BRITISH STANDARD

BS 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

The European Standard EN 350-2:1994 has the status of a British Standard

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Cooperating organizations

The European Committee for Standardization (CEN), under whose supervision this European Standard was prepared, comprises the national standards organizations of the following countries:

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National foreword

This Part of BS EN 350 has been prepared under the direction of the Technical Sector Board for Building and Civil Engineering and is the English language version of 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,* published by the European Committee for Standardization (CEN). EN 350-2 was produced as a result of international discussion in which the United Kingdom took an active part.

It is intended that BS EN 350 will consist of the following Parts:

— *Part 1: Guide to the principles of testing and classification of the natural durability of wood;*

— *Part 2: Guide to natural durability and treatability of selected wood species of importance in Europe.*

BS EN 350-1:1994 is identical with EN 350-1:1994.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 34, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

EUROPEAN STANDARD

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EUROPÄISCHE NORM

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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

Durabilité du bois et des matériaux dérivés du bois — Durabilité naturelle du bois massif — Partie 2: Guide de la durabilité naturelle du bois et de l'imprégnabilité d'essences de bois choisies pour leur importance en Europe

Dauerhaftigkeit von Holz und Holzprodukten — Natürliche Dauerhaftigkeit von Vollholz — Teil 2: Leitfaden für die natürliche Dauerhaftigkeit und Tränkbarkeit von ausgewählten Holzarten von besonderer Bedeutung in Europa

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CEN

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Comité Européen de Normalisation
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Foreword

This Part of this European Standard has been drawn up by WG 2 “Natural durability” of the Technical Committee CEN/TC 38 “Durability of wood and wood-based products” of which the Secretariat is held by AFNOR.

This European Standard is divided in two Parts. Part 1 gives guidance on the procedure of determining and classifying the comparative natural durability of an individual wood species, and Part 2 gives the natural durability and treatability of selected wood species of importance in Europe.

This Part of 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 1994, and conflicting national standards shall be withdrawn at the latest by December 1996.

This Part of this European Standard was adopted by CEN and in accordance with the Common CEN/CENELEC Rules, the following countries are bound to implement this Part of the European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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Introduction

Wood is a variable material. Its natural durability to various forms of biological attack is affected by many factors. Consequently, definitive statements about natural durability cannot be made without having accurate and comprehensive test data. However, based on the information currently available, this Part of EN 350 gives guidance on the durability of heartwood and sapwood of selected wood species to degradation by a range of organisms. Separate guidance is given for each organism. For fungi a single durability classification is listed, usually derived from the performance of heartwood stakes exposed half buried out of doors in soil. Detailed guidance concerning the performance of wood species in relation to fungal degradation in other than ground contact situations is not given as this is a product of a complex interaction of factors which is not fully understood.

Information on other selected characteristics of each wood species is given for the guidance of users.

EN 460 gives guidance on the durability classification appropriate for a particular hazard class.

The performance of a component in service will, in many cases, require consideration of the proportion of sapwood which may be present as sapwood and heartwood generally have different durabilities.

It should be emphasized that the durability rating of wood species given in this Part of EN 350 cannot be regarded as any guarantee of performance in service.

1 Scope

This Part of EN 350 lists the natural durability of solid wood for selected wood species, considered of importance to the countries within Europe for constructional purposes. It lists their relative durability to

— wood-destroying fungi

— dry wood-destroying beetles

— termites

— marine organisms.

It also gives information relating to their treatability, origin, density, and sapwood width.

NOTE The omission of a species does not imply that it is unsuitable for use. A species may have been omitted because it was not considered of sufficient importance to be included, or because no or insufficient data were available to classify it.

This Part of EN 350 does not give service lives for components but gives a ranking of various wood species in order to allow comparison of unknown species with well known ones.

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 335-1:1992, *Durability of wood and wood-based products — Definition of hazard classes of biological attack — Part 1: General.*

EN 350-1:1994, *Durability of wood and wood-based products — Natural durability of solid wood — Part 1: Guide to the principles of testing and classification of the natural durability of wood.*

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

CITES "Convention on International Trade in Endangered Species of wild Fauna and Flora" signed at Washington DC on 3 March 1973 and published as a special supplement to IUCN Bulletin 4 (3) March 1973

3 Definitions

For the purposes of this Part of EN 350, the following definitions apply.

