



SLOVENSKI STANDARD
oSIST prEN 13523-10:2023
01-september-2023

Prevečene kovine, ki se navijajo - Preskusne metode - 10. del: Odpornost proti fluorescentni ultravijolični svetlobi in kondenzaciji vode

Coil coated metals - Test methods - Part 10: Resistance to fluorescent UV radiation and water condensation

Bandbeschichtete Metalle - Prüfverfahren - Teil 10: Beständigkeit gegen UV-Strahlung mit Leuchtstofflampen und Kondensation von Wasser

Tôles prélaquées - Méthodes d'essai - Partie 10 : Résistance à un rayonnement UV fluorescent et à la condensation de l'eau

Ta slovenski standard je istoveten z: prEN 13523-10

ICS:

17.180.20	Barve in merjenje svetlobe	Colours and measurement of light
25.220.60	Organske prevleke	Organic coatings

oSIST prEN 13523-10:2023

en,fr,de

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 13523-10

July 2023

ICS 25.220.60

Will supersede EN 13523-10:2017

English Version

Coil coated metals - Test methods - Part 10: Resistance to fluorescent UV radiation and water condensation

Tôles prélaquées - Méthodes d'essai - Partie 10 :
Résistance à un rayonnement UV fluorescent et à la
condensation de l'eau

Bandbeschichtete Metalle - Prüfverfahren - Teil 10:
Beständigkeit gegen UV-Strahlung mit
Leuchtstofflampen und Kondensation von Wasser

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.

This draft European Standard was established by CEN 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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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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (prEN 13523-10:2023) 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 13523-10:2017.

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

- a) in 8.1 the test duration has been aligned with EN 1396 and EN 10169;
- b) in 8.3 wider range of observations have been included;
- c) in Clause 9 the test method has been aligned to new coating categories defined in EN 10169;
- 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 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*

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

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1 Scope

This document specifies the basic principles and procedure for determining the resistance of an organic coating on a metallic substrate (coil coating) to a combination of fluorescent UV radiation, and water condensation and temperature under controlled conditions.

Due to varied conditions which occur during natural weathering and the extreme nature of accelerated testing, correlation between the two cannot be expected.

Not all organic coatings will perform on an equal basis, but a degree of correlation between the same generic type might be observed.

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 1396, *Aluminium and aluminium alloys — Coil coated sheet and strip for general applications — Specifications*

EN 10169, *Continuously organic coated (coil coated) steel flat products — Technical delivery conditions*

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

EN 13523-1, *Coil coated metals — Test methods — Part 1: Film thickness*

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

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

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

EN 13523-22, *Coil coated metals — Test methods — Part 22: Colour difference — Visual comparison*

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

EN ISO 16474-3, *Paints and varnishes — Methods of exposure to laboratory light sources — Part 3: Fluorescent UV lamps (ISO 16474-3)*

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 coating is exposed in a cyclic manner to UV radiation, condensation of water and temperature under controlled conditions.

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One of two types of fluorescent UV lamps, UVA-340 or UVB-313, is used.

After exposure to UV radiation under controlled conditions, chalking and changes in gloss and colour are assessed.

5 Apparatus and materials

Ordinary laboratory apparatus and glassware, together with the following.

5.1 Test chamber.

The test chamber shall be constructed of corrosion resistant materials. Enclosed within the test chamber shall be eight fluorescent lamps (5.2), a heater pan, racks for test specimens, and provisions for indicating and controlling operating times and temperatures.

The lamps shall be in banks of four on either side of the cabinet. Electrical operating conditions for the lamps shall be as given by the manufacturer.

5.2 UV lamps.

Either UVA-340 or UVB-313, as specified in EN ISO 16474-3:

- UVA-340 starting at a wavelength of approximately 300 nm with a peak emission at 340 nm;
- UVB-313 starting at a wavelength of approximately 280 nm with a peak emission at 313 nm.

5.3 Water supply, deionized water.

6 Sampling

Shall be according to EN 13523-0.

7 Test panels

Shall be according to EN 13523-0.

The test specimens shall be flat and about 150 mm × 75 mm in size.

Deviations from the standard methods of panel shape, size, previous working, or conditioning may be agreed between the interested parties.

