

SLOVENSKI STANDARD
SIST EN 13523-15:2003**01-januar-2003**

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

Bandbeschichtete Metalle - Prüfverfahren - Teil 15: Metamerie

Tôles prélaquées - Méthodes d'essai - Partie 15 : Métamérisme

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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 13523-15:2003**en**

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EUROPEAN STANDARD
NORME EUROPÉENNE
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EN 13523-15

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ICS 17.180.20; 25.220.60

English version

Coil coated metals - Test methods - Part 15: Metamerism

Tôles prélaquées - Méthodes d'essai - Partie 15:
Métamérisme

Bandbeschichtete Metalle - Prüfverfahren - Teil 15:
Metamerie

This European Standard was approved by CEN on 11 April 2002.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

EN 13523-15:2002 (E)**Foreword**

This document EN 13523-15:2002 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 January 2003, and conflicting national standards shall be withdrawn at the latest by January 2003.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland 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 ΔE (instrumental colour difference for a given illuminant, see EN 13523-3:2001) 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 13523-3:2001).

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

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 13523-0:2001, *Coil coated metals — Test methods — Part 0: General introduction and list of test methods.*

EN 13523-3:2001, *Coil coated metals — Test methods — Part 3: Colour difference — Instrumental comparison.*

EN 23270:1991, *Paints and varnishes and their raw materials — Temperatures and humidities for conditioning and testing (ISO 3270:1984).*

3 Terms and definitions

For the purposes of this Part of EN 13523, the terms and definitions given in EN 13523-0 apply, together with the following.

3.1

metamerism

the 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

a 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.

5 Apparatus

5.1 Spectrophotometer (see EN 13523-3:2001)

The spectrophotometer shall permit L^* , a^* and b^* colour coordinates to be ascertained at least under standard illuminant D65 and 10° to standard observer and standard illuminant A and 10° to normal conditions.

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 geometries $d/8^\circ$ or $8^\circ/d$ are 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 13523-0:2001.

7 Test panels

See EN 13523-0:2001.

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

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 ± 2) °C and a relative humidity of (50 ± 5) %, in accordance with EN 23270:1991.

One of the specimens shall be designated the reference specimen.

Measure at first 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 equation:

$$MI = [(\Delta L_1^* - \Delta L_2^*)^2 + (\Delta a_1^* - \Delta a_2^*)^2 + (\Delta b_1^* - \Delta b_2^*)^2]^{1/2}$$

where

subscript 1 is the test illuminant being used, e.g. test illuminant A, or a "warm white" type fluorescent lamp illuminant;

subscript 2 is the reference illuminant (preferably D65);

$$\Delta L_1^* = L_{B1}^* - L_{P1}^*$$

$$\Delta L_2^* = L_{B2}^* - L_{P2}^*$$

$$\Delta a_1^* = a_{B1}^* - a_{P1}^*$$

$$\Delta a_2^* = a_{B2}^* - a_{P2}^*$$

$$\Delta b_1^* = b_{B1}^* - b_{P1}^*$$

$$\Delta b_2^* = b_{B2}^* - b_{P2}^*$$

where

subscript B is the reference specimen (see below);

subscript P is the test specimen (see below).

Indicate the results as the mean of the measurements taken, expressed in units.

10 Precision

NOTE 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 Part of EN 13523 (EN 13523-15);
- c) the type of instrument used;
- d) the illuminants used;
- e) the geometry used;
- f) the metamerism index, as indicated in clause 9;
- g) the components of the metamerism index, if required;
- h) any deviation from the test method specified;
- i) the date of the test.

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ENV 10169-2:1999, *Continuously organic coated (coil coated) steel flat products — Part 2: Products for building exterior applications.*

prEN 10169-3:2001, *Continuously organic coated (coil coated) steel flat products — Part 3: Products for building interior applications.*

ISO 7724-1:1984, *Paints and varnishes — Colorimetry — Part 1: Principles.*

ISO 7724-2:1984, *Paints and varnishes — Colorimetry — Part 2: Colour measurement.*

ISO 7724-3:1984, *Paints and varnishes — Colorimetry — Part 3: Calculation of colour differences.*

DIN 6172:1993, *Special metamerism-index for pairs of samples at change in illuminant.*

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