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## Wood-flooring and parquet — Multi-layer parquet elements

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## National foreword

This British Standard is the UK implementation of EN 13489:2023. It supersedes BS EN 13489:2017, which is withdrawn.

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

A list of organizations represented on this committee can be obtained on request to its committee manager.

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EUROPEAN STANDARD

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July 2023

ICS 79.080

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English Version

**Wood-flooring and parquet - Multi-layer parquet elements**Planchers en bois et parquets - Éléments de parquet  
contrecolléHolzfußböden und Parkett -  
Mehrschichtparkettelemente

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## European foreword

This document (EN 13489:2023) 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of an identical text or by endorsement, at the latest by January 2024, and conflicting national standards shall be withdrawn at the latest by January 2024.

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 13489:2007.

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

- a complete revision of EN 13489 has been done, especially:
  - a) update to revised terminology standard EN 13756;
  - b) update to revised standard for geometrical characteristics according to EN 13647;
  - c) update to revised Brinell hardness standard EN 1534;
- a reference to test methods for surface finishes (chemical resistance/abrasion/elasticity) according to EN 13696 and EN 13442 has been included;
- a reference to a test method and min. requirement for top layer bonding according to EN 17456 has been included.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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## Introduction

This document is one of a series of standards about wood flooring and wood panelling and cladding.

This document specifies the characteristics of multi-layer parquet. It is based upon current dimensional standards used in the industry and other characteristics together with functions that have been verified by test.

A large amount of knowledge exists about multi-layer parquet and values for product characteristics are attested by long use and experience. It is therefore not necessary to have test results. For new products technical data will have to be verified by testing.

The appearance of the parquet floor is mainly influenced by species, classification and the pattern.

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## 1 Scope

This document specifies the characteristics, requirements and test methods of multi-layer parquet elements for internal use as flooring.

## 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 1309-3, *Round and sawn timber - Methods of measurements - Part 3: Features and biological degradations*

EN 1534, *Wood flooring and parquet - Determination of resistance to indentation - Test method*

EN 13183-1, *Moisture content of a piece of sawn timber - Part 1: Determination by oven dry method*

EN 13442, *Wood and parquet flooring and wood panelling and cladding - Determination of the resistance to chemical agents*

EN 13647, *Wood flooring and wood panelling and cladding - Determination of geometrical characteristics*

EN 13696, *Wood flooring - Test methods to determine elasticity and resistance to wear and impact resistance*

EN 13756, *Wood flooring and parquet - Terminology*

EN 17456, *Wood flooring and parquet - Determination of top layer delamination of multilayer elements - Test method*

## 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:

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

### 3.1

#### **multi-layer parquet**

wood flooring system of laminated construction with a solid wood top layer of at least 2,5 mm thickness and additional layer(s) as a core/backing constituted of wood based and/or lignified material of more or equal to 75 % in mass

Note 1 to entry: 2-layer and 3-layer parquet are specific variants of multilayer parquet. 2-layer parquet consists of top layer and core layer made of solid wood, wood based panels or combinations of them. Additionally, a veneer or a secondary wood based panel is applied as backing in 3-layer parquet.

[SOURCE: EN 13756:2018, 4.2.1.6, modified – adding Note 1 to entry]

**3.2**  
**element**

smallest individual piece or the smallest piece as delivered prior to installation

[SOURCE: EN 13756:2018, 4.1]

**3.3**  
**top layer**

finished or unfinished upper wood layer, intended to be the visible side when the floor is installed

[SOURCE: EN 13756:2018, 7.12]

**3.4**  
**strip**

smallest single item forming the top layer of each element

## **4 Requirements**

### **4.1 Technical requirements**

#### **4.1.1 General**

The element shall be precisely machined, properly sanded and shall have tongue and/or groove on all sides, or integral locking profile. The tongue may be detachable.

The laying instructions shall be supplied or made available by the producer/supplier.

NOTE 1 The cross laminated construction minimizes the possibility of the wood to move (shrink and swell) under changing climatic conditions.

NOTE 2 Optical and slight mechanical changes of surface may occur, but do not limit the usage.

NOTE 3 Low use frequency combined with climate changes may lead to slight creaking effects on floated installed multilayer parquet.

