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**Wood and parquet flooring and wood  
panelling and cladding — Determination  
of the resistance to chemical agents**

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## National foreword

This British Standard is the UK implementation of EN 13442:2023. It supersedes BS EN 13442:2013, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/543, Round and sawn timber.

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EUROPEAN STANDARD

**EN 13442**

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 2023

ICS 79.080

Supersedes EN 13442:2013

English Version

## Wood and parquet flooring and wood panelling and cladding - Determination of the resistance to chemical agents

Planchers et parquets en bois et lambris et bardages en bois - Détermination de la résistance aux agents chimiques

Holz- und Parkettfußböden und Wand- und Deckenbekleidungen aus Holz - Bestimmung der chemischen Widerstandsfähigkeit

This European Standard was approved by CEN on 3 March 2023.

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## European foreword

This document (EN 13442:2023) has been prepared by Technical Committee CEN/TC 175 “Round and sawn timber”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by October 2023, and conflicting national standards shall be withdrawn at the latest by October 2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 13442:2003.

The main changes compared to the previous edition are listed below:

- 3.6 and 3.7, new definitions;
- 6.1.2, light sources has been modified;
- 6.2, Test equipment has been modified;
- Table 1, test agent has been modified;
- Table 2, has been added;
- 8.2, Procedure has been clarified;
- 9.3, has been deleted;
- Figure 2, has been deleted.

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## Introduction

This document is one of a series of standards about wood floorings (including parquet) and wood panelling and cladding.

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## 1 Scope

This document specifies a test method to determine the resistance of the surface of an element of wood flooring, panelling and cladding, to a predetermined list of chemical agents they may be exposed to during their service life.

## 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 13756, *Wood flooring and parquet - Terminology*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13756 and the following 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>

### 3.1

#### **test piece**

part, of a size suitable for testing, taken from an element

### 3.2

#### **test specimen**

either a full element or an assembly of elements to be tested

### 3.3

#### **test surface**

part of the test piece, where the test area is located

Note 1 to entry: For products made from small elements the test piece can be the same as the test specimen.

### 3.4

#### **test area**

area under the Petri dish

### 3.5

#### **reference area**

any unexposed surface of the test specimen close to the test area but outside the Petri dish

### 3.6 film-forming coating

coating that forms a continuous, perceivable and measurable film on a wood surface

Note 1 to entry: A continuous coating film can be produced in planed surfaces of coniferous wood species (e.g. spruce, pine and larch) and ring porous hardwood species (e.g. oak, ash and elm) above a dry film thickness of approximately 20 µm. On diffuse-porous hardwood species (e.g. maple, beech and birch) lower film thicknesses can result in continuous coating films.

Note 2 to entry: On structured surfaces the dry film thickness can be up to 30 µm.

[SOURCE: ISO 5323:2019, 3.47, modified —adding note 2 to entry]

### 3.7 non-film-forming coating

coating which does not form a continuous physical film

Note 1 to entry: Oiled and waxed surfaces or combinations of both with a thickness of the dry coating film < 20 µm are examples for non-film-forming coatings.

