



**SLOVENSKI STANDARD**  
**kSIST-TS FprCEN/TS 16360:2021**

**01-marec-2021**

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**Barve in laki - Premazi in premazni sistemi za zaščito lesa za zunanjo uporabo - Ocenjevanje razteznosti filma z vtiskovanjem premaza na leseni podlagi**

Paints and varnishes - Coating materials and coating systems for exterior wood - Assessment of film extensibility by indentation of a coating on a wooden substrate

Beschichtungsstoffe - Beschichtungsstoffe und Beschichtungssysteme für Holz im Außenbereich - Beurteilung der Verformbarkeit durch Eindrücken einer Beschichtung auf einem Holzsubstrat

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Peintures et vernis - Produits de peintures et systèmes de peintures pour bois en extérieur - Évaluation de l'extensibilité du feuill par poinçonnement d'un revêtement sur un support en bois

**Ta slovenski standard je istoveten z: FprCEN/TS 16360**

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**ICS:**

71.100.50	Kemikalije za zaščito lesa	Wood-protecting chemicals
87.040	Barve in laki	Paints and varnishes

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TECHNICAL SPECIFICATION  
SPÉCIFICATION TECHNIQUE  
TECHNISCHE SPEZIFIKATION

**FINAL DRAFT**  
**FprCEN/TS 16360**

January 2021

ICS 87.040

Will supersede CEN/TS 16360:2012

English Version

**Paints and varnishes - Coating materials and coating systems for exterior wood - Assessment of film extensibility by indentation of a coating on a wooden substrate**

Peintures et vernis - Produits de peintures et systèmes de peintures pour bois en extérieur - Évaluation de l'extensibilité du feuillet par poinçonnement d'un revêtement sur un support en bois

Beschichtungsstoffe - Beschichtungsstoffe und Beschichtungssysteme für Holz im Außenbereich - Beurteilung der Verformbarkeit durch Eindrücken einer Beschichtung auf einem Holzsubstrat

This draft Technical Specification is submitted to CEN members for Vote. It has been drawn up by the Technical Committee CEN/TC 139.

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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 (FprCEN/TS 16360:2021) 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 Vote on TS.

The main changes compared to the previous edition are as follows:

- the designation of the cones in Figure 1 and Table 1 has been changed from figures to letters;
- the speed of the testing machine has been changed from 8 mm/min to  $(10\pm 5)$  mm/min;
- in 5.3 the magnification of the microscope has been changed from 50× to 10×;
- the size of the test panels has been changed;
- the number of tests has been changed from three to ten;
- a description of the cracked coating and a figure showing the appearance of concentric cracks in the coating has been added;
- the text has been editorially revised and the normative references have been updated.

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## Introduction

A suitable extensibility of a coating film on wood in exterior use is of importance to follow dimensional changes of the wood and to resist some mechanical impacts without formation of cracks in the coating film. The simple method described in this document gives evidence on extensibility of a coating film on wood on an ordinal scale and provides first evidence on mechanical behaviour. A similar method exists in EN 13696:2008 for coated wood floorings in interior use but in the present document the description of a carefully selected substrate is added to enable testing of coating materials and coating systems for exterior wood. The method should preferably be used on coatings that have not been exposed to weathering but it may also be applied after ageing of the coating film or under different climatic conditions to gain additional experience.

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## 1 Scope

This document specifies a test method for assessing film extensibility by indentation of a coating on a defined and carefully selected wooden extensibility substrate for coatings on stable wood components in exterior use. The method is preferably be used on coatings that have not been exposed to weathering.

## 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 927-3:2019, *Paints and varnishes — Coating materials and coating systems for exterior wood — Part 3: Natural weathering test*

EN ISO 4618:2014, *Paints and varnishes — Terms and definitions (ISO 4618:2014)*

ISO 554, *Standard atmospheres for conditioning and/or testing — Specifications*

ISO 1361-2, *Physical and mechanical properties of wood — Test methods for small clear wood specimens — Part 2: Determination of density for physical and mechanical tests*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 4618:2014 and the following apply.

