SLOVENSKI STANDARD
SIST-TS CEN/TS 16499:2014

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Barve in laki - Premazi in premazni sistemi za zaščito lesa za zunanjo uporabo - Odpornost filmov premazov proti medsebojnemu zlepljanju

Paints and varnishes - Coating materials and coating systems for exterior wood - Resistance to blocking of paints and varnishes on wood

Beschichtungsstoffe - Beschichtungsstoffe und Beschichtungssysteme für Holz im Außenbereich - Bestimmung der Blockfestigkeit

Peintures et vernis - Produits de peinture et systèmes de peinture pour le bois en extérieur - Résistance au blocage des peintures et vernis sur bois

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Paints and varnishes - Coating materials and coating systems for exterior wood - Resistance to blocking of paints and varnishes on wood

Peintures et vernis - Produits de peinture et systèmes de peinture pour le bois en extérieur - Résistance au blocage des peintures et vernis sur bois

Beschichtungsstoffe - Beschichtungsstoffe und Beschichtungssysteme für Holz im Außenbereich - Bestimmung der Blockfestigkeit

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Contents

Page

Foreword 3

1 Scope 4

2 Normative references 4

3 Terms and definitions 4

4 Principle 5

5 Apparatus 5

6 Sampling 6

7 Test panels – substrate – test specimens 6
7.1 General 6
7.2 Substrate s1 – Spruce 7
7.3 Substrate s2 – Other wood species 7
7.4 Substrate s3 – Inert substrate 7
7.5 Substrate s4 – Other plane substrates 7

8 Application to the test specimens 8
8.1 General 8
8.2 Application to substrate s1 – spruce, s2 – other wood substrates, or substrate s4 - other plane substrates 8
8.3 Application to substrate s3 – inert substrate or substrate s4 - other plane substrates 8
8.4 Typical dry film thickness on stable wood constructions 9

9 Drying time 9

10 Preparation of test strips and specimen 9
10.1 General 9
10.2 Determination of the dry film thickness 9

11 Conditioning of test strips 10

12 Application of load 10
12.1 General 10
12.2 Load to be applied 11
12.3 Climatic conditions during loading 12

13 Evaluation 13

14 Precision 14

15 Test report 14

Annex A (normative) Necessary additional information 15

Annex B (informative) Suggested form for specifying application parameters 16

Bibliography 21

Foreword

This document (CEN/TS 16499:2013) has been prepared by Technical Committee CEN/TC 139 “Paints and varnishes”, the secretariat of which is held by DIN.

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Remark about climatic conditions:

EN 23270, *Paints and varnishes and their raw materials — Temperatures and humidity for conditioning and testing (*ISO 3270*)* prescribe the use of standard conditions 23/50 [(23 ± 2) °C and (50 ± 5) % relative humidity]. Historically for wooden substrates there are a lot of mechanical properties which refer to the alternative standard conditions 20/65 [(20 ± 2) °C and (65 ± 5) % relative humidity] according to ISO 554, *Standard atmospheres for conditioning and/or testing — Specifications*. Therefore, the use of standard conditions 20/65 instead of standard conditions 23/50 could be arranged but should be noted.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: 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 Technical Specification specifies a test method for determining, under standard conditions, whether a single-coat film or a multi-coat system of paints and varnishes on wood after a specified drying period is sufficiently dry to avoid damage when two painted surfaces or one painted surface and another surface are placed in contact under pressure and subsequently separated. The method is intended to simulate the conditions when painted articles come into contact which each other. In comparison to EN ISO 9117-2, the conditioning and parameters which influences the behaviour of wood coatings are more specific.

NOTE In some countries, the test is called a “block or blocking resistance” test.

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 927-1, *Paints and varnishes - Coating materials and coating systems for exterior wood - Part 1: Classification and selection*

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

EN ISO 1513, *Paints and varnishes - Examination and preparation of test samples (ISO 1513)*

EN ISO 2808, *Paints and varnishes - Determination of film thickness (ISO 2808)*

EN ISO 15528, *Paints, varnishes and raw materials for paints and varnishes - Sampling (ISO 15528)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
blocking
unwanted adhesion between two surfaces, at least one of which has been coated, when they are left in contact under load after a given drying period

[SOURCE: EN ISO 4618:2006; 2.29]

Note 1 to entry: Blocking does not apply to bonding of coated surfaces after insufficient drying.

Note 2 to entry: In practice, blocking can occur if coated wood panels are stacked on each other or on windows and doors if the frames are in direct contact with the faces. Blocking depends on temperature and load (pressure).

Note 3 to entry: The term blocking is also sometimes used to describe agglomerated caked powder.

Note 4 to entry: Unwanted adhesion can lead to damage upon separation.

3.2
load
mass needed to achieve a suitable test pressure

Note 1 to entry: High temperature and humidity increase the challenge at a given load. The application method, film thickness, drying conditions and climatic conditions should also be taken into account.

3.3
after tack
property of a film to remain sticky after normal drying or curing

[SOURCE: EN ISO 4618:2006; 2.8]

Note 1 to entry: The term after tack can also mean a subjectively stickiness of the surface (“finger tack” or “surface tack”). This effect however might not necessarily be related to blocking.