#### **4.1.2 Moisture content**

The moisture content shall be between 5 % and 9 % at the time of the first delivery of the product.

The only suitable method of measurement for moisture content for multi-layer parquet is given in EN 13183-1 (oven-dry method).

NOTE 1 EN 13183-2 (electrical method) can only provide an estimation of the moisture content.

NOTE 2 Depending on the construction of multilayer parquet (e.g. the amount and type of glue, type of core board, etc.), the equilibrium moisture content at the same climate conditions differ to solid wood.

#### **4.1.3 Dimensional characteristics and limit deviations**

Dimensional characteristics and permitted deviations of dimensions of elements at all points at the time of the first delivery of the product are shown in Table 1.

Measurement of geometrical characteristics shall be done according to EN 13647.



**Table 1 — Dimensional characteristics and limit deviations of element**

Characteristics	Dimension characteristic	Limit deviations
Top layer thickness	≥ 2,5 mm	---
Permitted deviation of length	---	±0,1 %
Permitted deviation of width	---	±0,2 mm
Lipping (between elements)	---	≤ 0,2 mm
Permitted deviation of squareness	---	≤ 0,2 % over the width
Cup (across the element)	---	≤ 0,2 % over the width
Spring (across the element)	---	≤ 0,1 % over the length

For elements of width ≤ 90 mm and length ≤ 700 mm, squareness should be ≤ 0,1 % and cup ≤ 0,3 %.

Due to process in production, the deviation of declared top layer thickness can be ± 0,2 mm but the thickness shall be never less than 2,5 mm.

#### 4.1.4 Hardness

Values for wood hardness shall be determined by the test defined in EN 1534.

NOTE In EN 1534:2020, Annex A, a list of HB of typical wood species is available.

#### 4.1.5 Finishing

The surface treatment used and any artificial change of the natural wood colour shall be stated in the product description.

NOTE The product is usually delivered with a factory applied surface coating which allows the product to be taken into use immediately after installation.

If applicable, characteristics of finishing shall be determined according to Table 2.

**Table 2 — Test procedures for finishes on multilayer parquet**

Characteristics	Reference test procedure <sup>a</sup>
Resistance to chemical agents	EN 13442
Abrasion resistance <sup>b</sup>	EN 13696
Impact resistance <sup>b</sup>	EN 13696
Elasticity <sup>b</sup>	EN 13696
<sup>a</sup> To comply with local requirements, other standardized test methods may apply. <sup>b</sup> Film forming finishes according to EN 13442 only.	

#### 4.1.6 Bonding quality for products under dry indoor conditions and for underfloor heating systems

The procedures for the evaluation of top layer bonding shall be according to EN 17456. The limit for mean value of top layer delamination after aging treatment 1 is  $\leq 1\%$  and for single values is  $\leq 5\%$ .

#### 4.1.7 Product specific requirements

For product specific requirements see EN 14342.

### 4.2 Requirements for wood species

#### 4.2.1 Introduction

A list of the most commonly used wood species for parquet as described in this document is given in EN 13556.

NOTE Wood species exhibit natural colour and grain. Each species and consignment will have varied decorative appearance according to the procurement area.

#### 4.2.2 General rules

Tables 3 to 6 define the classification relating to appearance rules for the face and for the non-visible parts (back and edges) of an element of the most commonly used species for multi-layer parquet as defined in this document.

Features shall be measured according to EN 1309-3 (knots assessed according to the general method of EN 1309-3). Biodeterioration shall be measured according to EN 1309-3.

A classification named « Free class » is based on the principles laid out in Annex A.

A classification with three appearance classes is specified, designated  $\circ$ ,  $\Delta$  and  $\square$ .

The material used for the top layer shall be selected hardwood or softwood, fresh and sound without rot, fungus, mould or insect attack and insect damage. Possible exceptions shall be listed in the “free class” specification. There will be variations from strip to strip, but the total impression of the installed floor shall show a homogeneous character of each classification.

To allow for unavoidable classification differences, 3 % of the elements in a batch may be from other classes. Any additional strips from other classes are allowed as long as the general impression of the floor is not disturbed.

