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**Trajnost lesa in lesnih materialov - Definicija razredov ogroženosti pred biološkim napadom - 3. del: Uporaba za lesne plošče**

Durability of wood and wood-based products - Definition of hazard classes of biological attack - Part 3: Application to wood-based panels

Dauerhaftigkeit von Holz und Holzprodukten - Definition der Gefährdungsklassen für einen biologischen Befall - Teil 3: Anwendung bei Holzwerkstoffen

Durabilité du bois et des matériaux dérivés du bois - Définition des classes de risque d'attaque biologique - Partie 3: Application aux panneaux à base de bois

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# EUROPEAN STANDARD NORME EUROPÉENNE EUROPÄISCHE NORM

EN 335-3

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Descriptors: Wood-based panel products, hazards, classification.

## English version

### Durability of wood and wood-based products Definition of hazard classes of biological attack Part 3: Application to wood-based panels

Durabilité du bois et de matériaux dérivés du bois; définition des classes de risque d'attaque biologique. Partie 3: Application aux panneaux à base de bois

Dauerhaftigkeit von Holz und Holzprodukten; Definition der Gefährdungsklassen für einen biologischen Befall. Teil 3: Anwendung bei Holzwerkstoffen

This European Standard was approved by CEN on 1995-05-24.

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat 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 Central Secretariat has the same status as the official versions.

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# CEN

European Committee for Standardization  
Comité Européen de Normalisation  
Europäisches Komitee für Normung

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**Contents**

	<b>Page</b>
Foreword . . . . .	3
1 Scope . . . . .	4
2 Normative references . . . . .	4
3 Definitions . . . . .	4
3.1 Plywood . . . . .	4
3.2 Particleboard . . . . .	5
3.3 Oriented strand board (OSB) . . . . .	5
3.4 Fibreboard . . . . .	5
3.5 Cement-bonded particleboard . . . . .	5
4 Hazard classes : Application to wood-based panels . . . . .	5
4.1 General . . . . .	5
4.2 Plywoods . . . . .	6
4.3 Particleboards . . . . .	9
4.4 Oriented strand boards (OSB) . . . . .	12
4.5 Fibreboards . . . . .	15
4.6 Cement-bonded particleboards . . . . .	18
Annex A (informative) - Guide for the application to wood-based panels . . . . .	18
A.1 Introduction . . . . .	18
A.2 General decision making . . . . .	18
A.3 General precautions . . . . .	19
A.4 Durability of wood-based panels - Inherent or conferred . . . . .	19
Annex B (informative) - List of product standards to wood-based panels . . . . .	20
Annex C (informative) - Bibliography . . . . .	21

## Foreword

This European Standard has been prepared by the Technical Committee CEN/TC 38 "Durability of wood and wood-based products" of which the secretariat 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 1996, and conflicting national standards shall be withdrawn at the latest by January 1996.

This European Standard is divided in three parts, part 1 gives general definitions of hazard classes of biological attack, part 2 concerns their application to solid wood and part 3 concerns their application to wood-based panels, this last part has been established in association with CEN/TC112 "Wood-based panels".

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, 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 Part of EN 335 gives guidance on the application of the hazard class system, as defined in Part 1 of EN 335, to wood-based panels : plywood, particleboards, oriented strand boards, fibreboards, cement-bonded particleboards in relation only to the biological agencies that can attack wood-based panels over a duration sufficient to result in deterioration.

This Part is to be used in conjunction with Part 1 of EN 335.

Annex A (informative) provides additional guidance on the use and suitability of wood-based panels, preservative treatment and/or finishing within a given hazard class.

## 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 309:1992	Wood particleboards - Definition and clasification
EN 313-2 <sup>1)</sup>	Plywood - Classification and terminology - Part 2: Terminology
EN 316:1993	Wood fibreboards - Definition, classification and symbols
EN 322:1993	Wood-based panels - Determination of moisture content
EN 335-1:1992	Durability of wood and wood-based products - Definition of hazard classes of biological attack Part 1 : General
EN 633:1993	Cement-bonded particleboards - definition and classification

## 3 Definitions

For the purpose of this standard, the following definitions apply:

### 3.1 Plywood

Wood-based panel consisting of an assembly of plies bonded together with the direction of the grain in alternate layers usually at right angles. [EN 313-2]

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<sup>1)</sup> In preparation



NOTE: In general, the outer and inner plies are placed symmetrically on both sides of a central ply or core.

