DRAFT FOR DEVELOPMENT

DD CEN/TS 1099:2007

Plywood — Biological durability — Guidance for the assessment of plywood for use in different use classes

ICS 79.060.10

BSI British Standards

National foreword

This Draft for Development is the UK implementation of CEN/TS 1099:2007. It supersedes DD ENV 1099:1998 which is withdrawn.

This publication is not to be regarded as a British Standard.

It is being issued in the Draft for Development series of publications and is of a provisional nature. It should be applied on this provisional basis, so that information and experience of its practical application can be obtained.

Comments arising from the use of this Draft for Development are requested so that UK experience can be reported to the European organization responsible for its conversion to a European standard. A review of this publication will be initiated not later than 3 years after its publication by the European organization so that a decision can be taken on its status. Notification of the start of the review period will be made in an announcement in the appropriate issue of *Update Standards*.

According to the replies received by the end of the review period, the responsible BSI Committee will decide whether to support the conversion into a European Standard, to extend the life of the Technical Specification or to withdraw it. Comments should be sent to the Secretary of the responsible BSI Technical Committee at British Standards House, 389 Chiswick High Road, London W4 4AL.

The UK participation in its preparation was entrusted to Technical Committee B/541, Wood-based panels.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

This Draft for Development was published under the authority of the Standards Policy and Strategy Committee on 30 November 2007

ISBN 978 0 580 58041 3

Amendments issued since publication

Amd. No.	Date	Comments

TECHNICAL SPECIFICATION

SPÉCIFICATION TECHNIQUE

TECHNISCHE SPEZIFIKATION

CEN/TS 1099

August 2007

ICS 79.060.10

Supersedes ENV 1099:1997

English Version

Plywood - Biological durability - Guidance for the assessment of plywood for use in different use classes

Contreplaqué - Durabilité biologique - Guide d'utilisation dans les différentes classes d'emploi

Sperrholz - Biologische Dauerhaftigkeit - Leitfaden zur Beurteilung von Sperrholz zur Verwendung in verschiedenen Gebrauchsklassen

This Technical Specification (CEN/TS) was approved by CEN on 14 July 2007 for provisional application.

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Ref. No. CEN/TS 1099:2007: E

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Foreword

This document (CEN/TS 1099:2007) has been prepared by Technical Committee CEN/TC 112 “Wood-based panels”, the secretariat of which is held by DIN.

This document supersedes ENV 1099:1997.

Compared to ENV 1099:1997 the following changes have been made:

— “hazard class” has been replaced by “use class” in accordance with EN 335-1:2006;

— Clause 2 and the Bibliography have been updated;

— the deliverability has been changed from ENV to CEN/TS. No technical changes have been made.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, 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.

1 Scope

This document gives guidance on the selection of plywood for use in the different use classes as defined in EN 335-1.

The guidance given takes into account the natural durability classification for solid timber (see EN 350-2) together with other factors specific for plywood.

It does not consider durability against chemico-physical factors, such as weathering, nor does it consider the biological durability of the adhesive.

Guidance on precautionary measures for use is also given.

2 Normative references

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 313-2:1999, *Plywood — Classification and terminology — Part 2: Terminology*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 313-2:1999 apply.

4 Precautionary measures for use

4.1 Rules for selection

Plywood should be selected according to the relevant use classes of its end use situation and taking into account any risk from perceived hazards likely to occur.

Five use classes have been identified as being representative of the various conditions the material is likely to meet. These five classes are defined in EN 335-1 and their applications for plywood in EN 335-3.

The risk of biological attack can differ for different end-uses within the same use class.

If the use class cannot be determined accurately or when different parts of the same plywood panel are exposed to different use classes, selection should be made with regard to the most severe of the probable use classes.

When a plywood component would be difficult to replace, or the consequences of its failure would be serious, it is advisable to use more durable plywood than that normally appropriate for the use class of the end use situation.

