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Prevlečene kovine, ki se navijajo - Preskusne metode - 12. del: Odpornost proti razenju

Coil coated metals - Test methods - Part 12: Resistance to scratching

Bandbeschichtete Metalle - Prüfverfahren - Teil 12: Widerstand gegen Ritzen

Tôles prélaquées - Méthodes d'essai - Partie 12 : Résistance à la rayure

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25.220.60 Organske prevleke Organic coatings

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English Version

Coil coated metals - Test methods - Part 12: Resistance to scratching

Tôles prélaquées - Méthodes d'essai - Partie 12 :
Résistance à la rayure

Bandbeschichtete Metalle - Prüfverfahren - Teil 12:
Widerstand gegen Ritzen

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 13523-12:2023) 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 13523-12:2017.

In comparison with the previous edition, the following technical modifications have been made:

- a) in 8.2 information on direction of scratching has been added;
- b) Annex A concerning details about the tip and the needle has been added;
- c) 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 and metamerism — 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 16: Resistance to abrasion*
- *Part 17: Adhesion of strippable films*
- *Part 18: Resistance to staining*

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

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1 Scope

This document specifies the procedure for determining the resistance of an organic coating on a metallic substrate to penetration by scratching with a needle.

It is possible that with some aluminium alloys and thin gauge steel substrate below 0,4 mm, that rather than scratching, the needle will deform the substrate. Under these conditions, this test method is not applicable.

Soft coatings such as poly vinyl chloride (PVC) and structured coatings will not give a precise result due to the soft nature of the coating and/or the potential for the needle to snag.

The method is not applicable to conductive coatings.

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 13523-0:2021, *Coil coated metals — Test methods — Part 0: General introduction*