### 3.2 Particleboard

Panel material manufactured under pressure and heat from particles of wood (e.g. wood flakes, chips, shavings, sawdust, wafers, strands and similar) and/or other lignocellulosic material in particle form (e.g. flax shives, hemp shives, bagasse fragments and similar) with the addition of an adhesive. [EN 309:1992]

### 3.3 Oriented strand board (OSB)

A multi-layered board made from strands of wood of a predetermined shape and thickness together with a binder. The strands in the external layers are aligned and parallel to the board length or width ; the strands in the centre layer or layers may be randomly oriented or aligned, generally at right angles to the strands of the external layers.

### 3.4 Fibreboard

Panel material with a thickness of 1,5 mm and greater, manufactured from lignocellulosic fibres with application of heat and/or pressure. The bond is derived from :

- either the felting of the fibres and their inherent adhesive properties,
- or from a synthetic binder added to the fibres

Other additives may be included. [EN 316:1993]

### 3.5 Cement-bonded particleboard

Sheet material manufactured under pressure, based on wood or other vegetable particles bound with hydraulic cement and possibly containing additives. [EN 633:1994]

## 4 Hazard classes: Application to wood-based panels

### 4.1 General

As a result of the different compositions and methods of production of wood-based panels in a given environment, the equilibrium moisture content and risk of biological attack can differ from those of the solid wood from which the panels are made.

Moisture contents<sup>2)</sup> given in this part of EN 335 help to classify the risk of attack by the various biological agencies which affect the durability of structural and non-structural wood components.

NOTE: Some wood-based panel types may only be suitable for use in certain hazard classes. Guidance on the suitability of individual wood-based panel types in each hazard class is given in Annex A and Annex B.

## 4.2 Plywoods

### 4.2.1 Hazard class 1

In this environment, plywoods have a moisture content no higher than that which would result from exposure to an air temperature of 20 °C and a relative humidity of 65 % for practically the whole of their service life. They may therefore be regarded as being dry, and thus the risk of attack by surface moulds or by staining or wood-destroying fungi is insignificant.

Attack by wood-destroying insects, including termites, is possible but the frequency and importance of this risk depends upon the geographical region<sup>3)</sup>. Attack by beetles can also depend upon choice of veneer with respect to species and thickness.

### 4.2.2 Hazard class 2

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In this environment, the moisture content of a plywood panel, either in the whole or only in part, can occasionally attain or exceed that which would result from exposure to an air temperature of 20° C and a relative humidity of 90 %. The moisture content can therefore occasionally increase to a level which can allow the growth of wood-destroying fungi.

For panels the use of which includes a decorative function, disfigurement can also occur as a result of the growth of surface moulds and staining fungi.

Risk of insect attack is similar to that for hazard class 1.

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<sup>2)</sup> Determined in accordance with EN 322.

<sup>3)</sup> Beetles are present throughout Europe but the risk of attack varies greatly from high to insignificant. If national standards do not specify the risk of insect attack, local or national experts should be consulted for advice on the risk of insect attack.



#### 4.2.3 Hazard class 3

In this environment plywoods can frequently have a moisture content above 20 % and thus will often be liable to attack by wood-destroying fungi.

For panels the use of which includes a decorative function, disfigurement can also occur as a result of the growth of surface moulds and staining fungi.

Risk of insect attack is similar to that for hazard class 1.

#### 4.2.4 Hazard class 4

In this environment plywoods have a moisture content permanently above 20 % and thus are liable to attack by wood-destroying fungi.

NOTE: The use of plywoods in this hazard class is appropriate only if the inherent and/or conferred properties of the boards are adequate.

Risk of insect attack to the above ground or water portion of components is similar to that for hazard class 1. Termites can be an additional problem in certain geographical regions.