3.1
natural durability

the inherent resistance of wood to attack by wood destroying organisms (See EN 350-1.)

3.2
sapwood

outer zone of wood that, in the growing tree, contains living cells and conducts sap
(See EN 350-1.)

NOTE Often distinguishable from heartwood by a lighter colour.

3.3
heartwood

inner zone of wood that, in the growing tree, has ceased to contain living cells or to conduct sap
(See EN 350-1.)

NOTE Often distinguishable from sapwood by a darker colour. Not every wood species contains heartwood.

3.4
treatability

the ease with which a wood can be penetrated by a liquid (for example a wood preservative)

4 Background information

4.1 Wood species

In Table 2 and Table 3 the wood species are listed alphabetically according to their botanical names, and not in order of importance.

— Table 2 lists the data for softwoods.

— Table 3 lists the data for hardwoods.

— Table 4 lists woods of different species which are sold together as commercial groupings.

— Table 5 refers to the species listed in this Part of EN 350, which are known to be durable or moderately durable to marine organisms.

For European species, common names are given in parallel in English, French, and German. For tropical wood species the ATIBT[1)] name is given where possible. Other common names are given only if they are widely used. The origins of common names are indicated as follows:

Symbol	Explanation
X	ATIBT name
D	German name
E	English name
F	French name
O	Other names

Information on the origin of the wood species is given in Table 2, Table 3 and Table 4. Wood properties may vary according to the geographical source.

Information on density (in kg/m^3) is included to give an indication of physical and mechanical properties. However, no clear correlation exists between density and natural durability or treatability. The density is based on mass/volume at a wood moisture content (m.c.) of 12 % (*m*/*m*). The range refers to commonly encountered values and not to the total possible variation.

4.2 Natural durability

4.2.1 *General*

Several classification schemes are used in this Part of EN 350 to describe the natural durability of wood. They indicate the relative performance of each wood species with respect to its resistance to degradation by fungi, insects and marine borers.

The classification schemes used in this Part of EN 350 are the same as those described in EN 350-1.

The data given in the tables of this Part of EN 350 is based upon information drawn from various sources, including historical records, practical experience, laboratory tests and other data.

NOTE Annex B presents a scheme of abbreviations for the expression of natural durability. Using this scheme the durability of *Picea sitchensis,* for example would be written as *Picea sitchensis* — natural durability: 4-5$_F$, S$_{HY}$, SH$_A$, D$_L$, S$_T$.

4.2.2 *Classification of the natural durability to wood-destroying fungi*

A five class system is used:

Durability class	Description
1	very durable
2	durable
3	moderately durable
4	slightly durable
5	not durable

The durability given in the tables refers to heartwood only; sapwood of all wood species should be considered as belonging to durability class 5 (not durable) unless other data are available.

The classification gives an indication of the performance of wood in ground contact (service conditions as described for hazard class 4 in EN 335-1). Where wood is to be used in other hazard classes, the service conditions may result in a performance which differs from that implied by the classification in Table 2 to Table 4 inclusive. Further guidance on the durability requirements for wood to be used in hazard classes is given in EN 460.

The ability of wood to absorb moisture has an important effect upon its service life in out-of-ground contact, and service life in these situations depends on both its durability class and its treatability class. A wood of a given durability which has low moisture absorbing characteristics (for example treatability class 4) will, because of reduced water uptake, generally last markedly longer in out-of ground contact situations, which are subject to intermittent wetting, than a wood of the same durability rating, but which is more absorbent (for example treatability class 1).

4.2.3 *Classification of the natural durability to Hylotrupes bajulus, Anobium punctatum, Lyctus brunneus and Hesperophanes cinnereus*

A two class system is used to classify the natural durability of wood to *Hylotrupes bajulus, Anobium punctatum, Lyctus brunneus* and *Hesperophanes cinnereus.*

[1)] Association Technique Internationale des Bois Tropicaux.

Durability class	Description
D	durable
S	susceptible

In Table 2 and Table 3 it is assumed that the heartwood of all species is durable to these insects, except where indicated otherwise for *Hylotrupes bajulus* and *Anobium punctatum*.

SH	heartwood is also known to be susceptible

Durability to *Hylotrupes bajulus* is only given for softwoods (see Table 2) as hardwoods will not be attacked.

Durability to *Lyctus brunneus* is not mentioned in the list (see Table 2 and Table 3) as only the wood of starch-containing hardwood species with pores of suitable width is susceptible. For species with highly susceptible sapwood a specific note appears in the Remark column. Softwoods will not be attacked.