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

3 Terms and definitions

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

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

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

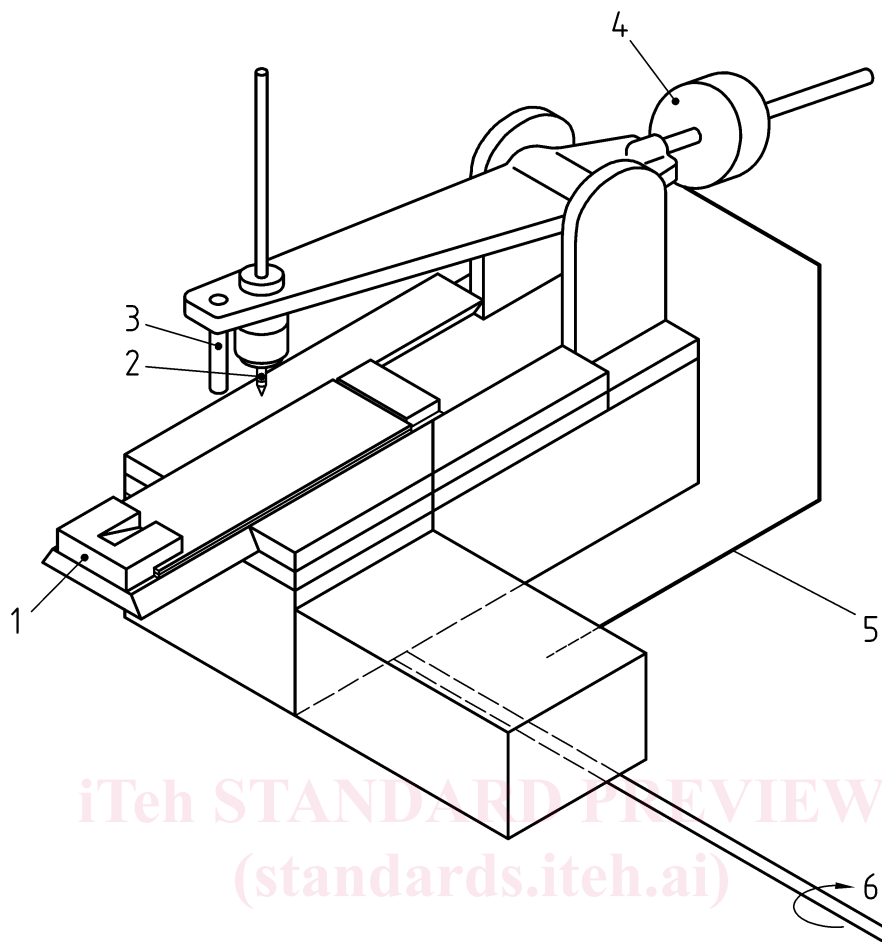
4 Principle

The organic coating is tested by mechanical means whereby a test panel is dragged beneath a needle upon which a specified load is placed.

5 Apparatus

5.1 Scratch apparatus (see EN ISO 1518-1). The apparatus is shown in Figure 1. It consists of a sliding table, which holds the test panel, with an arm on which the load is placed over a chuck, which holds the needle, a constant speed motor to drive the table and a low voltage electrical meter to detect electrical contact.

Other arrangements which give a similar performance may be used.

**Key**

- 1 panel in test panel holder with sloping ramp
- 2 needle
- 3 rod which allows the needle to lower gently onto the tested surface
- 4 counterweight
- 5 electrical connection with indicator for detecting scratch penetration to a metallic substrate
- 6 drive from constant-speed motor

Figure 1 — Scratch apparatus

5.2 Needle that can be fixed on the apparatus. The tip of the needle is a small sphere ($1 \pm 0,05$) mm in diameter of hardened steel or tungsten carbide, the latter giving a longer serviceable life.

In the case of a needle with a tip of hardened steel, the needle should be used only once and then disposed of or re-tipped. Details about the tip and the needle are given in Annex A.

NOTE A Clemen device can be used instead.

6 Sampling

Shall be in accordance with EN 13523-0.

7 Test panels

Shall be in accordance with EN 13523-0.

The test panel to be tested shall be flat and typically 75 mm × 150 mm, although size may vary depending on the apparatus.

8 Procedure

8.1 Ambient conditions

Measure the resistance to scratching of the organic coating at ambient conditions. For more accurate measurements, as required for instance in case of dispute, the temperature shall be (23 ± 2) °C or any other temperature agreed upon and the relative humidity shall be (50 ± 5) %, in accordance with EN 23270. Conditioning is carried out in accordance with EN 13523-0:2021, Clause 6.

8.2 Determination

Clamp the test panel onto the sliding table, using the screw clamps on the apparatus, the long edge being in the direction in which the scratch is to be made. The surface to be tested shall be facing up.

Define the direction of scratching (perpendicular or parallel) to the rolling direction. If another device, such as Clemen is used, define direction of the test (backward / forward).

Place the needle in the chuck. It is important that the needle tip is checked for damage and that any debris is removed. This should be carried out prior to every scratch.

Adjust the position of the counterweight so that the rod is just in contact with the sample holder on top of the ramp. Place the specified load on the needle. Put the apparatus into the scratch mode and start the test.

The minimum length of the travel shall be 50 mm.

The penetration of the coating will be indicated by the detection of an electrical current when the needle makes contact with the metallic substrate.

If the test method is to be used as a pass or fail method, this procedure shall be carried out 3 times with the same load at different positions on the test panel.

This procedure can be repeated after increasing the load until penetration of the coating to the metallic substrate takes place.

It is essential that the movement is smooth with no heavy downward or lateral movement.

9 Expression of results

The result shall be expressed either by a pass or fail with a specified load or by the load just prior to penetration, in which case the result shall be the arithmetic mean of three measurements.

10 Precision

No precision data are available.

prEN 13523-12:2023 (E)**11 Test report**

The test report shall contain at least the following information:

- a) all details necessary to identify the product tested;
- b) a reference to this document, i.e. EN 13523-12:—;
- c) the temperature at which the test was carried out;
- d) the direction of scratching (relative to rolling direction);
- e) the result of the test, as indicated in Clause 9;
- f) any deviation from the test method specified;
- g) any unusual observations (anomalies) observed during the test;
- h) the date of the test.

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