



# SLOVENSKI STANDARD

## SIST EN 13523-19:2005

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

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

**Ta slovenski standard je istoveten z: EN 13523-19:2004**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
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**EN 13523-19**

November 2004

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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 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 Central Secretariat has the same status as the official versions.

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COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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## Foreword

This document (EN 13523-19:2004) 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of an identical text or by endorsement, at the latest by May 2005, and conflicting national standards shall be withdrawn at the latest by May 2005.

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

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## 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.

**EN 13523-19:2004 (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 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 13523-2, *Coil coated metals — Test methods — Part 2: Specular gloss.*

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

EN 13523-7:2001, *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.*

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**3 Terms and definitions**

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

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**4 Apparatus****4.1 Rack design**

The typical rack configuration accommodating the three elevations is shown in Figures 4 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 <sup>1)</sup> and shall give an overhang on the panel of 65 mm.

**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 13523-7:2001, 8.2.2.

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1) e.g. Perspex

**4.3 Cutting tool**, with a hard metal tip (according to Clemen). The cutting tool shall be designed to produce an indentation mark (scribe mark) with a V-shaped cross-section that exposes a width of at least 0,2 mm of metal substrate.

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 plastic cover<sup>2)</sup> (see Figure 2).

**4.5 Aluminium domed rivets**, with a stainless steel core.

## 5 Sampling

See EN 13523-0.

## 6 Test panels

See EN 13523-0.

### 6.1 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.

### 6.2 Panel design

#### 6.2.1 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 is used predominantly to measure changes in colour (EN 13523-3), changes in gloss (EN 13523-2) and degree of chalking (EN 13523-14).

#### 6.2.2 PANEL 2 (90° facing North, see Figure 2)

##### 6.2.2.1 General

Panel 2 consists of two blanks each exhibiting: variable radius bends, scribe marks and stainless steel screw fixings with plastic 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.

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2) e.g. SELA screws

**EN 13523-19:2004 (E)****6.2.2.2 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.

**6.2.2.3 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.

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

**6.2.2.4 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.

**6.2.2.5 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.

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

**6.2.3 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.



## 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

See EN 13523-21.

Dimensions in millimetres



### Key

- 1 Variable radius bend

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