#### 4.2.3 Classification rules for species

##### 4.2.3.1 Rules for the most commonly used species

###### 4.2.3.1.1 *Quercus* spp. (oak)

Rules for oak are given in Table 3.

Table 3 — Classification for *Quercus* spp. (oak)

Face of the element				
Features	Class			
	○	Δ	□	
<b>Sound sapwood</b>	Not permitted	Permitted up to 50% of the face, if distributed	All features permitted without limit to size or quantity if these do not impair the strength or the wearing quality of the parquet flooring.	
<b>Knots</b> <sup>a</sup> Sound and intergrown Unsound knots	Permitted if: diameter ≤ 3 mm diameter ≤ 11 mm if not grouped together <sup>b</sup>	Permitted if: diameter ≤ 8 mm diameter ≤ 2 mm		
<b>Checks</b>	Not permitted	Permitted up to 20 mm in length per strip		
<b>Bark pockets</b>	Not permitted	Not permitted		
<b>Lightning shake</b>	Not permitted	Not permitted		
<b>Slope of grain</b>	Permitted, no limit	Permitted, no limit		
<b>Colour variation</b>	Slight variation permitted	Permitted		
<b>Medullary ray</b>	Permitted	Permitted		
<b>Biodeterioration</b>	Not permitted	Not permitted		Not permitted, except blue stain and black holes.
Non-visible parts				
All features permitted without limit to size or quantity if these do not impair the strength or the wearing quality of the parquet flooring.				
<sup>a</sup> Cracks in knots and knot holes greater than 3 mm shall be filled. <sup>b</sup> Knots are grouped together if the distance separating them, measured from edge to edge, does not exceed 30 mm.				

4.2.3.1.2 *Fraxinus excelsior* (European ash), *Fagus sylvatica* (European beech), *Betula* spp. (birch) and *Acer* spp. (maple)

Rules for European ash, European beech, birch and maple are given in Table 4.

**Table 4 — Classification for *Fraxinus excelsior* (European ash), *Fagus sylvatica* (European beech), *Betula* spp. (birch) and *Acer* spp. (maple)**

Features	Face of the element		
	Class		
	○	△	□
<b>Sound sapwood</b>	Not applicable	Not applicable	Not applicable
<b>Knots</b> <sup>a</sup> Sound and intergrown Unsound knots	Permitted if: diameter ≤ 3 mm diameter ≤ 1 mm if not grouped together <sup>b</sup>	Permitted if: diameter ≤ 8 mm <sup>c</sup> diameter ≤ 2 mm <sup>c</sup>	All features permitted without limit to size or quantity if these do not impair the strength or wearing quality of the parquet flooring.
<b>Checks</b>	Not permitted	Permitted up to 20 mm in length per strip	
<b>Bark pockets</b>	Not permitted	Not permitted	
<b>Lightning shake</b>	Not permitted	Not permitted	
<b>Slope of grain</b>	Permitted, no limit	Permitted, no limit	
<b>Colour variation</b>	Slight variation permitted <sup>d</sup> . Slight traces of natural discoloration permitted	Permitted	
<b>Red heart and black heart</b> <sup>e</sup>	Not permitted	Permitted up to 50 % of the face, if distributed	
<b>Stick marks</b>	Not permitted	Permitted	
<b>Medullary ray</b>	Permitted	Permitted	
<b>Biodeterioration</b>	Not permitted	Not permitted	Not permitted, except blue stain and black holes
<b>Non-visible parts</b>			
All features permitted without limit to size or quantity if these do not impair the strength or wearing quality of the parquet flooring.			
<sup>a</sup> Cracks in knots and knot holes greater than 3 mm shall be filled. <sup>b</sup> Knots are grouped together if the distance separating them, measured from edge to edge, does not exceed 30 mm. <sup>c</sup> No limitation in <i>Betula</i> spp. (birch). <sup>d</sup> Permitted for steamed beech. <sup>e</sup> Brown heart for birch and maple.			

4.2.3.1.3 *Larix* spp. (larch), *Pinus sylvestris* (redwood; Scots pine) and *Picea* spp. (spruce)

Rules for larch, redwood; Scots pine and spruce are given in Table 5.