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

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

### 3.1

#### film extensibility

ability of a dry film to follow without damage the deformations of the substrate to which it is applied

## 4 Principle

A metal plate with 12 cones with different heights is pressed into a coated wood surface and after removing the plate coating cracks in the areas indented by the cones are assessed.

## 5 Apparatus

**5.1 Cone plate**, metal plate with 12 cones with different heights (see Figure 1). The tips of cones are slightly rounded, bases of all cones lie on the level of the metal plate, measures of cones are listed in Table 1.

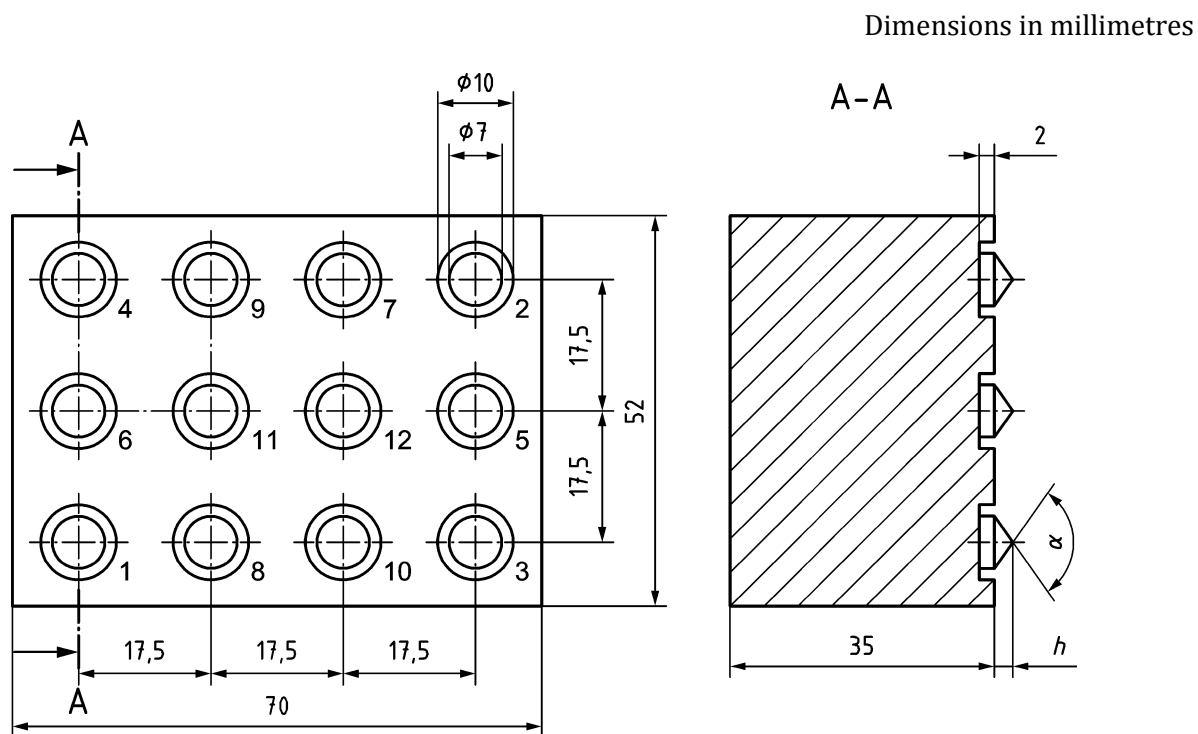


Figure 1 — Metal plate with 12 different cones for assessment of film extensibility

Table 1 — Heights and angles of cones

Cone No.	Height $h$ in mm	Angle $\alpha$ <sup>a</sup>
1	2,6	106°45'
2	2,4	110°05'
3	2,2	115°40'
4	2,0	120°30'
5	1,8	125°40'
6	1,6	130°50'
7	1,4	136°25'
8	1,2	142°10'
9	1,0	148°05'
10	0,8	154°15'
11	0,6	160°35'
12	0,4	167°00' <sup>a</sup>

<sup>a</sup> Rounded to a multiple of 5'.

