SLOVENSKI STANDARD
SIST EN 12871:2004

01-januar-2004

Lesne ploġ e - Lastnosti in zahteve za nosilne ploġ e, ki se uporabljajo za pode, stene in strehe

Wood-based panels - Performance specifications and requirements for load bearing boards for use in floors, walls and roofs

Holzwerkstoffe - Leistungsspezifikationen und Anforderungen für tragende Platten zur Verwendung in Fußböden, Wänden und Dächern

Panneaux a base de bois - Spécifications et exigences fonctionnelles pour panneaux travaillants utilisés en planchers, murs et toitures

Ta slovenski standard je istoveten z: **EN 12871:2001**

ICS:

79.060.01	Lesne ploġ e na sploġno	Wood-based panels in general

SIST EN 12871:2004 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 12871

May 2001

ICS 79.060.01

English version

Wood-based panels - Performance specifications and requirements for load bearing boards for use in floors, walls and roofs

Panneaux à base de bois - Spécifications et exigences fonctionnelles pour panneaux travaillants utilisés en planchers, murs et toitures

Holzwerkstoffe - Leistungsspezifikationen und Anforderungen für tragende Platten zur Verwendung in Fußböden, Wänden und Dächern

This European Standard was approved by CEN on 19 February 2001.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

Foreword

This European Standard 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 November 2001, and conflicting national standards shall be withdrawn at the latest by November 2001.

This European Standard combines the drafts published as prEN 12869-1:1997, prEN 12869-2:1997, prEN 12870-1:1997, prEN 12870-2:1997, prEN 12871-1:1997, prEN 12872-2:1997 and prEN 12871-3:1997.

In the structural use of wood-based panels there are two methods of achieving satisfactory performance of the completed structure.

The first approach is to design the structure by calculation using structural characteristic values (contained in EN 12369 or derived accoridng to EN 1058 and EN 789), where there are no requirements for impact and concentrated loads, or where compliance with these requirements can be demonstrated. Subject to the above limitations, the method can be applied to any structure, but because of the method of generation of the various assumptions used in design calculation, the derived design may not be optimized in terms of performance.

The second approach is to design the structure by prototype testing in order to satisfy the requirements for both impact and concentrated loading. This test work is complemented by calculation in order to satisfy the requirement for uniformly distributed load. This approach yields a more optimised design, the results from the testing apply only to that one specific design.

This standard relates specifically to the second approach, namely, design by prototype testing. Thus, this standard sets out the specifications and requirements for load bearing wood-based panels used as structural floor or roof decking or wall sheathing.

No existing European Standard is superseded.

The annexes A and C are normative. Annex B is informative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard sets out the performance specifications and requirements for load bearing wood-based panels used as structural decking and sheathing in floors, roofs and walls, and provides a method of demonstrating compliance based on prototype testing.

Reference is also made to general performance requirements for loads not defined in ENV 1991-1, ENV 1991-2-1 or ENV 1995-1-1.

Uniformly distributed loads in accordance with ENV 1991-2-1 are not included in this standard; but can be verified by calculation according to ENV 1995-1-1, see clause 6.

The concept of punching shear is included within this standard.

This European Standard also specifies requirements for additional properties for load bearing wood-based panels used as structural decking and sheathing in floors, roofs and walls, which are not given in other European Standards.

2 Normative references

See annex A.

3 Terms and definitions

For the purposes of this standard the following terms and definitions apply:

3.1
service classes

3.1.1
service class 1
is characterized by a moisture content in the materials corresponding to a temperature of 20 °C and the relative humidity of the surrounding air only exceeding 65 % for a few weeks per year [ENV 1995-1-1]

3.1.2
service class 2
is characterized by a moisture content in the materials corresponding to a temperature of 20 °C and the relative humidity of the surrounding air only exceeding 85 % for a few weeks per year [ENV 1995-1-1]

3.1.3
service class 3
climatic conditions leading to higher moisture contents than in service class 2 [ENV 1995-1-1]

3.2
serviceability limit state
see ENV 1995-1-1 and ENV 1991-1

3.3
ultimate limit state
see ENV 1995-1-1 and ENV 1991-1

3.4
characteristic value
see ENV 1995-1-1 and ENV 1991-1

3.5
hazard classes
see EN 335-1

3.6
load category
see ENV 1991-2-1

3.7
structural floor decking
an assembly of wood-based panels supported on joists over which the decking spans. The characteristic of the decking is that it is supported by joists and, when subjected to load, is free to deflect between the joists

