



SLOVENSKI STANDARD

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Kovine, prevlečene v svitkih - Metode preskušanja - 21. del: Vrednotenje preskušancev, izpostavljenih zunanjemu okolju

Coil coated metals - Test methods - Part 21: Evaluation of outdoor exposed panels

Bandbeschichtete Metalle - Prüfverfahren - Teil 21: Bewertung von freibewitterten Probenplatten

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Tôles prélaquées - Méthodes d'essai - Partie 21: Évaluation des panneaux exposés en extérieur

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EUROPEAN STANDARD

EN 13523-21

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2010

ICS 25.220.60

Supersedes EN 13523-21:2003

English Version

Coil coated metals - Test methods - Part 21: Evaluation of outdoor exposed panels

Tôles prélaquées - Méthodes d'essai - Partie 21 :
Évaluation des panneaux exposés en extérieur

Bandbeschichtete Metalle - Prüfverfahren - Teil 21:
Bewertung von freibewitterten Probenplatten

This European Standard was approved by CEN on 20 February 2010.

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 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 Management Centre has the same status as the official versions.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 13523-21:2010) 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of an identical text or by endorsement, at the latest by September 2010, and conflicting national standards shall be withdrawn at the latest by September 2010.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 13523-21:2003.

The main changes are:

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

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)*
- *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*

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EN 13523-21:2010 (E)

- *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)*

According to the CEN/CENELEC Internal Regulations, the national standards organizations 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

This European Standard specifies the procedure for evaluating the behaviour of an organic coating on a metallic substrate during and after outdoor exposure. Panel design, preparation and the procedure for outdoor exposure are performed in accordance with EN 13523-19.

After washing of the panel some dirt can remain on the panel. This remaining dirt can influence the accuracy and precision of readings of gloss and colour, performed on exposed panels, although carried out in accordance with the standards. Unlike other precise measurements, the objective of this European Standard is to report on trends in the corrosion and/or paint degradation behaviour of coil coated panels.

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

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

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 4628-3, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 3: Assessment of degree of rusting (ISO 4628-3:2003)*

EN ISO 4628-4, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 4: Assessment of degree of cracking (ISO 4628-4:2003)*

EN ISO 4628-5, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 5: Assessment of degree of flaking (ISO 4628-5:2003)*

3 Terms and definitions

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

4 Principle

The behaviour of the test panels exposed in accordance with EN 13523-19 is evaluated. Any degradation in the relevant area is reported, using the relevant parts of EN 13523 and appropriate EN ISO Standards.

In cases where the inspection area is limited (e.g. at screws and bends), the evaluation method described in the EN ISO 4628 standard series is replaced by an easier and more suitable measurement of the degradation in millimetres.

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Where possible, the results of symmetrical areas, e.g. left and right edges, are combined and the average value is reported.

The inspection of the 45° panel (panel 1) will focus on paint degradation, whereas the 90° panel (panel 2) and the 5° panel (panel 3) are mainly evaluated for corrosion.

NOTE 1 Panel designations (1, 2, 3) are as defined in EN 13523-19.

NOTE 2 Due to restrictions in the available flat area, the number of recommended readings might vary from other parts of EN 13523 and relevant EN ISO Standards.

NOTE 3 It is strongly recommended to take a photograph of each exposed panel at each inspection.

5 Apparatus and materials

5.1 **Gloss meter**, in accordance with EN 13523-2.

5.2 **Apparatus for colour measurement**, in accordance with EN 13523-3.

5.3 **Apparatus for measurement of chalking**, in accordance with EN 13523-14.

5.4 **Washing solution**, containing 0,5 % (by mass) of a mild non-reactive detergent (pH 6 to 7) in water.

5.5 **Cloth or sponge**, non-abrasive and smooth.

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6 Sampling

See EN 13523-0.

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7 Test panels

See EN 13523-0.

8 Procedure

8.1 General

Evaluate the coating properties at ambient temperature.

The panels should be inspected not less than every six months in the first year and yearly afterwards. Colour measurements on metallics as well as gloss and colour measurements on textured and embossed surfaces are only indicative.

8.2 Preparation

8.2.1 Ensure that results of the measurements of gloss in accordance with EN 13523-2 and colour in accordance with EN 13523-3 are available before exposure of the test panels.

When using reference panels, these panels shall be kept in an envelope and not exposed to any light source.

8.2.2 Some measurements require a washed area prior to inspection. Washing shall be performed as follows:

Wash the upper 1/3 part of the 45° panel with washing solution (5.4) at ambient temperature (see Note). Use the cloth or sponge (5.5) to gently clean the surface. Rinse with water at ambient temperature and air dry at ambient temperature.

NOTE Washing should be carried out in such a way that the other 2/3 of the panel is not affected.

8.3 Evaluation

8.3.1 General

The following procedure specifies the sets of different readings that are taken. For each panel the procedure is accompanied by a table summarising the different measurements and the relevant standard test methods.

8.3.2 Panel 1 (45° panel)

A summary of the different measurements and evaluations on panel 1 is given in Table 1.

For gloss and colour change, measurements shall be performed on the washed area of the panel. Chalking and the evaluation of the overall surface shall be performed on the unwashed area of the panel. Cracking on the bend shall be evaluated on both the washed and unwashed area of the panel.

Inspect the panels as indicated in a) to e) below.

a) Change in gloss

Measure the gloss in accordance with EN 13523-2. Perform the reading parallel with the bend and report the average value of not less than three measurements. Use the same measurement angle as has been used for the initial measurement prior to exposure and report this angle. Report both initial gloss and gloss after exposure from which the change in gloss and the gloss retention can be calculated.

b) Colour change

Carry out the measurement in accordance with EN 13523-3. The colour change is the difference between the initial L^* , a^* , b^* values and the L^* , a^* , b^* values after exposure. Report initial and inspection measurements L^* , a^* , b^* and changes ΔL^* , Δa^* , Δb^* and ΔE .

c) Chalking

Perform the measurement and report the results in accordance with EN 13523-14.

d) Cracking on the bend

Inspect the bend visually for cracking. Report the presence of cracks as the distance, in millimetres, from the 1T side to the last sign of cracking.

e) Overall surface evaluation

The overall surface is defined as the flat surface of panel 1 excluding edges and bends.

Inspect the overall surface of the panel for blisters in accordance with EN ISO 4628-2, for cracking in accordance with EN ISO 4628-4, for flaking in accordance with EN ISO 4628-5 and for corrosion in accordance with EN ISO 4628-3.

Report all other observations, e.g. dirt, mildew, etc., as remarks.

8.3.3 Panel 2 (90° panel)

A summary of the different measurements and evaluations on panel 2 is given in Table 2.

NOTE The inspection is limited to the evaluation of corrosion. Evaluation of the degree of paint degradation can be performed but this panel orientation is not recommended for it. The 45° panel (panel 1) is more appropriate.

The inspection shall be performed on unwashed panels. Any deviations from the specified inspection shall be reported.

Inspect the panels as indicated in a) to g) below.