**5.2 Universal testing machine** for compression tests with a maximum force of 100 kN, a constant speed of  $(10 \pm 5)$  mm/min and an adapter to mount the cone plate with flexible connection.



**5.3 Magnifying glass or microscope** with a magnification of min. 10 × .

## 6 Procedure

### 6.1 Wood panels

Boards of Norway spruce (*Picea abies*) are selected with normal growth rate (i.e. 3 annual rings to 8 annual rings per 10 mm), a density between 0,4 g/cm<sup>3</sup> and 0,5 g/cm<sup>3</sup> (measured after conditioning) and straight grain. The wood shall be free from blue stain and evidence of surface or bulk fungal infection. Abnormal porosity (caused by bacterial attack) shall be avoided according to EN 927-3:2019, A.9. From these boards panels with the dimensions min. 270 mm × min. 80 mm × (20 ± 2) mm free from knots, cracks and resinous streaks are produced, that the inclination of the growth rings to the test surface is 60° to 90°. The panels shall be planed to a smooth and uniform finish. In order to avoid aged wood surface, the panels shall be hand sanded (mesh 150) immediately before coating.

The wood shall be conditioned at (20 ± 2) °C and a relative humidity of (65 ± 5) % in accordance with ISO 554 to an equilibrium moisture content of (13 ± 2) %. After conditioning, wood density shall be determined according to ISO 1361-2.

### 6.2 Coating application

Apply the coating system to the front side of the panels using the method specified by the manufacturer to give a wet film thickness corresponding to the mean value (±20 %) of the manufacturer's recommended spreading rate. Record the quantity of coating applied. The values should be stated preferably in g/m<sup>2</sup>, but may also be expressed as wet film thickness (in micrometres).

After coating application, age the panels for 21 days in the controlled environment at (20 ± 2) °C and a relative humidity of (65 ± 5) % in accordance with ISO 554.

### 6.3 Assessment of film extensibility

The cone plate is mounted into the universal testing machine in compression mode using an adapter for a flexible connection. After ageing the coating system for 21 days the cones are pressed into the coated wood surface with a constant speed of (10 ± 5) mm/min so far that the metal plate is just in contact with the panel surface. The metal plate is kept in contact with the panel surface for 10 s. Ten tests shall be carried out with a minimum distance of 50 mm between the tested areas.

After removing the cone plate the areas indented by the cones are observed under a microscope with a magnification of 10 x to observe coating cracks in the region of the cones. The first cone number of Table 1 where no concentric cracks in the coating film can be observed is taken as rating of film extensibility. In the event of no cracking occurring, the extensibility shall be rated as higher than '1'. The coating is cracked when a concentric crack of min. 2 mm lengths occurs (Figure 2). Radial cracks and cracks in direction of the grain of the wood substrate shall be ignored.

The test result is calculated as median value of ten tests to one decimal.

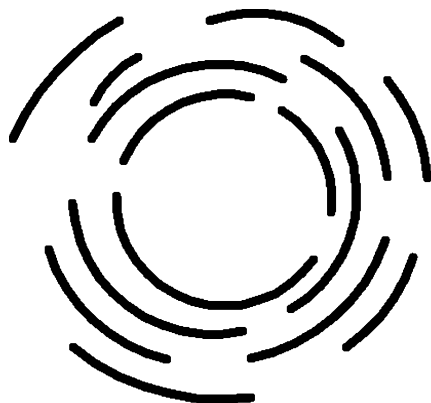


Figure 2 — Appearance of concentric cracks in the coating film caused by the indentation of cones

## 7 Test report

The test report shall contain at least the following information:

- a) reference to this Technical Specification;
- b) name and address of the testing laboratory;
- c) type of apparatus used;
- d) identification number of the test report;
- e) name and address of the organization or the person who ordered the test;
- f) date and person responsible for the sampling;
- g) date of receipt of the coating system tested;
- h) test results according to 6.3 including wood density;
- i) authorization date of the test report.

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