3.8
structural wall sheathing
wood-based panel capable of providing mechanical resistance to a wall structure

3.9
structural roof decking
an assembly of wood-based panels supported on joists over which the roof decking spans. The characteristic of the decking is that it is supported by joists and, when subjected to load, is free to deflect between the joists

3.10
warm roof
roof design in which the panels supported on joists are placed below the insulation. The panels are considered to be under conditions corresponding to service class 1

3.11
cold roof
roof design in which the panels and some of the supporting joists are placed above the insulation. The panels are considered to be under conditions corresponding to service class 2

3.12
set
residual deformation of the test floor, wall or roof after the removal of the applied load

3.13
sub-floor
structural panel meant to be covered by overlays

3.14
racking resistance
capacity of a component to resist an in-plane load

3.15
racking stiffness
secant stiffness of a component when it is in-plane loaded to approximately 40 % of its maximum racking resistance

3.16
punching shear
the performance of a panel under a concentrated load excluding the effect of bending

4 Symbols and subscripts

4.1 Symbols

F direct action, force (load) applied to structure, in kilonewtons

k faktor

L centre to centre distance (span) of the joists or studs, in millimetres

Q variable action, concentrated load (imposed load), in kilonewtons

R stiffness of the structural decking or sheathing, in kilonewtons per millimetre

u deflection, in millimetres

γ partial safety factor

4.2 Subscripts

Q	actions
k	characteristic
m	material property
def	deformation
dis	distribution (concentrated load contact area)
max	maximum
mod	modification
ser	serviceability
05	5-percentile
1, 2, 3	service class 1, 2 or 3 in accordance with ENV 1995-1-1
α	roof slope (angle)
p	panel

5 Specifications

5.1 General

The specification and parameters included in tables 1 and 2 shall be used for load bearing wood-based panels for structural decking and sheathing in floors, roofs and walls.

Table 1 — Panel product specification for structural decking and sheathing in floors, roofs and walls

Characteristics	Relevant EN
Particleboard – service class and grade	EN 312-4/5/6/7
OSB – service class and grade – main load bearing direction	EN 300-OSB/2/3/4
Plywood – lay-up – wood species and surface appearance class – service class – main load bearing direction	EN 313-1/2 EN 635-1/2/3 EN 636-1/2/3
Solid-wood-panel[b]	
Fibreboard – service class, type and grade	EN 622-2/3/5
Cement-bonded particleboard[a] – service class	EN 634-2

[a] Cement-bonded particleboards shall only be used for structural design provided values of k_{mod} and k_{def} have been determined in accordance with ENV 1156

[b] To be included when EN specifications are available.

Table 2 — Parameters to be specified for structural decking and sheathing in floors, roofs and walls

Design parameter	Relevant EN	Explanation
Span (joist spacing) for floors	EN 1195	Determined from the performance test
Span (stud spacing) for walls	EN 594 EN 596	Determined from the performance test
Span (joist spacing) for roofs	Annex D	Determined from the performance test
Joints		
– the method of supporting the panel edges	EN 324-1/2	Dimensions — According to that used in the performance test
– type of panel to panel joints (e.g. tongued & grooved, square edged with noggins)	EN 324-1	Tolerances — According to that used in the performance test
– type of fasteners (e.g. nailed, screwed and spacing)	—	According to that used in the performance test
– type of glue if relevant	—	Determined from the performance test
Panel dimensions	Clauses 6.4.1 and 6.4.2	Tolerances
Thickness	EN 324-1	According to that used in the performance test
Conditioning before installation		
– moisture content	EN 322	Specified by the manufacturer — Related to service class
– dimensional changes of the panel due to change in moisture content	EN 318	Specified by the manufacturer — Related to service class and function

5.2 Durability

For all load bearing wood-based panels used for structural decking and sheathing in floors, roofs and walls in service classes 1, 2 or 3 the biological hazard classes and the moisture resistance or glue bond quality depending on panel type, shall be specified in accordance with the standards listed in table 3.