#### 4.2.5 Hazard class 5

In this environment plywoods have a moisture content permanently above 20 % and are wholly or partially submerged in salt water. Attack by invertebrate marine organisms is therefore the principal problem. Particularly in warmer waters, organisms such as *Limnoria* spp and *Teredo* spp can cause significant damage. In addition, in this environment plywoods are liable to attack by wood-destroying fungi.

NOTE: The use of plywoods in this hazard class is appropriate only if the inherent and/or conferred properties of the boards are adequate.

Risk of insect attack to the portion above the water level is similar to that for hazard class 1. Termites can be an additional problem in certain geographical regions.

**4.2.6 Summary of hazard classes for plywood**

Table 1 gives general moisture levels for plywoods and a summary of the biological agencies which can attack them in the various hazard classes.

**Table 1: Summary of hazard classes, general moisture levels and attacking biological agencies for plywoods.**

Hazard class	General service situation	General moisture level	Occurrence of biological agencies					
			Wood-destroying fungi		Wood-disfiguring fungi <sup>4)</sup>	Insects		Marine borers
			Basidiomycetes	Soft rot	Blue stain	Beetles <sup>1)</sup>	Termites	
1	Above ground, covered (dry conditions)	Dry <sup>2)</sup>	-	-	-	U	L	-
2	Above ground, covered (risk of wetting/humid conditions)	Occasionally increased <sup>3)</sup>	U	-	U	U	L	-
3	Above ground, not covered (exterior conditions)	Frequently above 20 %	U	-	U	U	L	-
4	In contact with ground or fresh water <sup>5)</sup>	Permanently above 20 %	U	U	U	U	L	-
5	In salt water <sup>5)</sup>	Permanently above 20 %	U	U	U	U	L	U

U : Universally present within Europe.

L : Locally present within Europe.

1) : The risk of attack can be insignificant in certain service situations.

2) : Equivalent to a temperature of 20°C and a relative humidity of 65 %.

3) : Can attain or occasionally exceed a moisture content equivalent to that which would result from exposure to an air temperature of 20°C and a relative humidity of 90 %.

4) : Mould. Protection against mould fungi may also be considered.

5) : For the use of plywood in these hazard classes, see the note to clause 4.2.4 and 4.2.5 respectively.

### 4.3 Particleboards

#### 4.3.1 Hazard class 1

In this environment, particleboards have a moisture content no higher than that which would result from exposure to an air temperature of 20 °C and a relative humidity of 65 % for practically the whole of their service life. They may therefore be regarded as being dry, and thus the risk of attack by surface moulds or by staining or wood-destroying fungi is insignificant.

Due to the specific structure of particleboards, there is no risk of attack by wood-destroying insects except termites<sup>4)</sup>.

#### 4.3.2 Hazard class 2

In this environment, the moisture content of a particleboard, either in the whole or only in part, can occasionally attain or exceed that which would result from exposure to an air temperature of 20 °C and a relative humidity of 90 %. The moisture content can therefore occasionally increase to a level which can allow the growth of wood-destroying fungi.

For panels the use of which includes a decorative function, disfigurement can also occur as a result of the growth of surface moulds and staining fungi.

Risk of insect attack is similar to that for hazard class 1.

#### 4.3.3 Hazard class 3

In this environment, particleboards can frequently have a moisture content above 20 % and thus will often be liable to attack by wood-destroying fungi.

NOTE: The use of particleboards in this hazard class is appropriate only if the inherent and/or conferred properties of the boards are adequate.

Risk of insect attack is similar to that for hazard class 1.

#### 4.3.4 Hazard class 4

In this environment, particleboards have a moisture content permanently above 20 % and thus are liable to attack by wood-destroying fungi.

NOTE: At present, no suitable particleboards are manufactured for use in this hazard class.

Risk of insect attack to the above ground or water portion of components is similar to that for hazard class 1. Termites can be an additional problem in certain geographical regions.

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<sup>4)</sup> If national standards do not specify the risk of insect attack, local or national experts should be consulted for advice on the risk of insect attack.