SLOVENSKI STANDARD
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Coil coated metals - Test methods - Part 19: Panel design and method of atmospheric exposure testing

Bandbeschichtete Metalle - Prüfverfahren - Teil 19: Probenplatten und Verfahren zur Freibewitterung

Tôles prélaquées - Méthodes d'essai - Partie 19 : Modèles de panneaux et méthode d'essai pour les essais d'exposition à l'extérieur

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English Version

Coil coated metals - Test methods - Part 19: Panel design and method of atmospheric exposure testing

Tôles prélaquées - Méthodes d'essai - Partie 19 : Modèles de panneaux et méthode d'essai pour les essais d'exposition à l'extérieur

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 139.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 13523-19:2018) has been prepared by Technical Committee CEN/TC 139 “Paints and varnishes”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 13523-19:2011.

The main changes are:

a) in 4.1 some additional information has been added for the rack design;

b) in 6.3.4 some information on how to use panels 1, 2 and 3 has been added;

c) the test site for continental industrial climate has been deleted from Annex B;

d) the text has been editorially revised and the normative references have been updated.

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

— Part 0: General introduction

— Part 1: Film thickness

— Part 2: 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)

— 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: Resistance to 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)

Introduction

In the past, it has been common practice in the northern hemisphere to expose test panels at 45° facing South.

Whilst this orientation is appropriate for degradation of the organic coating, investigations have shown that it has little bearing on the overall corrosion performance of the product when used in building applications.

For example, the 45° facing South exposure takes no account of

— overhangs which produce unwashed areas;

— sheet overlaps;

— low pitched roofing, etc.

The Outdoor Exposure Committee of European Coil Coating Association (ECCA) designed an exposure system which aligns more closely with “real life” situations and which is the basis of this part of EN 13523.

Three panel orientations are specified:

a) PANEL 1: 45° to horizontal facing South. The traditional orientation for evaluation of organic coatings: colour change, gloss change, chalking, etc.;

b) PANEL 2: 90° to horizontal facing North, with an overhang for evaluating general corrosion on side cladding particularly in unwashed areas;

c) PANEL 3: 5° to horizontal facing South. This panel which includes an overlap is principally for evaluating general corrosion in roofing applications.

The selection of one or more panel designs and their corresponding orientations will be chosen according to the exposure data required.

The multiplicity of panel types and exposure conditions can be somehow confusing when trying to compare results from systems that were characterized in different conditions. The normative recommendation is to use PANEL 1: 45° to horizontal facing South for characterizing UV resistance. PANEL 2 and PANEL 3 are more suitable for evaluation of corrosion resistance.

1 Scope

This document specifies the panel design and describes the procedure for determining the resistance to outdoor exposure of an organic coating on a metallic substrate.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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, *Coil coated metals - Test methods - Part 0: General introduction*

EN 13523-2, *Coil coated metals - Test methods - Part 2: Gloss*

EN 13523-3, *Coil coated metals - Test methods - Part 3: Colour difference - Instrumental comparison*

EN 13523-7:2014, *Coil coated metals - Test methods - Part 7: Resistance to cracking on bending (T-bend test)*

EN 13523-14, *Coil coated metals - Test methods - Part 14: Chalking (Helmen method)*

EN 13523-21, *Coil coated metals - Test methods - Part 21: Evaluation of outdoor exposed panels*

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

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

4 Apparatus

4.1 Rack design

The typical rack configuration accommodating the three elevations is shown in Figures 4 a), 4 b) and 5. The actual design and material of manufacture is at the discretion of the individual taking into consideration the corrosivity on the exposure site. Similarly the method of fixing the panels to the rack is up to the individual, but they shall be fixed in such a way as to avoid bimetallic corrosion. The material to provide the overhang on the North-facing panel shall be manufactured from an inert rigid material such as polymethyl methacrylate [1)] and shall give an overhang on the panel of approximately 65 mm (see 2 in Figure 4 a)).

1) e.g. Perspex. Perspex is the trade name of a product supplied by Perspecs Distribution Ltd. This information is given for the convenience of users of this document and does not constitute an endorsement of the product named. Equivalent products may be used if they can be shown to lead to the same results.

Some racks are designed in such a way that there is nothing behind the exposed panels, some racks are designed with a rigid support plate behind the panels. A support contributes to the overall ageing mechanisms because it changes airflows and temperature on the backside of the samples. The recommendation is an open back of the samples. Other exposure methods are available to enhance degradation rates. In all cases, details about the rack design shall be given with the outdoor exposure results. Care shall be taken when comparing data from different methods.

4.2 Apparatus to prepare 90° variable radius bends

Forming the 90° variable radius bends can be made either manually or by an automatic press fitted with a variable radius forming tool and die. The typical design of a suitable tool and die is illustrated in Figure 6 and defined in EN 13523-7:2014, 8.2.2.

4.3 Cutting tool, with a hard metal tip having a radius or width capable of exposing at least 0,2 mm of metal substrate in accordance with EN ISO 17872.

NOTE If the substrate is zinc- or zinc-alloy coated steel, the intention is that the scratch should penetrate as far as the zinc coating and not further, to the steel.

4.4 Stainless steel self-tapping fixing screws, with integral sealing ring and plastics cover[2)] (see Figure 2 and Figure 3).

4.5 Aluminium domed rivets, with a stainless-steel core (see Figure 2 and Figure 3).

5 Sampling

Shall be in accordance with EN 13523-0.

6 Test panels

6.1 General

Shall be in accordance with EN 13523-0.

6.2 Panel preparation

For exposure at all three orientations, five blanks per set are required (see Figures 1, 2 and 3).

Panels can be made from laboratory prepared samples or coil line production runs.