## 4 Principle

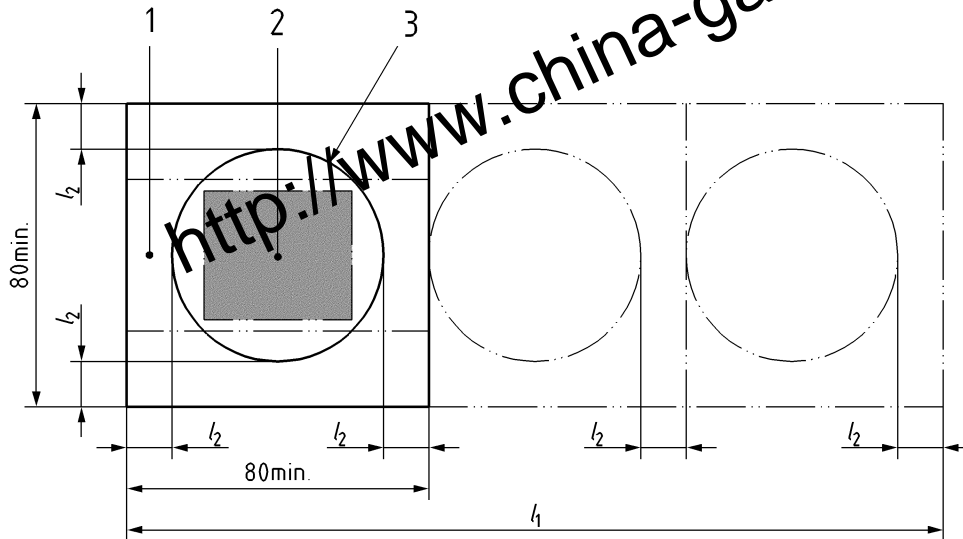
A liquid test agent impregnating a saturated paper is laid on a surface, which is then covered by a glass Petri dish. After a specified period of time, removal of the paper, washing and drying of the surface and examination for visible change. Assessment of the test results in terms of a numerical rating code.



## 5 Test pieces and test specimens

### 5.1 Dimensions

A test piece shall have a minimum size of 80 mm by 80 mm by the thickness of the element. See Figure 1. Dimensions in millimetres



#### Key

- 1 test surface
- 2 test area
- 3 Petri dish
- $l_1$   $\geq 80 + 60 (n - 1)$  mm, minimum distance between the edge and the next test area(s) according to the number of test areas
- $l_2$  20 mm, minimum distance between any test area and the edge or another test area
- $n$  number of test areas

**Figure 1 — Dimensions of a test piece**

If the size of the element delivered by the manufacturer does not allow the cutting of a test piece, a test specimen shall be assembled in accordance with the manufacturer's specification, which allows to cut the necessary test pieces.

### 5.2 Sampling

Three test pieces or test specimens shall be tested for each agent to be applied.

## 6 Equipment and materials

### 6.1 Apparatus

#### 6.1.1 Conditioning

If a conditioning system is available, the following climate shall be used:

- temperature (23 ± 2) °C;
- relative humidity (50 ± 5) %.

#### 6.1.2 Diffused light source

This source provides evenly diffused light, giving an illumination on the test area of between (1 200 ± 400) lx.

The light source should have a correlated colour temperature of (6 500 ± 50) K and an  $R_a$  (colour rendering index) greater than 92, by using a colour matching booth in accordance with EN ISO 3668.

### 6.2 Test equipment

**6.2.1 Pieces of cellulose filter paper with a diameter of (25 ± 2) mm** to apply each of the test agents, free of dyes and of chemicals, with a grammage of 400 g/m<sup>2</sup> to 500 g/m<sup>2</sup>.

**6.2.2 Glass Petri dishes** with ground edges and without lips, external diameter between 40 mm and 60 mm.

**6.2.3 Pair of tweezers.**

**6.2.4 Absorbent paper or tissue**, with good absorbent properties, free of dyes and of chemicals.

**6.2.5 White, soft, absorbent cotton cloths.**

**6.2.6 Vessels for containing test agents during soaking of filter paper.**

### 6.3 Chemical agents

#### 6.3.1 Test agents

The test agents for film-forming coatings are listed in Table 1. The test agents for non-film-forming coating are listed in Table 2.