3.4
stable mass
mass achieved when the difference between two subsequent weighings within 24 h does not exceed 0,2 %

[SOURCE: EN 927-5:2006; 3.3]

3.5
stackability
resistance to damage due to unwanted adhesion between adjacent surfaces of articles that develops when these articles are left in contact

[SOURCE: EN ISO 9117-2:2010; 3.1]

4 Principle

The coating material or the coating system under test is applied on test panels or cut strips under specified conditions. After specified drying time and under specified climatic conditions, the two test panels or cut stripes are placed crosswise in contact with each other. This assembly is subsequently placed in a test apparatus to be subjected to a specified load under specified climatic conditions. After a specified period of time, the load is removed and the test panels manually separated under specific climatic conditions and the contact areas examined for any damage to the coating in the area of contact.

5 Apparatus

5.1 Weights, of a mass which correspond to the requirements of 12.1.

5.2 Oven or conditioning chamber, depending on the selected climatic conditions during load (see Clause 11 or 12.3):

— Oven of appropriate size, controlled at a temperature of (50 ± 2) °C or (60 ± 2) °C;

— climatic conditioning chamber where the selected climatic conditions can be achieved.

5.3 Inert substrate for application on Specimen s3.

5.3.1 Test panels[1)] (“strips”) made of polyvinyl chloride film free of migrating plasticizers, of sufficient rigidity to ensure a flat surface, impervious to and unaffected by water or aliphatic organic solvents and of nominal

1) Suitable test foil made of plasticised PVC is available from Leneta Co. Whitney Road, Mahawa, NJ 07430-3129, USA, or Erichsen GmbH, Am Iserbach 14, D-58675 Hemer, Germany, or Sheen Instruments, Unit 4, St George’s Industrial Estate, Richmond Road, Kingston, Surrey KT2 5BQ, United Kingdom. This information is given for the convenience of users of the document and does not constitute an endorsement by CEN of the product named.

thickness 0,25 mm. Other types of plastics film might be used where the coating material contains solvents which may adversely affect the PVC film. If the coating delaminates from the substrate before or during the test, another, more suitable substrate should be used.

5.3.2 Film applicator, preferably automatic, used at an application speed of 10 mm/s to 15 mm/s and fitted with a doctor blade (see 8.2) with an appropriate gap clearance and a gap width of at least 60 mm.

5.3.3 Use cutting knife, metal template or straight-edge ruler to cut the foils.

5.4 Tools for application on test specimen s1, s2, s4, (e.g. roller, brush, spray equipment) depending on the paint manufacturer's specification.

6 Sampling

Take a representative sample of the product to be tested (or of each product in the case of a multi-coat system), in accordance with EN ISO 15528. Examine and prepare each sample for testing in accordance with EN ISO 1513.

7 Test panels – substrate – test specimens

7.1 General

Depending on the specimens provided for use, different application methods can be required (see Table 1)

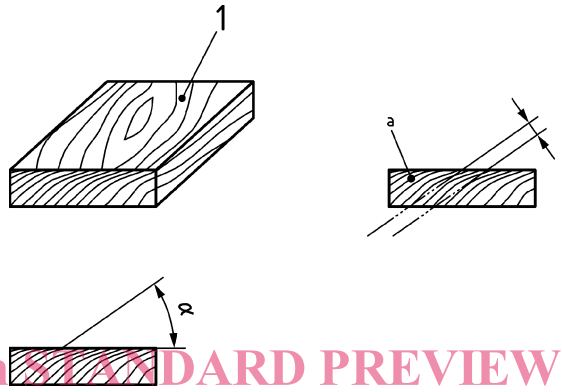
Table 1 — Substrate

Substrate (s)	Type	Description	Recommended use
s1	wood	spruce (*Picea abies*) (see 7.1)	standard test method to check a coating system or a individual top coat.
s2	other wood substrates	any wood species (see 7.2)	individual wood species on customer-specific requirement (e.g. a coated test specimen from which test panels can be cut)
s3	inert substrate	PVC-foil (see 5.3)	lab test method to compare different top coats (simulation of the blocking behaviour on not absorbing substrates)
s4	other plane substrates	e.g. plywood according to EN 636	lab test method to compare different coating materials or coating systems.

7.2 Substrate s1 – Spruce

The wood shall be spruce (*Picea abies*) that has been selected to be free from knots and cracks, to be straight-grained and of normal growth rate (i.e. between 3 and 8 annual rings per 10 mm).

The panels shall be planed all round to a smooth and uniform finish. The inclination of the growth rings to the test face shall be (45 ± 10)°. See Figure 1. The wood shall be free from blue stain and evidence of surface or bulk infection. Abnormal porosity shall be avoided. Condition the wood prior to conversion into test panels in accordance with EN 23270 at (23 ± 2) °C and a relative humidity of (50 ± 5) %. The density of the wood shall be between 0,4 g/cm^3 and 0,5 g/cm^3 when measured at an equilibrium moisture content at standard climate in accordance with EN 23270 at (23 ± 2) °C and a relative humidity of (50 ± 5) %.



