



SLOVENSKI STANDARD

SIST-TS ENV 12872:2004

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Državni inštitut za standardizacijo

Wood-based panels - Guidance on the use of load-bearing boards in floors, walls and roofs

Holzwerkstoffe - Leitfaden für die Verwendung von tragenden Platten in Böden, Wänden und Dächern

Panneaux a base de bois - Guide pour l'utilisation des panneaux structurels dans planchers, murs et toitures

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English version

Wood-based panels - Guidance on the use of load-bearing boards in floors, walls and roofs

Panneaux à base de bois - Guide pour l'utilisation des panneaux structurels dans planchers, murs et toitures

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This European Prestandard (ENV) was approved by CEN on 14 February 2000 as a prospective standard for provisional application.

The period of validity of this ENV is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the ENV can be converted into a European Standard.

CEN members are required to announce the existence of this ENV in the same way as for an EN and to make the ENV available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the ENV) until the final decision about the possible conversion of the ENV into an EN is reached.

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Prestandard has been prepared by Technical Committee CEN/TC 112 "Wood-based panels", the secretariat of which is held by DIN.

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

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1 Scope

This European Standard gives guidance on the use of wood-based panels in structural applications as structural floor and roof decking on joists or structural wall sheathing on studs in accordance with EN 12871. It provides information on:

- inspection at site;
- transport and delivery;
- handling;
- stacking;
- storage;
- moisture content, conditioning and the effects of moisture;
- cutting and machining;
- selection;
- installation.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

EN 300

Oriented Strand Boards (OSB) – Definitions, classification and specifications

EN 312-4

Particleboards – Specifications – Part 4: Requirements for load-bearing boards for use in dry conditions

EN 312-5

Particleboards – Specifications – Part 5: Requirements for load-bearing boards for use in humid conditions

EN 312-6

Particleboards – Specifications – Part 6: Requirements for heavy duty load-bearing boards for use in dry conditions

EN 312-7

Particleboards – Specifications – Part 7: Requirements for heavy duty load-bearing boards for use in humid conditions

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EN 622-2

Fibreboards – Specifications – Part 2: Requirements for hardboards

EN 622-3

Fibreboards – Specifications – Part 3: Requirements for medium boards

EN 622-5

Fibreboards – Specifications – Part 5: Requirements for dry process boards (MDF)

EN 634-2

Cement-bonded particleboards – Specifications – Part 2: Requirements for OPC bonded particleboards for use in dry, humid and exterior conditions

EN 636-1

Plywood – Specifications – Part 1: Requirements for plywood for use in dry conditions

EN 636-2

Plywood – Specifications – Part 2: Requirements for plywood for use in humid conditions

EN 636-3

Plywood – Specifications – Part 3: Requirements for plywood for use in exterior conditions

EN 12871

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

ENV 1995-1-1

Eurocode 5 – Design of timber structures – Part 1-1: General rules and rules for buildings

3 Definitions

For the purposes of this standard the following definitions apply:

3.1 Service Classes

3.1.1 Service class 1: is characterised 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 : 1993].

3.1.2 Service class 2: is characterised 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 : 1993].

3.1.3 Service class 3: climatic conditions leading to higher moisture contents than in service class 2 [ENV 1995-1-1 : 1993].

3.2 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.

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3.3 Structural wall sheathing: Wood-based panel capable of providing mechanical resistance to a wall structure.

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3.4 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.

3.5 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.

3.6 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.

3.7 Sub floor: Structural panel meant to be covered by overlays.

4 Performance requirements

The requirements to ensure sufficient margin of safety against failure, damage or excessive deflection are given in EN 12871.

5 Inspection at site

The following should be checked based on the marking of the panel and/or the manufacturers documentation and/or the designers specification:

- Grade or class according to EN specification standard;
- Thickness;
- Service class;
- Biological durability hazard class;
- Surface (sanded or unsanded);
- Edges (tongue and groove or other type of profile);
- Joist or stud spacing;
- Load category;
- Main load-bearing direction for OSB, plywood and solid wood panels only.

6 Transport and delivery

Panels should be adequately protected by a waterproof covering during transportation. Edges should be well protected from rain or traffic spray. Edge protection should also be provided to avoid damage by ropes, straps or other banding. This applies particularly to profiled panels such as tongued and grooved panels.

Panels should be stacked properly to avoid sagging or other distortion, see clause 8.