**Table 1 — Test agents for film-forming coatings for different levels of chemical resistance (A, B)**

Agent	Initial temperature of the agent $\pm 2$ °C	Procedure A	Procedure B
Acetic acid 4,4 %	23	(24 $\pm$ 1) h	(60 $\pm$ 1) min
Acetone, purity grade min. mass fraction of 99,5 %	23	(120 $\pm$ 10) s	(10 $\pm$ 1) s
Ammonia solution <sup>b</sup> at 10 % in water	23	(2) min	-
Cleaning Solution (see 6.3.2.2)	23	(24 $\pm$ 1) h	(24 $\pm$ 1) h
Coffee <sup>a</sup> , 40 g instant, freeze-dried coffee per 1 l of boiling water	23	(24 $\pm$ 1) h	(24 $\pm$ 1) h
Distilled water (see 6.3.2.1)	23	(24 $\pm$ 1) h	(24 $\pm$ 1) h
Ethanol, not denaturated, mass fraction of 48 % in distilled water	23	(24 $\pm$ 1) h	(24 $\pm$ 1) h
Parafin oil for medical use (Paraffinium liquidum dynamic viscosity at 20°C of 25 until 80 mPas)	23	(24 $\pm$ 1) h	(24 $\pm$ 1) h
Plain red wine, alcohol with a volume fraction of at least 13 %	23	(24 $\pm$ 1) h	(24 $\pm$ 1) h
<sup>a</sup> The test agents cow's milk, coffee and tea can be used only for four hours. <sup>b</sup> The ammonia solution can be used only for one month.			

**Table 2 — Test agents for non-film-forming coatings for different levels of chemical resistance (C, D, E)**

Agent	Initial temperature of the agent $\pm 2$ °C	Procedure C	Procedure D	Procedure E
Acetic acid 4,4 %	23	(120 $\pm$ 10) s	-	-
Cleaning solution (see 6.3.2.3)	23	(60 $\pm$ 1) min	(10 $\pm$ 1) min	-
Coffee <sup>a</sup> , 40 g instant, freeze-dried coffee per 1 l of boiling water	23	(60 $\pm$ 1) min	(10 $\pm$ 1) min	-
Distilled water (see 6.3.2.1)	23	(16 $\pm$ 1) h	(60 $\pm$ 1) min	(10 $\pm$ 1) min
Ethanol, chemical pure, not denaturated, mass fraction of 48 % in distilled water	23	(10 $\pm$ 1) min	-	-
Parafine oil for medical use (Paraffinium liquidum)	23	(60 $\pm$ 1) min	(10 $\pm$ 1) min	-
<sup>a</sup> The coffee can be used only for four hours.				

The test agents shall be stored in sealed glass bottles in a dark place and shall be conditioned to the test temperature prior to use. Cow's milk, coffee, tea and wine shall be fresh.

### 6.3.2 Cleaning agents

#### 6.3.2.1 Deionised or distilled water.

#### 6.3.2.2 Detergent, of the following composition:

- a) 12,5 % (m/m) Sodium dodecylbenzenesulfonate [CAS 25155-30-0];
- b) 12,5 % (m/m) polyoxyethylene(20)sorbitan monostearate [CAS 9005-70-9];
- c) a mass fraction of 5 % ethanol, chemical pure, not denatured, minimum mass fraction of 96 %;
- d) a mass fraction of 70 % water (see 6.3.2.1).

The detergent shall be stored in a glass bottle in a cool dark place and should be used within 1 year of the day of preparation.

12,5 % (m/m) Sodium dodecylbenzenesulfonate [CAS 25155-30-0]

#### 6.3.2.3 Cleaning solution containing 15 ml/l of the detergent (see 6.3.2.2) in water (see 6.3.2.1).

This solution shall be freshly prepared on each occasion.

## 7 Procedure

### 7.1 Test pieces and test specimen

If the test piece or test specimen is coated, carry out the test after full curing of the coating. Relevant information shall be provided by the manufacturer.

Wipe the test surface carefully with a dry cloth (see 6.2.5) before testing.

### 7.2 Chemical test

Immediately after the conditioning, if any, carry out the test in an atmosphere of  $(23 \pm 2)$  °C.

Place the test surface horizontally. Test it with the test agents specified in 6.3.1 at test areas, their centre being not more and not less than 60 mm apart, centre to centre and not less than 40 mm from any edge of the test surface.