8 Procedure

8.1 Exposure

Place the test specimens in racks which are made of inert material. Expose the face of the test specimens parallel to the lamps.

If there are empty spaces within the racks fill these with blanks to maintain the conditions within the test chamber.

Repositioning of the specimens during exposure is desirable and might be necessary to ensure uniformity of all exposure stresses.

Cycle the test specimens through periods of 4 h of dry UV exposure at a black panel temperature of $(60 \pm 3) ^\circ\text{C}$, followed by a period of 4 h of water condensation exposure, without radiation, at a black panel temperature of $(40 \pm 3) ^\circ\text{C}$. (One cycle consists of 8 h exposure.)

Arrange the test specimens to allow the condensate to freely run off the surface under gravity. For coating systems with UV resistance categories R_{UV2} , R_{UV3} , R_{UV4} and R_{UV5} described in EN 1396 and EN 10169 use UVA 340 lamps. The test duration is 2 000 h (250 cycles) for all categories except R_{UV5} where the test duration is 4 000 h. When other radiation sources are used (such as UVB-313 or Xenon), exposure times and number of cycles might differ and shall be agreed at the time of enquiry and order.

Conclude the exposure at an agreed time, for example 2 000 h for UVA-340 or 1 000 h for UVB-313, or an agreed number of cycles, for example 250 cycles for UVA-340 or 125 cycles for UVB-313.

Where possible, use an agreed irradiance level, typically $0,83 \text{ W/m}^2$ for UVA-340 or $0,71 \text{ W/m}^2$ for UVB-313.

For safety reasons (UV radiation), it is recommended to remove or re-arrange the test panels when the UV lamps are switched off (e.g. during the humidity cycle).

8.2 Calibration and maintenance of calibration

Calibration of the UV-lamps depends on the type of weathering apparatus, whether the irradiance level can be set or not.

For apparatus without the possibility to set the irradiance, after every usage of 400 radiation hours, replace one lamp and rotate the others within the bank with the oldest lamp being taken out of service unless otherwise specified by the equipment manufacturer.

For apparatus with irradiance measurement, the apparatus indicates when the radiation sensors need to be calibrated. Carry out the calibration of the radiation sensors according to the method provided by the equipment manufacturer using the calibration equipment. When the irradiance of a lamp falls below the set point, it shall be replaced. This is usually triggered by an alarm on the equipment.

8.3 Evaluation of test specimens

At the conclusion of the exposure, evaluate the test specimens for loss of dry film thickness, chalking, changes of gloss and colour, and changes of overall surface appearance and structure.

Assess the coating for chalking, change of gloss and change of colour at ambient temperature. For more accurate measurements, as required for instance in case of dispute, the temperature shall be $(23 \pm 2) \text{ }^\circ\text{C}$ and the relative humidity $(50 \pm 5) \%$, in accordance with EN 23270.

When the assessment of dry film thickness is used, the following shall be stated:

- 1) Method for dry film thickness determination
- 2) Parameters of preconditioning of the sample after UV-radiation prior to dry film thickness measurement (i.e. duration, temperature, relative humidity).

9 Expression of results

The results shall be expressed as comparison between an unexposed test specimen and an exposed test specimen for properties defined in EN 13523-1, EN 13523-2, EN 13523-3, EN 13523-14 and EN 13523-22, if appropriate in terms of, for example, $x \%$ gloss retention according to EN 13523-2, $y = \Delta E_{ab}^*$ or ΔE_{00} according to EN 13523-3, z chalking according to EN 13523-14.

The coating system should then be categorized in accordance with EN 10169:2022, 7.5.8.4.2, Resistance to accelerated UV radiation, and Table 8 for steel. For aluminium it should be categorized in accordance with EN 1396:2023, C.6.1.2.

prEN 13523-10:2023 (E)**10 Precision**

No precision data are currently available.

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 13523-10:—;
- c) the type of UV lamps used;
- d) the duration of exposure in hours (h);
- e) the results of the test, as indicated in Clause 9;
- f) any deviation, by agreement or otherwise, from the test method specified;
- f) any unusual observations (anomalies) observed during the test;
- g) the date of the test.

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