For durability to *Hesperophanes cinnereus,* which only attacks hardwood in southern Europe, a specific note appears in the Remark column, if a wood species is known as highly susceptible.

NOTE "Susceptible" does not necessarily imply that all commodities made from the wood in question are at risk. For example, the risk of attack by *Hylotrupes bajulus* of "susceptible" softwood diminishes as the wood ages. Additionally susceptibility of a commodity may be influenced by other factors, for example, its moisture content in service and the presence of surface coatings.

4.2.4 *Classification for the natural durability to termites*

A three class system is used:

Durability class	Description
D	durable
M	moderately durable
S	susceptible

The durability refers to heartwood only; sapwood of all wood species is susceptible.

"Durable" does not imply total resistance (see Table 4 of EN 350-1:1994).

4.2.5 *Classification for the natural durability to marine borers*

A three class system is used:

Durability class	Description
D	durable
M	moderately durable
S	susceptible

The durability refers to heartwood only; sapwood of all wood species is susceptible.

"Durable" does not imply total resistance (see Table 5 of EN 350-1:1994).

4.3 Classification of treatability

A four class system is used.

Table 1 provides a set of broad descriptions for classifying treatability based on general observations associated with vacuum/pressure treatment processes.

Treatability cannot be exactly defined. Therefore the treatability classes cannot be separated exactly from each other; this applies particularly to the treatability classes 2 and 3. Wood species assigned to these treatability classes often show very irregular penetration.

NOTE Information on treatability is included to assist in the interpretation of EN 351-1.

4.4 Sapwood/Heartwood

In Table 2 and Table 3 typical sapwood width is given to indicate its abundance in mature trees and is categorized as follows:

Symbol	Explanation
vs	very small (< 2 cm)
s	small (2 cm to 5 cm)
m	medium (5 cm to 10 cm)
b	broad (> 10 cm)
x	no distinct differentiation between heartwood and sapwood
(x)	generally no distinct differentiation between heartwood and sapwood

The durability and the treatability of sapwood and heartwood are usually different with higher durability in the heartwood and better treatability in the sapwood. If the heartwood and sapwood cannot be distinguished the component should be regarded as being composed entirely of sapwood if its durability is being considered, and as being composed entirely of heartwood, if its treatability is being considered.

4.5 Additional notes in Table 2 and Table 3

Where necessary the following additional notes are used:

Symbol	Explanation
v	the species exhibits an unusually high level of variability
n/a	insufficient data available

Table 1 — Classification of the treatability of wood

Treatability class	Description[a]	Explanation
1	Easy to treat	Easy to treat; sawn timber can be treat penetrated completely by pressure treatment without difficulty
2	Moderately easy to treat	Fairly easy to treat; usually complete penetration is not possible, but after 2 h or 3 h by pressure treatment more than 6 mm lateral penetration can be reached in softwoods and in hardwoods a large proportion of the vessels will be penetrated
3	Difficult to treat	Difficult to treat; 3 h to 4 h by pressure treatment may not result in more than 3 mm to 6 mm lateral penetration
4	Extremely difficult to treat	Virtually impervious to treatment; little preservative absorbed even after 3 h to 4 h by pressure treatment; both lateral and longitudinal penetration minimal

[a] Historically treatability data may use other descriptive terms which approximate to the treatability classes as follows:

class 1	permeable
class 2	moderately resistant
class 3	resistant
class 4	extremely resistant

Table 2 — Natural durability and treatability of softwood species

The common names are listed alphabetically in Annex A. A summary of the meaning of the symbols is given in Annex C.