Immerse a piece of filter paper (see 6.2.1) into a test agent (see 6.3.1) for  $(30 \pm 1)$  s, lift with the pair of tweezers (see 6.2.3) and wipe off against the edge of the vessel (see 6.2.6). Quickly place the filter paper on the test area and immediately cover with an inverted glass Petri dish (see 6.2.2). The filter paper shall not touch the edge of the glass Petri dish.

Record the position of each impregnated paper on each test area for each test agent.

After the stated duration for each test agent used (see 6.3.1), remove the glass Petri dish and lift off the filter paper with the pair of tweezers. Do not remove fibres of paper adhering to the test area. Soak up any remaining test agent with the absorbent paper (see 6.2.4) without rubbing and leave the test surface undisturbed for 16 h to 24 h in the test atmosphere without covering it. The test area shall be sufficiently protected against dust without limiting in any way the free access of air.

After the expiry of the 16 h to 24 h, wash the test surface by lightly rubbing it with the absorbent paper or tissue (see 6.2.4) soaked in cleansing solution (see 6.3.2.3) and then with another absorbent paper or tissue soaked in distilled water (see 6.3.2.1). Finally wipe the surface carefully with a dry cloth (see 6.2.5).

At the same time, wash and dry the same way a reference area on the test surface that has not been exposed to the test agent.

Leave the test surface undisturbed, without covering it, for  $(30 \pm 1)$  min in the test atmosphere, then proceed to the examination (see Clause 8).

## 8 Examination of the test piece

### 8.1 Rating code

Rate the test area by comparison with the reference area for each test agent according to the following numerical rating code:

- 5) No visible changes (no damage).
- 4) Slight change in the surface structure or slight change in gloss level and/or colour visible only when the light source is mirrored in the test surface on or quite near the mark and is reflected towards the observer's eye, or a few isolated marks just visible.
- 3) Slight mark, visible in several viewing directions; for example, almost the complete shape of the filter paper is just visible.
- 2) Strong mark, the structure of the surface being however largely unchanged.
- 1) Strong mark, the structure of the surface being strongly changed or the surface material being totally or partially removed or the filter paper adhering to the surface.

If other notable changes are at hand, this shall be reported.

### 8.2 Procedure

Carefully examine the test area for damage, e.g. discolouration, change in gloss and colour, blistering and other defects. For this purpose, illuminate the surface using the diffused light source (see 6.1.2) and examine from different angles, including angle combinations such that the light is reflected from the test surface and towards the observer's eye. Viewing distance shall be 0,25 m to 1,0 m.

Place the test piece in different positions with the light parallel and perpendicular to the direction of the grain, if any. In each position, compare the test area with the surface of the reference area.

Changes of the structure of the surface due by the test agents shall be examined also by touching of the test area.

Rate the test area according to 8.1.

## 9 Expression of results

### 9.1 For each test area

It is recommended that each test area be rated by more than one observer experienced in this type of assessment. The reported rating for the test area shall be the average value given by the observer(s).

### 9.2 For each test agent

The mean value of the three test pieces for each test agent according to Table 1 or Table 2 shall be calculated and rounded on the next integral number. For non-film-forming coating the calculation shall be made for the test agents of the chosen procedure.

## 10 Test report

The test report shall contain at least the following information:

- a) the name and the address of the laboratory;
- b) a reference to this document and the deviations, if any;
- c) the chosen procedure;
- d) the type (the brand, if any) and the full description of the elements, lay-up, coating (film-forming or non-film-forming), appearance classification if available, etc.;
- e) the conditioning applied to the test pieces prior to testing;
- f) the climatic conditions within the laboratory during the testing;
- g) any unusual features observed;
- h) the test result for each test agent, as described in 9.2;
- i) the date of the test.

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## Bibliography

- [1] ISO 5323:2019, *Wood flooring and parquet — Vocabulary*
- [2] EN ISO 3668, *Paints and varnishes - Visual comparison of colour of paints (ISO 3668)*

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