



# SLOVENSKI STANDARD SIST EN 13523-15:2015

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Nadomešča:

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**Prevlečene kovine, ki se navijajo - Preskusne metode - 15. del: Metamerija**

Coil coated metals - Test methods - Part 15: Metamerism

Bandbeschichtete Metalle - Prüfverfahren - Teil 15: Metamerie

Tôles prélaques - Méthodes d'essai - Partie 15: Métamérism

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**Ta slovenski standard je istoveten z: EN 13523-15:2015**

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**ICS:**

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

**SIST EN 13523-15:2015**

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EUROPEAN STANDARD

EN 13523-15

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2015

ICS 25.220.60

Supersedes EN 13523-15:2002

English Version

## Coil coated metals - Test methods - Part 15: Metamerism

Tôles prélaquées - Méthodes d'essai - Partie 15:  
MétamérismeBandbeschichtete Metalle - Prüfverfahren - Teil 15:  
Metamerie

This European Standard was approved by CEN on 27 May 2015.

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.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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## European foreword

This document (EN 13523-15:2015) has been prepared by Technical Committee CEN/TC 139 "Paints and varnishes", the secretariat of which is held by DIN.

This document supersedes EN 13523-15:2002.

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 January 2016, and conflicting national standards shall be withdrawn at the latest by January 2016.

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.

The main technical changes are:

- a) the specification concerning the test illuminant of the spectrophotometer was amended;
- b) the formulas in Clause 9 were aligned with the current standards for colorimetry (EN ISO 11664-4) and metamerism index (DIN 6172);
- c) a reference to EN 13523-0 concerning conditioning of the test panels was added.

EN 13523, *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 — 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)*

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**EN 13523-15:2015 (E)**

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

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## 1 Scope

This part of EN 13523 defines terms of the procedure for determining the metamerism of a colour match of an organic coating on a metallic substrate.

When two colour specimens have identical spectral reflection curves, they are matching under any illuminant irrespective of its spectral characteristics. This is termed a “spectral match”. It is also possible for two colour specimens having different spectral reflection curves to match visually under a given light source but not to match under another light source with different spectral characteristics; such matches are termed “metameric”.

One quantitative description of metamerism is the so-called “metamerism index”.

The information of the metamerism index is of limited value where  $\Delta E$  (instrumental colour difference for a given illuminant, see EN 13523-3) is  $> 0,5$ . The metamerism index is not suited for determining the absolute colour difference or colour constancy of a given specimen at change of illuminant.

The colour difference under the reference illuminant is to be measured in colour coordinates  $L^*$ ,  $a^*$  and  $b^*$  (see EN 13523-3).

Excluded from this method are organic coatings producing fluorescence and/or which are multicoloured, pearlescent or metallic.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 13523-0:2014, *Coil coated metals - Test methods - Part 0: General introduction*

<https://standards.iteh.ai/catalog/standards/sist/9db99cd4-db7e-42fe-9384->

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

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 and the following apply.

### 3.1

#### **metamerism**

phenomenon characterized by the difference in colour observed when two specimens visually matching under a given light source are viewed under another light source with different spectral characteristics

### 3.2

#### **metamerism index**

calculated value of the degree to which a colour difference between two specimens changes when using different illuminants

## 4 Principle

The colour difference of a colour match is determined under different illuminants. From the measured colour coordinates  $L^*$ ,  $a^*$  and  $b^*$  the metamerism index is calculated.

**EN 13523-15:2015 (E)****5 Apparatus****5.1 Spectrophotometer (see EN 13523-3)**

The spectrophotometer shall permit  $L^*$ ,  $a^*$  and  $b^*$  colour coordinates to be ascertained at least under standard illuminant D65 and  $10^\circ$  to standard observer and standard illuminant A and  $10^\circ$  to standard observer. Other test illuminants may be used, in which case it shall be stated in the test report.

The circular measuring aperture shall have a minimum diameter of 10 mm.

Illumination/viewing geometry:

Geometries  $45^\circ:0^\circ$  or  $0^\circ:45^\circ$  are preferred but geometry  $d:8^\circ$  is also allowed.

Any further conditions shall be the subject of a particular agreement.

The spectrophotometer shall detect as little specular reflected light as possible.

**6 Sampling**

See EN 13523-0.

**7 Test panels**

See EN 13523-0.

The surfaces to be measured shall be at least as large as the area of the measuring aperture and shall be flat against the measuring aperture.

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**8 Procedure****8.1 Calibration**

The apparatus shall be used in accordance with the manufacturer's instructions, particularly with regard to warm-up time and calibration.

**8.2 Measurement**

Condition the test samples in accordance with EN 13523-0:2014, Clause 6.

Measure the colour coordinates at ambient temperature ensuring that the temperature is within the range stated by the manufacturer of the apparatus. In cases of dispute, the measurement shall be carried out under conditions of  $(23 \pm 2)^\circ\text{C}$  and a relative humidity of  $(50 \pm 5)\%$ , in accordance with EN 23270.

One of the specimens shall be designated the reference specimen.

First measure the colour coordinates of the reference specimen and then the colour coordinates of the test specimen.



## 9 Expression of results

Calculate the metamerism index MI, using the following formula:

$$MI = [(\Delta L_t^* - \Delta L_r^*)^2 + (\Delta a_t^* - \Delta a_r^*)^2 + (\Delta b_t^* - \Delta b_r^*)^2]^{1/2}$$

where

subscript t is the test illuminant being used, e.g. standard illuminant A, or a “warm white” type fluorescent lamp illuminant;

subscript r is the reference illuminant (standard illuminant D65);

$$\Delta L_t^* = \Delta L_{spl,t}^* - \Delta L_{std,t}^*$$

$$\Delta L_r^* = \Delta L_{spl,r}^* - \Delta L_{std,r}^*$$

$$\Delta a_t^* = \Delta a_{spl,t}^* - \Delta a_{std,t}^*$$

$$\Delta a_r^* = \Delta a_{spl,r}^* - \Delta a_{std,r}^*$$

$$\Delta b_t^* = \Delta b_{spl,t}^* - \Delta b_{std,t}^*$$

$$\Delta b_r^* = \Delta b_{spl,r}^* - \Delta b_{std,r}^*$$

where

subscript std is the reference specimen (standard);

subscript spl is the test specimen (sample).

## 10 Precision

No precision data are currently available.

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