No.	Scientific name	Common name	Origin	Density/range of mean values at 12 % (m/m) m.c. kg/m^3	Natural durability				Treatability		Sapwood width	Remark
					Fungi	Hylotrupes	Anobium	Termites	Heartwood	Sapwood		
2.1	*Abies alba* Mill., A. *excelsior* Franco [= *A.grandis* (Dougl.)Lindl.] *A. procera* Rehde	E: fir F: sapin D: Tanne Weißtanne	Europe N.America	440-460-480	4	SH	SH	S	2-3	2v	x	
2.2	*Agathis damara (A.B.* Lambe) L.C. Rich [= *A. alba* Foxw.] *A. australis* (D.Don.) Salisb., A sp.pl	X: agathis O: Kauri	Australia New Zealand Malaysia, Papua New Guinea	430-490-550	3-4	S	S	S	3	n/a	x	
2.3	*Araucaria angustifolia* (Bertol.)O.Ktze.	E: parana pine F: pin de parana D: Parana Pine Brasilkiefer	Brazil	500-540-600	4-5	D	S	S	2	1	b	
2.4	*Chamaecyparis nootkatensis* (D.Don) Spach	E: yellow cedar F: yellow cedar D: yellow cedar	N.America	430-480-530	2-3	S	S	S	3	1	s	
2.5	*Cryptomeria japonica*(L.f.)D.Don	E: sugi E: cryptomeria D: Sugi	E.Asia and cultivated in Europe	280-320-400	5	D	n/a	S	3	1	s	
2.6	*Larix decidua* Mill., *L. kaempferi* (Lamb.)Sarg.[= L. *leptolepis* (Sieb. & Zucc.) Gord.], *L.* × *eurolepsis* A.Henr. *L.occidentalis* Nutt.	E: larch F: mélèze D: Lärche	Europe Japan	470-600-650	3-4	S	S	S	4	2v	s	

Table 2 — Natural durability and treatability of softwood species

The common names are listed alphabetically in Annex A. A summary of the meaning of the symbols is given in Annex C.

No.	Scientific name	Common name	Origin	Density/range of mean values at 12 % (m/m) m.c. kg/m^3	Natural durability				Treatability		Sapwood width	Remark
					Fungi	Hylotrupes	Anobium	Termites	Heartwood	Sapwood		
2.7	*Picea abies*(L.)Karst	E: Norway spruce F: epicéa D: Fichte	Europe	440-460-470	4	SH	SH	S	3-4	3v	x	
2.8	*Picea sitchensis*(Bong.) Carr.	E: sitka spruce F: sitka D: Sitka Fichte	N.America and cultivated in Europe	400-440-450	4-5	S	SH	S	3	2-3	(x)	
2.9	*Pinus caribaea* Morelet *P. oocarpa* Schiede	X: pitch pine[a] E: Caribbean Pitch pine[a] F: pitchpin[a] D: Pitch Pine[a]	C.America	710-750-770	3	S	S	M-S	4	1	m	
2.10a	*Pinus elliottii* Engelm. *P. palustris* Mill. *P. taeda* L. *P. echinata* Mill. *P.* sp.pl.	X: pitch pine[a] E: American pitch pine[a] F: pitchpin[a] D: Pitch Pine[a]	N.America	650-660-670	3	S	S	M-S	3-4	1	m	
2.10b	*Pinus elliottii* Engelm. *P. taeda* L. *P.* sp.pl.	X: southern pine[b]	Cultivated in C/N. America	400-450-500	4	S	S	S	3	1	m	
2.11	*Pinus contorta* Dougl. ex Loud var. *contorta* Wats var. *latifolia* Wats.	E: lodgepole pine F: pin de murray D: Contorta Kiefer	N.America and cultivated in N.Europe	430-460-470	3-4	S	S	S	3-4	1	m	

[a] This refers only to wood having dark resinous heartwood. Commercial gradings allow the presence of sapwood.
[b] Predominantly sapwood and then traded as “Carolina pine” or “Red pine”.

Table 2 — Natural durability and treatability of softwood species

The common names are listed alphabetically in Annex A. A summary of the meaning of the symbols is given in Annex C.

No.	Scientific name	Common name	Origin	Density/range of mean values at 12 % (m/m) m.c. kg/m^3	Natural durability				Treatability		Sapwood width	Remark
					Fungi	Hylotrupes	Anobium	Termites	Heartwood	Sapwood		
2.12	a) *Pinus nigra* Arnold ssp. *nigra,* [= P.*laricio* (Hoess)Loud.] b) *P. nigra* ssp. *Laricio* (Poir.) Maire	E: a) Austrian pine b) Corsican pine F: a) pin noir d'Autriche b) pin laricio de Corse D: Schwarzkiefer	S.E.Europe and cultivated in UK	510-580-650	4v	S	S	S	4v	1v	m-b	
2.13	*Pinus pinaster* Ait. [= *P.maritima* Lam. non Mill.]	E: maritime pine F: pin maritime D: Seestrand-Kiefer	S/S.W. Europe	530-540-550	3-4	S	S	S	4	1	b	
2.14	*Pinus radiata* D.Don	X: pin radiata O: radiata pine	Cultivated in Brazil, Chile, Australia, New Zealand, South Africa	420-470-500	4-5	S	SH	S	2-3	1	b	
2.15	*Pinus strobus* L.	E: yellow pine Weymouth pine F: pin weymouth D: Weymouths kiefer Strobe	N.America; cultivated in Europe	400-410-420	4	S	SH	S	2	1	b	
2.16	*Pinus sylvestris* L.	E: Scots pine redwood F: pin sylvestre D: Kiefer Föhre	Europe	500-520-540	3-4	S	S	S	3-4	1	s-m	

