part 24: Resistance to blocking and pressure marking*

— *Part 25: Resistance to humidity*

— *Part 26: Resistance to condensation of water*

— *Part 27: Resistance to humid poultice (Cataplasm test)*

— *Part 29: Resistance to environmental soiling (Dirt pick-up and striping)*

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1 Scope

This European Standard specifies the procedures for determining the resistance to salt spray (fog) of an organic coating on a metallic substrate (coil coating).

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

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.

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)*

EN 13523-19:2004, *Coil coated metals — Test methods — Part 19: Panel design and method for atmospheric exposure testing*

EN 60454-2, *Pressure-sensitive adhesive tapes for electrical purposes — Part 2: Methods of test (IEC 60454-2:2007)*

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

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 (ISO 4628-2:2003)*

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 (ISO 4628-8:2005)*

EN ISO 9227:2006, *Corrosion tests in artificial atmospheres — Salt spray tests (ISO 9227:2006)*

EN ISO 17872*, Paints and varnishes — Guidelines for the introduction of scribe marks through coatings on metallic panels for corrosion testing (ISO 17872:2007)*

3 Terms and definitions

For the purposes of this document, 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 EN ISO 9227.

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

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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. (See also EN ISO 9227, NSS test.)

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. (See also EN ISO 9227, AASS test.)

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 having a radius or width capable of exposing at least 0,2 mm of metal substrate according to EN ISO 17872.

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 EN 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 EN 13523-19:2004, 5.2, or EN 13523-7:2001, 5.1.2.

6 Sampling

See EN 13523-0.

7 Test panels

7.1 General

See EN 13523-0.

Design of the panels:

There are two options (7.2 and 7.3), both having the following in common:

— the protection of edges is optional;

— if not otherwise specified, the edges of the exposed panels shall be sheared with the burrs away from the test surface;

— 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;

— the scribes shall be prepared by means of the cutting tool (5.3) and extend down just through the coating to the substrate. The scribed indentation shall expose at least 0,2 mm of metal substrate. If the substrate is zinc- or zinc-alloy coated steel, the scribe shall be to the zinc coating, and not down to the steel;

— optionally, 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.

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7.2 Option 1

See Figure 1.

The test panel shall have a size of about 200 mm × 150 mm and shall be flat. The 200 mm side shall be in the rolling direction of the substrate (see EN 13523-19).

Make two scribes at 90° to each other. The scribes shall be about 40 mm in length with the vertical scribe central to the horizontal but separated by 10 mm. The horizontal scribe shall extend to 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.

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

Dimensions in millimetres

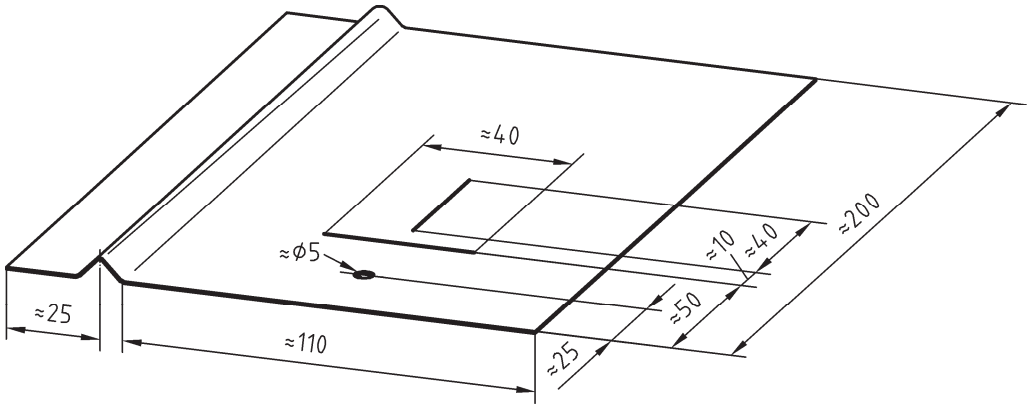

Figure 1 — Test panel in accordance with 7.2 (option 1)

7.3 Option 2

See Figure 2.

The test panel shall be of suitable size of at least 125 mm × 150 mm and shall be flat. The 150 mm side shall be in the rolling direction of the substrate (see EN 13523-19).

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 may be agreed between the interested parties depending on the end use of the product. The tightest radius is at the bottom of the panels.

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Dimensions in millimetres

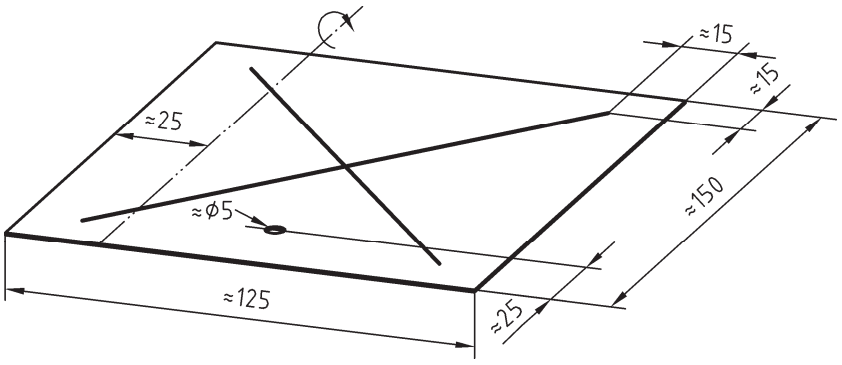

Figure 2 — Test panel in accordance with 7.3 before bending (option 2)

8 Procedure

8.1 Test conditions

Condition the test panels for at least 24 h 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 EN ISO 9227) before being expanded in the atomiser.

Control the amount of condensate generated during operation in accordance with EN ISO 9227:2006, 4.5, so that 80 cm² horizontal surface collect between 1,0 ml and 2,0 ml of condensate per hour.

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

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

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

8.2 Exposure of test panels

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

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

8.3 Evaluation

8.3.1 General

Evaluate the panel at ambient temperature. For a more accurate evaluation, 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.

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8.3.2 Blistering

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

8.3.3 Corrosion creep

Immediately after removal of the test panel from the cabinet wash it and carefully wipe off surface moisture with a soft tissue. Within 24 h, measure corrosion creep as follows: completely remove all the loosened coating (if any) adjacent to the scribe marks using a blunt knife as described in EN ISO 4628-8. Optionally loose coating can be removed using compressed air or adhesive tape (5.4).

Corrosion creep shall be measured at a minimum of six points 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:

a) on the general surface:

   1) degree of blistering;

b) at the cut edges:

   1) degree of blistering;

   2) delamination or corrosion creep (in millimetres);

c) at the scribe:

   1) degree of blistering;

   2) delamination or corrosion creep (in millimetres);

d) at the hole:

   1) degree of blistering,

   2) delamination or corrosion creep (in millimetres);

e) at the bend:

   1) degree of blistering;

f) other defects.

10 Precision

The concept of precision is not applicable to this part of EN 13523.

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11 Test report

The test report shall contain at least the following information:

a) all details necessary to identify the product tested;

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

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

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

e) width of the scribe;

f) duration of the exposure;

g) results of the test, as indicated in Clause 9;

h) any deviation from the test method specified;

i) date(s) of the test.

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Bibliography

[1] EN 1396, *Aluminium and aluminium alloys — Coil coated sheet and strip for general applications — Specifications*

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

[3] EN 10169-2, *Continuously organic coated (coil coated) steel flat products — Part 2: Products for building exterior applications*

[4] EN 10169-3, *Continuously organic coated (coil coated) steel flat products — Part 3: Products for building interior applications*

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

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