**Table 5 — Classification for *Larix* spp. (larch), *Pinus sylvestris* (redwood; Scots pine) and *Picea* spp. (spruce)**

Face of the element			
Features	Class		
	○	△	□
<b>Sound sapwood</b>	Permitted	Permitted	All features permitted without limit to size or quantity if these do not impair the strength or the wearing quality of the parquet flooring.
<b>Knots</b> <sup>a</sup> Sound and intergrown Unsound knots	Permitted if: diameter ≤ 12 mm diameter ≤ 5 mm if not grouped together <sup>b</sup>	Permitted if: diameter ≤ 25 mm diameter ≤ 15 mm	
<b>Checks</b>	Not permitted	Permitted up to 40 mm in length per strip	
<b>Bark pockets</b>	Not permitted	Not permitted	
<b>Lightning shake</b>	Not permitted	Not permitted	
<b>Slope of grain</b>	Permitted, no limit	Permitted, no limit	
<b>Colour variation</b>	Slight variation permitted	Permitted	
<b>Resin pockets</b>	Not permitted	Permitted 2 mm in width Permitted 25 mm in length	
<b>Biodeterioration</b>	Not permitted	Not permitted	Not permitted, except blue stain and black holes
Non-visible parts			
All features permitted without any limitation as to size or quantity if these do not impair the strength or wearing quality of the parquet flooring.			
<sup>a</sup> Cracks in knots and knot holes greater than 3 mm shall be filled. <sup>b</sup> Knots are grouped together if the distance separating them, measured from edge to edge, does not exceed 30 mm.			

4.2.3.1.4 Other hardwoods

Rules for other hardwoods are given in Table 6.

Table 6 — Classification for other hardwoods

Face of the element			
Features	Class		
	○	△	□
<b>Sound sapwood or heartwood</b> <sup>a</sup>	Not permitted Not permitted	Permitted Permitted up to 50 % of the face, if distributed	Slight traces permitted Permitted
<b>Knots</b> <sup>b</sup> Sound and intergrown Unsound knots	Permitted if: diameter ≤ 2 mm if not grouped together <sup>c</sup> diameter ≤ 1 mm if not grouped together <sup>c</sup>	Permitted if: diameter ≤ 5 mm if not grouped together <sup>c</sup> diameter ≤ 2 mm if not grouped together <sup>c</sup>	All features permitted without limit to size or quantity if these do not impair the strength or the wearing quality of the parquet flooring.
<b>Checks</b>	Not permitted	Not through going. Permitted if the width ≤ 0,5 % of the width of the element	
<b>Bark pockets</b>	Not permitted	Not permitted	
<b>Lightning shake</b>	Not permitted	Not permitted	
<b>Slope of grain</b>	Permitted, no limit	Permitted, no limit	
<b>Colour variation</b>	Permitted. Slight traces of natural discoloration (mineral lines) permitted.	Permitted	
<b>Medullary ray</b>	Permitted	Permitted	
<b>Biodeterioration</b>	Not permitted	Not permitted	Not permitted, except blue stain and black holes
<b>Non-visible parts</b>			
All features permitted without limit to size or quantity if these do not impair the strength or the wearing quality of the parquet flooring.			
<sup>a</sup> Sound sapwood or “heartwood” shall be chosen depending on the wood species concerned. <sup>b</sup> Cracks in knots and knot holes greater than 3 mm shall be filled. <sup>c</sup> Knots are grouped together if the distance separating them, measured from edge to edge, does not exceed 30 mm.			

#### 4.2.3.2 Free class

The free class covers any species which may be used for parquet. The free class covers any classification which the producer wishes to offer or which is requested by the buyer. The proportions or limits of features shall be specifically indicated in the producer's literature/data sheets, in conformity with Annex A and stated to Table A.1 when it refers to hardwood and according to Table A.2 when it refers to softwood.

#### 4.2.4 Natural colours

Timber colours are mainly dependent on the wood species.

NOTE All timber varies in colour when exposed to light over a period of time.

#### 4.2.5 Classification

The class shall be specified.

The decorative appearance of each species will vary with class.