4.2 Use of treated plywood

With some preservative products, a risk of excessive leaching exists[1)]. If the specified preservative product is leachable, it is essential that the panel is covered, or otherwise protected, after treatment and during transport and construction, as well as in service.

1) Leaching to a level where the conferred durability is compromised.

In addition to the natural biological durability of the plywood or durability conferred through preservative treatment, other factors which can affect the performance of plywood and which should be considered during development of specifications include building practice during construction, quality of maintenance, the type and integrity of surface coatings applied and the compatibility between treatments and coatings.

4.3 Installation principles

Plywood should be installed and maintained in such a way that the conditions in-service are no more severe than those appropriate to the specified material.

The moisture content of plywood is influenced by the gradients of temperature and water vapour between the two faces and the permeability of any surface coatings applied to the faces.

Where plywood intended for dry end use has become wet during installation, it should be allowed to dry thoroughly before the components or structures are sealed.

In use classes 2 and 3 where there is a risk of wetting, but which can be minimised through design, it is important to incorporate in that design suitable detailing and adequate ventilation to ensure that a build-up and subsequent retention of water does not occur.

Special attention should be paid to protecting plywood edges, e.g. by applying a low permeability finish.

5 Influence of plywood composition on biological durability

The characteristics of natural durability and treatability of solid wood are set out in EN 350-2 and EN 460. These can be used as guidance for estimating the durability and treatability performance of plywood.

If the plywood contains more than one wood species, the species having the lowest natural durability should be used to indicate the expected durability level of the untreated plywood and that being the most resistant to treatment should be used to indicate treatability.

Choice of plywood for a particular application should be made with due consideration given to the characteristics of adhesive type, wood species and lay up and the required life expectancy. The behaviour of plywood subjected to biological attack can differ from that of solid wood.

The behaviour of plywood under different moisture regimes is affected by the wood species comprising the plies, and the nature and content of the adhesive used. The equilibrium moisture content of plywood made from a single wood species can differ from that of solid wood of the same species under the same conditions.

Specific factors for consideration are indicated in Annex A.

6 Use of plywood in different use classes

6.1 General

In order to select suitable plywood, reference should be made to EN 350-2 to establish the natural durability classification of the constituent wood species against the various biological organisms associated with the hazard class in which the plywood will be used.

6.2 Wood-destroying fungi

Table 1 is based on EN 460 and gives guidance, where natural durability levels are insufficient, on the need for preservative treatment.

Table 1 — Wood-destroying fungi — Guidance on the application of natural durability classes of wood species to plywood used in various use classes

Use class for plywood[b]	Durability class of wood species used in the plies[a]				
	1	**2**	**3**	**4**	**5**
1	O	O	O	O	O
2	O	O	O	(O)	(O)
3	O	O	(O)	(x)	(x)
4	O	(O)	(x)	x	x
5	O	(x)	(x)	x	x

[a] Sapwood of all species is regarded as belonging to durability class 5.

[b] The use of plywood is only recommended in use class 4 and use class 5 if adequately modified (see EN 335-3:1995, Annex A and product standards).

Key

O natural durability sufficient

(O) natural durability is normally sufficient but, under certain end uses, treatment can be advisable (see EN 460:1994, Annex A)

(x) preservative treatment is normally advisable but, in certain end uses, natural durability can be sufficient (see EN 460:1994, Annex A)

x preservative treatment necessary

6.3 Insects and marine organisms

Natural durability ratings for plywood against insect and marine borer attacks, based on the rating for constituent wood species given in EN 350-2, are given in Table 2.

Wood destroying insects and marine organisms are universally present throughout Europe. Specific end-use situations and local conditions should be taken into account when assessing this risk for selection of suitable plywood or the need for preservative treatment.