If packing includes banding or strapping this should be removed as soon as possible after delivery to prevent any permanent deformation of the panels. When packs are delivered with edge or face protection panels, these should be left in place until the pack is required for use.

7 Handling

When lifting, moving and stacking panels, edge protection should also be provided to avoid damage by lifting ropes and/or forklifts.

When handling prefinished panels, it is essential to avoid damage or dirt on the finished surfaces.

Prefinished panels should always be lifted from a stack and never slid.

8 Stacking

Panels should be stacked flat on a level surface with all four edges flush. The ideal base is a close boarded or slatted pallet.

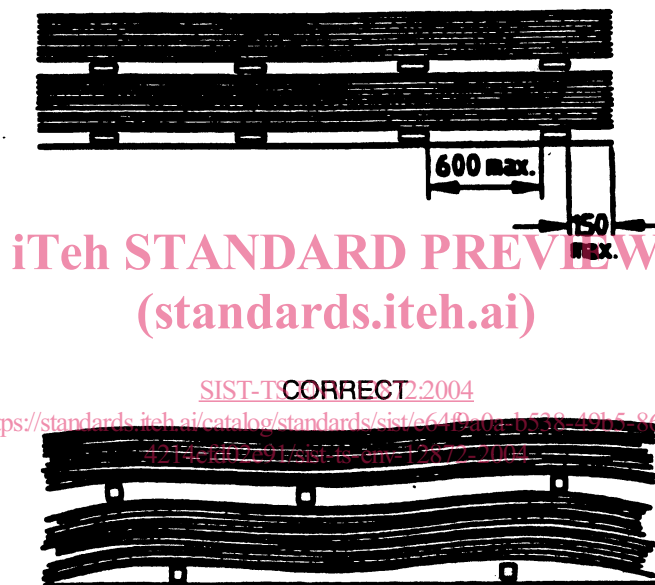
If this is not possible the panels should be carefully stacked on battens of equal thickness at centres not exceeding 600 mm as shown in figure 1.

Intermediate battens are recommended every 15 to 20 panels to allow through ventilation, they shall be placed directly above those below. The battens should be placed parallel to the short edges across the full width. Overhang of the panels at the ends of the stack should not exceed 150 mm. Where stacks are placed on top of one another, the bearers should line up vertically to prevent distortion.

The top of the stack should be covered.

Stacking on edge should be avoided whenever possible. Where space will only permit edge stacking then the edges should not be permitted to come into direct contact with the floor to avoid possible moisture pick-up or damage to the edges. Panels should not be leant against walls but supported by a braced, purpose made rack using thick (> 18 mm) base and back panels (see figure 2).

In case of tongued and grooved panels, edge stacking on the tongue should be avoided.



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Figure 1 – Panel storage

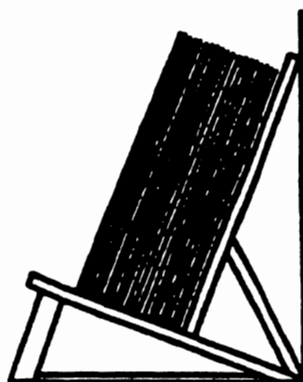


Figure 2 – Correct method of edge stacking

9 Storage

Panels should preferably be stored in an enclosed dry building. Where temporary storage outside cannot be avoided, then stacks should be covered with waterproof but vapour permeable sheeting, keeping all panels on raised bearers to prevent contact with the ground, water or vegetation. Any protective wrapping should be kept in place as long as possible prior to conditioning for use.

10 Moisture content, conditioning and the effects of moisture

10.1 Moisture content

Moisture content of wood-based panel products varies in accordance with the moisture condition of the surrounding environment, and is affected primarily by the relative humidity (rh) of the surrounding air. It moves towards and maintains an equilibrium moisture content (emc) i.e. one that is in equilibrium with the surrounding air. This means that moisture contents in wood-based panel products will vary depending on the situation of use and with time as temperature and humidity conditions change.

Although it is not possible to give precise levels, the figures in table 1 give a general indication of the range of moisture contents in wood-based panels in various conditions.

Table 1 – Equilibrium moisture content and conditions of use

Service class	Normal range of relative humidity (rh) at 20 °C	Approximate equilibrium moisture content (emc)	Conditions of use
1	30 % to 65 %	4 % ≤ emc ≤ 11 %	Dry installations, no risk of wetting in service
2	65 % to 85 %	11 % ≤ emc ≤ 17 %	Risk of wetting during installation and risk of occasional wetting in service
3	> 85 %	emc > 17 %	Risk of regular wetting in service

The moisture content of panels when they leave the factory can be as low as 2 % depending on the type of panel.