Key

1 front of panel (test face)

a min. 3, max. 8 growth rings per 10 mm (applies for the whole panel)

α angle of growth rings to test face min. 35°, max. 55°

Figure 1 — Selection of wood

7.3 Substrate s2 – Other wood species

In case of customer-specific requirements or if it might be assumed that other types of wood might give a different result an alternative wood species should be used as substrate. It is also an option for manufacturers to provide an already coated test specimen from which test panels can be cut. The chosen panel shall be precisely described in the test report. The surface of the specimens provided shall be plane. The test substrate shall be conditioned until constant mass at standard conditions according to EN 23270 [(23 ± 2) °C and (50 ± 5) % relative humidity].

7.4 Substrate s3 – Inert substrate

See 5.3.

7.5 Substrate s4 – Other plane substrates

The selected substrate should be precisely described in the test report. Alternatives that may be used include absorbing substrates (e.g. plywood) as well as non absorbing substrates (e.g. glass, aluminium, coated paper, polymer panels). Absorbing substrates should be conditioned until achieving constant mass at standard conditions according to EN 23270 [(23 ± 2) °C and (50 ± 5) % relative humidity].

8 Application to the test specimens

8.1 General

Depending on the specimens provided for use, a different type of application might be required (see Table 2).

Table 2 — Type of application

Substrate (s)	Type	Description	Recommended application
s1	wood	spruce (*picea abies*) (see 7.1)	According to manufacturer's specification
s2	other wood species	any wood species (see 7.2)	According to manufacturer's specification or customer's specification Optional use of already coated test specimen from which test panels can be cut.
s3	inert substrate	PVC-foil (see 5.3)	application of the top coat to be investigated in a dry film thickness related to practice, by means of a film applicator
s4	other plane substrates	e.g. plywood according to EN 636	According to manufacturer's specification, customer's specification or by application of the top coat to be investigated in a dry film thickness related to practice, by means of a film applicator

8.2 Application to substrate s1 – spruce, s2 – other wood substrates, or substrate s4 - other plane substrates

If nothing else is specified by the manufacturer of the coating system, the conditioned, planed wood specimens (test panels), shall be manually sanded with abrasive paper (180 grade) just before application. Dust shall be removed completely. The test panels are coated with the coating system to be tested, closely following manufacturer's instructions or specification. Examples of possible suitable application methods and their specification are given in Annex B.

8.3 Application to substrate s3 – inert substrate or substrate s4 - other plane substrates

Use an automatic film applicator fitted with a doctor blade with an appropriate gap clearance and gap width (somewhat wider than the intended final width). Make a draw-down of the prepared sample of coating material on the test panel to achieve a uniform even film at least 10 mm longer than the intended final test surface. Apply the coating material under test on the matt surface of the foil. Ensure that the gap clearance is sufficient to achieve a final dry film thickness corresponding with the paint manufacturer's specification. The applied wet

and the resulting dry film thickness of the coating under test shall be reported. Recommended application speed is 10 mm/s to 15 mm/s.

8.4 Typical dry film thickness on stable wood constructions

The dry film thicknesses below refer to Original Equipment Manufacturer (OEM) coating systems.

Spray applied coating systems:[2)]

Coating thickness > 80 µm for high build opaque, transparent and semi-transparent wood coating systems (according to EN 927-1).

Coating thickness > 100 µm for opaque coating systems.

Brush applied coating systems:[3)]

Coating thickness approximately 30 µm to 50 µm for medium to high build opaque, transparent and semi-transparent wood coating systems (according to EN 927-1).

Coating thickness approximately 60 µm to 100 µm for opaque coating systems.

EXAMPLE Gap clearance of a doctor blade: 400 µm for spray coating systems and 200 µm to 300 µm for brush coating systems. In each case a uniform smooth film is necessary.

9 Drying time

Drying and/or curing of each coated test panel should correspond to the manufacturer's specifications. Select the climatic conditions during drying and the proposed drying method according to the manufacturers' specifications. If nothing else is agreed, the top coat should be dried for 24 h at standard conditions according to EN 23270 [(23 ± 2) °C and (50 ± 5) % relative humidity].

10 Preparation of test strips and specimen

10.1 General

When the top coat has dried (see Clause 9), at least 6 test strips of the same type should be cut from the coated specimens (test panels) with a width of 20 mm to 50 mm and a length of not less than twice the width. When cutting the test strips, the surface to be tested shall not be damaged. Particular attention should be paid to the edges of the test strips. Burrs should be avoided. Other formats of the test strips may be used, but shall be indicated in the test report. After cutting the panels, the resulting test strips should be conditioned immediately.

10.2 Determination of the dry film thickness

The end sections of the test strips, i.e. the part of the strip or panel that has not been stacked towards another sample should be used for determination of the dry film thickness of the coating according to EN ISO 2808. The measurement of the dry film thickness should be made after the blocking test procedure. The selected measurement method and the resulting film thickness shall be stated in the test report.

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2) Refers to a complete coating system.

3) Refers to a complete coating system.