



SLOVENSKI STANDARD

SIST EN 12369-2:2011

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Nadomešča:
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**Lesne plošče - Karakteristične vrednosti za dimenzioniranje konstrukcij - 2. del:
Vezane plošče**

Wood-based panels - Characteristic values for structural design - Part 2: Plywood

Holzwerkstoffe - Charakteristische Werte für die Berechnung und Bemessung von
Holzbauwerken - Teil 2: Sperrholz

Panneaux à base de bois - Valeurs caractéristiques pour la conception des structures -
Partie 2: Contreplaqué

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79.060.10 Vezan les Plywood

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EUROPEAN STANDARD
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English Version

Wood-based panels - Characteristic values for structural design - Part 2: Plywood

Panneaux à base de bois - Valeurs caractéristiques pour la
conception des structures - Partie 2: Contreplaqué

Holzwerkstoffe - Charakteristische Werte für die
Berechnung und Bemessung von Holzbauwerken - Teil 2:
Sperrholz

This European Standard was approved by CEN on 11 May 2011.

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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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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Foreword

This document (EN 12369-2:2011) has been prepared by Technical Committee CEN/TC 112 "Wood-based panels", 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of an identical text or by endorsement, at the latest by December 2011, and conflicting national standards shall be withdrawn at the latest by December 2011.

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

This document supersedes EN 12369-2:2004.

This standard is intended to be used in conjunction with EN 1995-1-1:2004.

Compared to EN 12369-2:2004, the following changes have been made:

- a) The scope has been limited;
- b) Where no values were available, this document provides, for tension and compression, strength and stiffness values derived from bending classes in each direction and taking the surface appearance class into account;
- c) This document gives more relevant values for shear properties in relation to the density of the wood species in the panel;
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- d) The range of density, from 350 kg/m³ to 750 kg/m³, corresponds to data used to determine the correlation between these shear properties and density;
- e) The characteristic value of the density is determined by using the results of Factory Production Control (FPC).

This European Standard is one of a series specifying characteristic values of wood-based panels for structural design. The other parts of this series are listed in the Bibliography.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

EN 12369-2:2011 (E)**1 Scope**

This European Standard provides information on the characteristic values for use in designing structures incorporating wood-based panels. The characteristic values given in this standard are to be used in accordance with EN 1995-1-1.

When utilizing the classification system for derivation of plywood characteristic values, this European Standard can only be applied with reference to EN 636.

This European Standard includes the characteristic values of the mechanical properties for plywood complying with EN 636 in bending, tension, compression, panel shear and planar shear. EN 636 classifies bending properties into two sets of classes, one for stiffness and another for strength. Stiffness and strength in tension and compression are related to the same properties in bending.

For shear properties, fixed values determined by correlation to density are provided.

Where optimised values are needed, the characteristic values are determined directly by testing in accordance with EN 789 and EN 1058 or by combination of testing according to the latter two standards and calculation according to prEN 14272.

This European Standard applies to panels complying with the three following conditions:

- 5 layers or more and 6 mm overall thickness and more;
- the ratio of the cumulative thickness of veneers in alternate directions does not exceed 2,5;
- wood species with a mean density greater than 350 kg/m³ and not exceeding 750 kg/m³.

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2 Normative references

<https://standards.iteh.ai/catalog/standards/sist/56fee250-9a51-4533-9fa3-12f79e204308/sist-en-12369-2-2011>

The following referenced documents are indispensable for the application 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 310, *Wood-based panels — Determination of modulus of elasticity in bending and of bending strength*

EN 323, *Wood-based panels — Determination of density*

EN 326-2, *Wood-based panels — Sampling, cutting and inspection — Part 2: Initial type testing and factory production control*

EN 635-2, *Plywood — Classification by surface appearance — Part 2: Hardwood*

EN 635-3, *Plywood — Classification by surface appearance — Part 3: Softwood*

EN 636:2003, *Plywood — Specifications*

EN 1995-1-1:2004, *Eurocode 5: Design of timber structures — Part 1-1: General — Common rules and rules for buildings*

ISO 3131, *Wood — Determination of density for physical and mechanical tests*

3 Terms and definitions

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

3.1

characteristic value

value of a material property relating to limit state design, for use in the design of timber structures, elements, assemblies and component in accordance with EN 1995-1-1

NOTE 1 As defined in EN 1995-1-1, this value corresponds to a specified percentile of the assumed distribution of the property under consideration.