This indicates that unconditioned newly manufactured panels can increase in moisture content when installed in a building under construction and subsequently change in moisture content as the building is occupied, heated and

dries out, with the consequence of dimensional changes, see ranges given in 10.2.

10.2 Dimensional movement

Timber and wood-based panels expand on taking up moisture from the surrounding air, and shrink on losing moisture. Excessive changes in moisture content may therefore lead to unacceptable dimensional changes which may result in bowing, buckling or open joints between panels.

Panels should be protected from rain, dampness and accidental wetting and prior to fixing be conditioned to the moisture content corresponding to the moisture conditions of end use.

Problems which may occur if insufficient care is taken with protection or conditioning include edge swelling due to moisture ingress at unprotected edges, localised swelling due to moisture pick-up from adjacent materials which have a higher moisture content, e.g. timber joists, and general expansion causing bowing between supports or restraints. Any increase in moisture content will cause slight expansion in the panel.

For guidance purposes it may be assumed that a 1 % change in panel moisture content will cause a dimensional change in panel width, length and thickness as given in table 2.

The dimensional movement of specific products can differ from those given in table 2 and reference should be made to the manufacturers, where this is critical.

Table 2 – Dimensional change for a 1 % change in panel moisture content

Type of panel	Specification	Dimensional change at 1 % change in panel moisture content		
		Length %	Width %	Thickness %
Particleboards	EN 312-4/6	0,05	0,05	0,7
	EN 312-5/7	0,03	0,04	0,5
OSB	EN 300, OSB/2	0,03	0,04	0,7
	EN 300, OSB/3	0,02	0,03	0,5
	EN 300, OSB/4	0,02	0,03	0,5
Fibreboards	EN 622-2 (Hard)	0,03	0,03	0,5
	EN 622-3 (Medium)	0,04	0,04	0,7
	EN 622-5 (MDF)	0,05	0,05	0,7
Plywood	EN 636 (Spruce or pine)	0,015	0,015	0,2
	EN 636 (Beech)	0,025	0,025	0,3
Cement-bonded particleboards	EN 634-2	0,05	0,05	0,04

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10.3 Conditioning

To reduce dimensional changes the panels should be conditioned in the service class for the intended end use by loose laying (for example on floors) or stacking with spacers as appropriate (see figure 3).

The length of time allowed for conditioning will vary depending on the panel and the likely condition of use. A minimum period of 1 week is recommended but a longer period can be necessary.

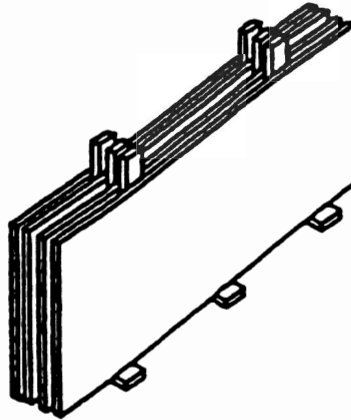


Figure 3 – Panels stacked with battens

11 Cutting and machining

11.1 General

Wood-based panels can be sawn, routed, spindle-moulded or drilled. When cutting wood based panels it is important to pay attention to normal good practice e.g. sharp cutters, adequate support close to saws and cutters, elimination of machine vibration, correct allowance for saw kerf.

The rate of feed should generally be slower than that used for solid wood and cutting tools should be kept sharp.

The quality of the machined surface decreases with increasing moisture content. When a very close tolerance fit is needed, panels should be cut to size after conditioning to the moisture content appropriate to the end use.

11.2 Cutting with hand tools

All panel types can be cut to size with conventional hand tools, however, quicker and more consistent results can be achieved using either portable or fixed power tools.

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11.3 Machining with power tools

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Carbide or diamond tipped blades and cutters should be used because of their longer cutting life.

For fibreboards and particleboards saw blades with cross cutting teeth should be used.

Circular saw blades should be set as low as possible to prevent chipping and scoring as the panel passes the rear of the saw blade.

If the feed speed is too slow, cutters will have insufficient chip load and the tip of the cutter will wear rapidly. Too great a feed speed will result in rough fibrous cut edges. Control of the panel during machining is important, panels should be properly supported and pressed down firmly against the cutting table and guides to avoid vibration.