All panels shall be prepared from an initial blank size of 200 mm × 150 mm. The 200 mm shall be in the rolling direction.

When preparing panels, all cuts and drill holes shall be made such that metal burrs occur on the side of the panel which is not exposed.

All panels shall have a 90° angle bend with a variable radius from 1T to 3T, as described in EN 13523-7.

2) E.g. SELA screws.

6.3 Panel design

6.3.1 PANEL 1 (45° facing South, see Figure 1)

Panel 1 consists of a single blank into which a 90° variable radius bend has been produced, 25 mm from and parallel to the 200 mm edge. The variable radius is from 1T to 3T as defined in EN 13523-7.

All dimensions are shown in Figure 1. This panel shall have all edges protected and shall be mounted such that the tightest bend radius is at the bottom of the panel. The method of protecting edges is at the discretion of the individual but recommended practices are taping or coating of the edges.

This panel shall be used predominantly to measure UV resistance, i.e. changes in colour according to EN 13523-3, changes in gloss according to EN 13523-2 and degree of chalking according to EN 13523-14.

6.3.2 PANEL 2 (90° facing North, see Figure 2)

6.3.2.1 General

Panel 2 consists of two blanks each exhibiting: variable radius bends, scribe marks and stainless-steel screw fixings with plastics covers. The panel is exposed under an overhang as described in 4.1 and shown in Figure 4.

This panel shall be mounted such that the variable radius bend is vertical with the tightest radius on the bend at the bottom of the panel.

6.3.2.2 Variable radius bends

These bends should be prepared such that the panels are mirror images, i.e. when they are riveted together, the tightest radius bends occur at the same end of the panel.

Position and dimensions of radius bends are shown in Figure 2. To form the variable radius bend in the right hand panel it is necessary to rotate the variable radius punch through 180° in the press.

6.3.2.3 Scribe marks

Two scribes on each blank are arranged at 90° to each other. The scribes are 40 mm in length with the vertical scribe starting at 10 mm from the middle of the horizontal scribe. When the blanks are riveted together, the scribes should be at opposite ends of the panels as shown in Figure 2.

The scribes are prepared by means of the cutting tool (4.3) and extend down just through the organic coating. The scribed indentation shall exhibit a V-shaped profile and shall expose at least 0,2 mm of metal substrate.

The use of any cutting tool other than described in 4.3 is not permitted.

6.3.2.4 Fixings

Two stainless steel fixing screws (4.4) shall be located at opposite ends of the blanks when riveted together, approximately 30 mm from the bends and 50 mm from the top and bottom edges as shown in Figure 2.

6.3.2.5 Rivets

The two blanks shall be riveted together such that the left hand blank overlaps the right one by 20 mm with the tightest radius of both blanks to the bottom of the panel. Rivets shall be domed aluminium with a stainless steel core.

6.3.2.6 Edges

All edges shall be uncoated as the main purpose of the panel is to check corrosion, particularly on the unwashed area under the overhang.

6.3.3 PANEL 3 (5° facing South, see Figure 3)

Panel 3 is prepared from two blanks riveted together as shown in Figure 3, i.e. two blanks with 90° variable radius bends (from 1T to 3T) and overlapped by 80 mm. In this case, the widest radius of the top blank overlaps the tightest in the bottom blank.

This panel shall be mounted such that the variable radius bend follows the 5° pitch with the widest radius on the bend at the bottom of the panel.

A stainless-steel fixing screw (4.4) is positioned as shown in Figure 3, 50 mm from the bottom of the panel and 47 mm from the edge.

The blanks are riveted together as shown in Figure 3 at the mid point of the overlap, i.e. 40 mm with domed aluminium rivets with stainless steel cores.

Edges are unprotected as the panel is mainly for corrosion measurement and simulation of low pitched roofs.

6.3.4 How to use PANEL 1, PANEL 2 and PANEL 3

The PANEL 1 should be used for determining the UV resistance category (Ruv class as defined in EN 10169).

Both PANEL 2 and PANEL 3 should have acceptable corrosion results defined for a corrosion resistance category (RC class defined in EN 10169) for considering that the system is ranked to the equivalent corrosion resistance category).

7 Procedure

Condition the panels for at least 24 h under ambient conditions of temperature and humidity before forming.

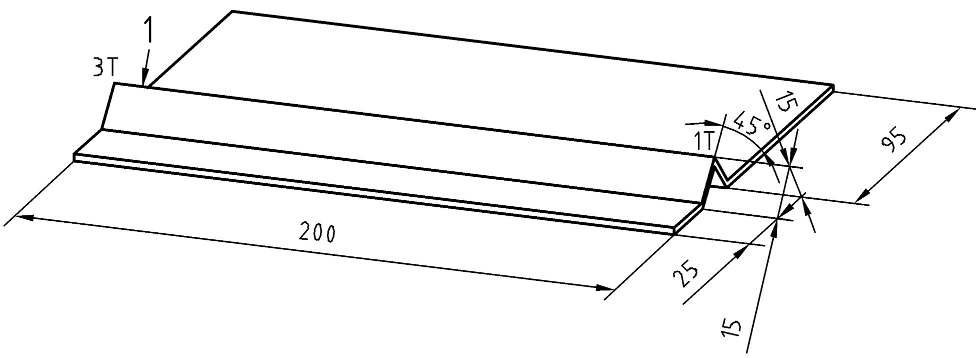
Expose the panels on the racks at the required orientation and an appropriate site that is monitored in the manner described in Annex A. For examples of appropriate sites see Annex B.

Inspect the panels regularly in accordance with EN 13523-21.

8 Expression of results

Shall be in accordance with EN 13523-21.

Approximate dimensions in millimetres



Key

1 variable radius bend

Figure 1 — 45° facing South panel (blank size 200 mm × 150 mm)