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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

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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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EUROPEAN STANDARD

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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

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

This European Standard was approved by CEN on 1 July 2019.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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Contents

Page

European foreword.....	3
Introduction	5
1 Scope	6
2 Normative references	6
3 Terms and definitions	6
4 Apparatus.....	6
5 Sampling.....	7
6 Test panels.....	7
6.1 General.....	7
6.2 Panel preparation	7
6.3 Panel design	7
7 Procedure.....	9
8 Expression of results.....	9
Annex A (informative) Parameters that can influence exposure results.....	14
Annex B (informative) European outdoor exposure sites recommended by ECCA	16
Bibliography.....	17

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<https://standards.iteh.ai/catalog/standards/sist/d2050a51-7cda-45e9-8c0c-31e272a028b2/sist-en-13523-19-2019>

European foreword

This document (EN 13523-19:2019) 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 March 2020, and conflicting national standards shall be withdrawn at the latest by March 2020.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 13523-19:2011.

The main changes compared to EN 13523-19:2011 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* [SIST EN 13523-19:2019
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- *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*

EN 13523-19:2019 (E)

- *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)*

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According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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.

EN 13523-19:2019 (E)**1 Scope**

This part of EN 13523 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)*

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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 methacrylate¹ 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 cover² (see Figure 2 and Figure 3).

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

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5 Sampling

Shall be in accordance with EN 13523-0.

6 Test panels

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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.

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.

² E.g. SELA screws.