Table 2 — Scheme for assigning natural durability rating of plywood for the various organisms

Organisms	Natural durability of wood species		
	Durable		Susceptible
Hylotrupes	D_{Hy}		S_{Hy}/SH_{Hy}
Anobium	D_A		S_A/SH_A
Lyctus	D_L		S_L
	Durable	**Moderately durable**	**Susceptible**
Termites	D_T	M_T	S_T
Marine organisms	D_{Ma}	M_{Ma}	S_{Ma}

Explanation of abbreviations:

D durable — M moderately durable — S susceptible — SH the heartwood is also known to be susceptible

Subcripts:

A Anobium — Hy Hylotrupes — L Lyctus — Ma Marine organisms — T Termites

Veneer thickness can result in a modification to the natural durability and thus affect the ratings which can be modified as follows:

a) in case of veneer thicknesses > 3 mm, Table 2 shall be used as shown;

b) in case of veneer thicknesses > 1,5 mm and ≤ 3 mm, change Table 2 as follows:

S_{HY}/SH_{Hy} to D_{Hy}

c) in case of veneer thicknesses ≤ 1,5 mm: use b) but, due to the limited thickness of the veneer, risk by Hylotrupes bajulus need not to be taken into account, and change Table 2 as follows:

S_A/SH_A to D_A

S_L to D_L

NOTE Table 2 is based on Annex B of EN 350-2:1994.

Annex A
(informative)

Specific factors related to the biological durability of plywood

A.1 Wood species

The more durable the (solid) wood species used, the greater is the durability of the plywood.

The durability of untreated plywood will be governed by the least durable species.

A.2 Sapwood and heartwood

Sapwood is less durable than heartwood, but is often more permeable.

The presence of sapwood in plywood can therefore result in the biological durability of plywood being less than that expected from the heartwood of the wood species used.

The durability of these more permeable sapwood areas can be improved due to the penetration of glue, which may affect the spread of insect and fungal attack. The effect is influenced by the thickness of the plies.

A.3 Thickness of plies

Biological durability can be enhanced as a result of penetration of the plies by the glue. Thinner plies are more likely to be fully penetrated. Plywood made using thin plies of permeable wood can therefore have a greater biological durability than similar plywood made using thick plies of the same wood species.

A.4 Adhesive content

Certain adhesives are known to have biocidal and fungicidal properties. This can impart to the plywood a degree of adventitious protection.

It is considered that this will be limited in effect and decreases with time but in some circumstances may obviate the need for preservative treatment.

Additionally, the glue lines can act as a barrier preventing wood boring insects and their larvae crossing between plies.

A.5 Preservative treatment

As for solid wood, a suitable preservative treatment will confer enhanced biological durability to plywood, particularly if the wood species used are easy to impregnate and/or the plies or the finished plywood are thin.

Depending upon the end use, preservative treatment can be less necessary for plywood than for the same species of solid wood where the influence of the above factors (see A.1 to A.4) can be demonstrated.

Bibliography

[1] EN 335-1, *Durability of wood and wood-based products — Definitions of use classes — Part 1: General*

[2] EN 335-3:1995, *Durability of wood and wood-based products — Definitions of hazard classes of biological attack — Part 3: Application to wood-based panels*

[3] EN 350-2:1994, *Durability of wood and wood-based products — Natural durability of solid wood — Part 2: Guide to natural durability and treatability of selected wood species of importance in Europe*

[4] EN 460:1994, *Durability of wood and wood-based products — Natural durability of solid wood — Guide to the natural durability requirements for wood to be used in hazard classes*

[5] Etude sur la durabilité des panneaux contreplaqués faits à partir d'essences diverses (Etude CTBA 1979) (see CEN/TC 112/GT2 N 53 F).

[6] Untersuchungen zum Verhalten von Schimmelpilzen gegenüber Klebstoffen bei Holzwerkstoffen, WALTRAUT KERNER-GANG UND HORST HOFFMANN (BAM-Berlin).

[7] Résistance des panneaux contreplaqués à la pourriture: premiers essais sur l'influence de l'épaisseur des plis (France: M. FOUGEROUSSE — R. BARRAY — G. DEON).

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