NOTE 2 For plywood determined as stipulated in this document.

3.2

service class

NOTE Three service classes are defined in EN 1995-1-1.

3.2.1

service class 1

conditions of exposure resulting in moisture content in the materials corresponding to a temperature of 20 °C and the relative humidity of the surrounding air exceeding 65 % for only a few weeks per year

NOTE In these conditions the moisture content of coniferous plywood can be expected not to exceed 12 %.

3.2.2

service class 2

conditions of exposure resulting in moisture content in the materials corresponding to a temperature of 20 °C and the relative humidity of the surrounding air exceeding 85 % for only a few weeks per year

NOTE In these conditions the moisture content of coniferous plywood can be expected not to exceed 18 %.

3.2.3

service class 3

conditions of exposure resulting in higher moisture content in the materials than in service class 2

NOTE In these conditions the moisture content of coniferous plywood can be expected to exceed 18 %.

3.3

load duration class

class characterized by the effect of a constant load acting for a certain period of time in the life of the structure

NOTE 1 For a variable action, the appropriate class is determined on the basis of an estimate of the interaction between the typical variation of the load with time and the rheological properties of the materials.

NOTE 2 For strength and stiffness calculations, actions are assigned to one of the load-duration classes given in Table 1, derived from EN 1995-1-1.

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Table 1 — Load duration classes

Load duration class	Order of accumulated duration of characteristic load	Examples of loading
Permanent	More than 10 years	Self weight
Long-term	6 months to 10 years	Storage
Medium-term	1 week to 6 months	Imposed load
Short-term	Less than 1 week	Snow ^a and wind
Instantaneous	—	Accidental load

^a In areas which have a heavy snow load for a prolonged period of time, part of the load should be regarded as medium-term

3.4

lay-up

thickness and arrangement of the plies

3.5

composition

factors compounding the lay-up plus the combination of wood species

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4 Symbols

4.1 Main symbols

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E Modulus of elasticity (defined as stiffness in EN 1995-1-1:2004), (N/mm²)

f Strength (N/mm²)

G Modulus of rigidity (N/mm²)

k Retention factor in strength (k_{mod}) or stiffness (k_{def}) after a period of time relative to initial values. Values are included in EN 1995-1-1

ρ Density of a wood species or of plywood (kg/m³)

0 In the direction of the grain of the outer layer of plywood

90 Perpendicular to the grain of the outer layer of plywood

4.2 Subscripts

c Compression

k or 05 Characteristic (5th percentile)

m Bending

r Planar shear

t Tension

v	Panel shear
w	Wood species
p	Panel
mean	or 50 th Mean (50 th percentile)
mod	related to modification factor for strength
def	related to modification factor for deflection

5 General

In this standard the 5th percentile defines the characteristic value for:

- strength;
- density;
- modulus of elasticity where buckling, as an example, may be expected in service.

Otherwise the 50th percentile defines the characteristic value of the modulus of elasticity.

The characteristic value is derived in panels with moisture content as determined by a temperature of 20 °C and a relative humidity of 65 %. (standards.iteh.ai)

The characteristic value of a property is to be used in design according to EN 1995-1-1.

Where panels are structurally used under service class 1, 2 and 3 conditions, performance values inferred by the classification and listed in Table 2 and 3 shall be modified according to the service class and the duration of load (k_{mod} , k_{def}).

Manufacturers utilising the EN 636 classification system for determination of characteristic values may present these values in a format similar to that in Annex A.

The characteristic values shall be supported by the following information:

- product description;
- product specifications;
- service class or classes in which the panel can be used;
- details of the veneer species and grade, and of the composition;
- density of the panel.

6 Characteristic values for plywood

6.1 Introduction

Characteristic values for plywood can be determined by one of two distinct methods as described in Clause 1. The following tables in this clause provide the characteristic values for plywood based on the EN 636 Classification System.