It should be noted that some classes allow many natural characteristics. This fact should be taken into account when specifying decorative appearance.

### 5 Measures to extend the life span

Multi-layer parquet shall be able to be refurbished (renovation) at least twice, provided that the installation and the value-preserving measures have been carried out professionally.

Depending on the degree of use, this can be a refreshing, a local repair or a full-surface renovation.

The manufacturer's instructions shall be followed when carrying out the work.

It is important to emphasize that any surface treatment carried out after installation influence or change the original appearance and technical properties.

(Maintenance and refreshing)

Basic cleaning and/or the application of surface treatment techniques can reduce existing signs of use and maintain and improve the appearance and usage properties.

Refreshing is possible several times.

(Local repair)

Depending on the type of surface treatment, a local repair can be carried out either by replacing parquet elements or by processing the areas to be repaired. When performed properly, no significant reduction of performance or top-layer-thickness is caused. A local repair is possible several times.

(Renovation/Refurbishment)

Renovation is carried out by sanding down the entire surface, brushing if necessary, and creating a new surface. This might change properties of the flooring, e.g. structure, coloration, reaction to fire.

If, due to deep damage to the wood structure, an excessive amount has to be removed, a new renovation by sanding may no longer be possible.

NOTE 1 For technical reasons it is not possible that surface structure, stained surfaces, multiple colours, digital printings, bevelled products, etc. remain after renovation since regularly the surface will be sanded in the renovation process.

NOTE 2 As wood is a hygroscopic material, it is influenced by fluctuations in humidity, as in content of water in the surrounding air, better known as Relative Humidity (RH). Changing of relative humidity influence the moisture content in the wood and potentially lead to deformations and/or squeaking of the wooden panels.

## 6 Labelling

Each package defined by the manufacturer at the time of the first delivery shall be clearly identified as follows:

- identification of the producer or trader;
- multi-layer parquet and if applicable its trade name;
- the nominal width, the nominal thickness and if relevant the nominal length;
- the laid measure in square metres;
- the wood species of the top layer and if relevant its nominal thickness;
- the designation of the appearance class (appropriate designation for free class(es) or ○, Δ and □);
- reference to this document, EN 13489;
- batch number if not already present on the product.



**Annex A**  
(normative)

**Principles for the classification of the free class**

The free class is an appearance class with a particular selection offered by the producer or on request by the buyer.

The free class shall be described with all the features given in Tables A.1 or A.2 and their requirements. The features shall be measured according to EN 13489-3.

The same species may have several different values for each feature to have several selections.

Table A.1 — Classification for hardwood species

Face of the element	
Feature	Limit
Sound sapwood	
Knots (sound, intergrown, unsound)	
Yellow stain	
Checks	
Bark pockets	
Lightning shake	
Curly grain	
Slope of grain	
Sound heart	
Colour variation (incl. blackheart, red heart, etc.)	
Stick marks	
Medullary ray	
Insect attack, insect damage	
Rot, fungus, mould	
Biodeterioration	
Non-visible parts	
All features permitted without any limitation as to size or quantity if these do not impair the strength or wearing quality of the parquet flooring.	

**Table A.2 — Classification for softwood species**

<b>Face of the element</b>	
<b>Feature</b>	<b>Limit</b>
Sound sapwood	
Knots (sound, intergrown, unsound)	
Bark pockets	
Resin pockets	
Pith	
Checks	
Splits	
Lightning shake	
Slope of grain	
Colour variation	
Incipient decay, blue stain	
Insect attack, insect damage	
Rot, fungus, mould	
Stick marks	
Biodeterioration	
<b>Non-visible parts</b>	
All features permitted without any limitation as to size or quantity if these do not impair the strength or wearing quality of the parquet flooring.	

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- [2] EN 13183-2, *Moisture content of a piece of sawn timber - Part 2: Estimation by electrical resistance method*
- [3] EN 13556, *Round and sawn timber - Nomenclature of timbers used in Europe*
- [4] EN 351-1, *Durability of wood and wood-based products - Preservative-treated solid wood - Part 1: Classification of preservative penetration and retention*
- [5] EN 460, *Durability of wood and wood-based products - Guidance on performance*

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