Table 3 — European Standards relating to the durability of load bearing wood-based panels

Panel Type	Relevant EN		Explanation
	Specifications and guidance	Test methods	
Particleboard	EN 335-3[b] EN 312-4/5/6/7 EN 312-5/7	 EN 321 EN 1087-1	Biological hazard classes Service class 1 — Dry conditions Service class 2 — Humid conditions Service class 2 — Cyclic test (Option 1) Service class 2 — Boil test (Option 2)
OSB	EN 335-3[b] EN 300 OSB/2/3/4 EN 300 OSB/3/4	 EN 321 EN 1087-1[a]	Biological hazard classes Service class 1 — Dry conditions Service class 2 — Humid conditions Service class 2 — Cyclic test (Option 1) Service class 2 — Boil test (Option 2)
Plywood	EN 335-3[b] ENV 1099 EN 636-1/2/3 EN 636-2/3 EN 636-3	 EN 314-1/2	Biological hazard classes Guideline for biological durability Service class 1 — Dry conditions Service class 2 — Humid conditions Service class 3 — Exterior conditions Tests and requirements according to service class
Solid-wood-panel[c]			
Fibreboard	EN 335-3[b] EN 622-2/3/5 type LA/HA/HLS EN 622-2/3/5 type HA/HLS	 EN 321 EN 1087-1[a]	Biological hazard classes Service class 1 — Dry conditions Service class 2 — Humid conditions Service class 2 — Cyclic test (Option 1) Service class 2 — Boil test (Option 2)
Cement-bonded Particleboard	EN 335-3[b] EN 634-2 EN 634-2 EN 634-2	 EN 321 EN 1328	Biological hazard classes Service class 1 — Dry conditions Service class 2 — Humid conditions Service class 3 — Exterior conditions Service class 2 — Cyclic test Service class 3 — Frost test

[a] EN 1087-1 test methods are modified for OSB and Fibreboard type MDF, see panel specification standard

[b] This standard describes the moisture content that can be attained by different panel products and their risk of attack from different wood-destroying organisms (fungi, insects and marine borers) when exposed to different service environments. The service environments are defined in terms of the hazard classes of biological attack (see EN 335-1). It does not define the expected service life of the different panel products when used in different service environments.

[c] To be included when EN specifications are available.

5.3 Mechanical properties

5.3.1 General

Test methods are set out in table 4.

Table 4 — European Standards relating to mechanical properties and test methods

Characteristic	Relevant EN	Explanation
Uniformly distributed load		
Bending strength/stiffness	EN 1058	Sampling for and determination of characteristic values
	EN 789	Technical data sheet from the manufacturer
	EN 12369	Characteristic values for structural use
	EN 1072	Plywood only
Tension strength/stiffness[c] Depending on design	EN 1058	Sampling for and determination of characteristic values
	EN 789	Technical data sheet from the manufacturer
	EN 12369	Characteristic values for structural use
Compression strength/stiffness[c] Depending on design	EN 1058	Sampling for and determination of characteristic values
	EN 789	Technical data sheet from the manufacturer
	EN 12369	Characteristic values for structural use
Panel shear strength/modulus[a] Depending on design	EN 1058	Sampling for and determination of characteristic values
	EN 789	Technical data sheet from the manufacturer
	EN 12369	Characteristic values for structural use
Planar shear strength[b] Depending on design	EN 1058	Sampling for and determination of characteristic values
	EN 789	Technical data sheet from the manufacturer
	EN 12369	Characteristic values for structural use

[a] Only applicable if the panel transmits horizontal loads.

[b] Only applicable if the panel is included in a stressed skin system or similar.

[c] Only applicable if this property is used in design.

NOTE The characteristic values for the above properties can either be taken from EN 12369 if present or determined using EN 789 and EN 1058.

(continued)

Table 4 *(concluded)*

Characteristic	Relevant EN	Explanation
Concentrated load		
Floor decking	EN 1195	Specified by the performance test. Determination of concentrated load and related deflection. Load category and field of application.
Wall sheathing	EN 594	Specified by the performance test. Determination of racking load and related deflection. Load category and field of application.
Roof decking	Annex C	Specified by the performance test. Determination of concentrated load and related deflection. Load category and field of application.
Requirements	Clause 6.2 Clause 6.3	Floor and roof decking Wall sheathing
Sampling	Clause 7	Sampling for and determination of characteristic values
Impact load		
Floor decking	EN 1195	Specified by the performance test
Wall sheathing	EN 596	Specified by the performance test
Roof decking	Annex C	Specified by the performance test
Requirements	Clause 6.2.4 Clause 6.3.4	Floor and roof decking Wall sheathing
Sampling	Clause 7	Sampling for and determination of characteristic values

5.3.2 Load categories

Relevant load categories are given in 6.1.3.

5.3.3 Static load

5.3.3.1 Uniformly distributed load

– Bending strength
– Bending stiffness

– Tension strength
– Tension stiffness

– Compression strength
– Compression stiffness

– Panel shear strength
– Panel shear modulus

– Planar shear strength