Table 2 — Natural durability and treatability of softwood species

The common names are listed alphabetically in Annex A. A summary of the meaning of the symbols is given in Annex C.

No.	Scientific name	Common name	Origin	**Density/range of mean values at 12 % (m/m) m.c. kg/m^3**	Natural durability				Treatability		Sapwood width	Remark
					Fungi	**Hylotrupes**	**Anobium**	**Termites**	**Heartwood**	**Sapwood**		
2.17	*Pseudotsuga menziesii* (Mirb.) Franco	E: Douglas fir	N. America; cultivated in Europe	510-530-550	3	S	S	S	4	3	s	
		F: Douglas		470-510-520	3-4	S	S	S	4	2-3	s	
		D: Douglasie										
2.18	*Taxus baccata* L.	E: yew	Europe	650-690-800	2	S	S	n/a	3	2	vs	
		F: if										
		D: Eibe										
2.19	*Thuja plicata* D.Don	E: western red cedar	N.America; cultivated in UK	330-370-390	2	S	S	S	3-4	3	s	
		F: western red cedar			3	S	S	S	3-4	3	s	
		D: western red cedar										
2.20	*Tsuga heterophylla* (Raf.) Sarg.	E: western hemlock	N. America; cultivated in UK	470-490-510	4	S	SH	S	3	2	x	
		F: western hemlock			4	S	SH	S	2	1	x	
		D: western hemlock										

Table 3 — Natural durability and treatability of hardwood species

The common names are listed alphabetically in Annex A. A summary of the meaning of the symbols is given in Annex C.

No.	Scientific name	Common name	Origin	Density/range of mean values at 12 % (*m/m*) m.c. kg/m^3	Natural durability			Treatability		Sapwood width	Remark
					Fungi	Anobium	Termites	Heartwood	Sapwood		
3.1	a) *Acer pseudoplatanus* L., b) *A.platanoides* L.	E: a) sycamore, maple b) Norway maple F: erable sycomore D: Ahorn	Europe	610-640-680	5	S	S	1	1	x	
3.2	*Aesculus hippocastanum* L.	E: European horse-chestnut F: maronnier d'Inde D: Roßkastanie	Europe	500-540-590	5	SH	S	1	1	x	
3.3	*Afzelia bipindensis* Harms, *A.pachyloba* Harms, *A* sp. pl.	X: doussié O: afzelia	W. Africa	730-800-830	1	n/a	D	4	2	s	
3.4	*Alnus glutinosa* (L.) Gaertn., *A. incana* (L.) Moench	E: alder F: aulne D: Erle	Europe	500-530-550 (for *A.glutinosa*)	5	S	S	1	1	x	*Hesperophanes* S
3.5	*Amburana cearensis* (Fr.All) A.C.Sm.	X: cerejeira	S.America	550-600-650	3	n/a	M	2	2	m	
3.6	*Amphimas pterocarpoides* Harms., *A* sp.pl.	X: lati	W. Africa	730-750-770	3	n/a	M	4	2	m	
3.7	*Aningeria robusta* (A.Chev.) Aubr. & Pellegr. *A.* sp.pl	X: aningré O: anegré	W./E. Africa	540-580-630	4-5	n/a	S	1	1	x	
3.8	*Anisoptera curtisii* Dyer ex King *A.* sp.pl.	X: mersawa O: krabak	S.E. Asia	520-650-740	4	n/a	M	3-4	n/a	x	

Table 3 — Natural durability and treatability of hardwood species

The common names are listed alphabetically in Annex A. A summary of the meaning of the symbols is given in Annex C.

No.	Scientific name	Common name	Origin	Density/range of mean values at 12 % (*m/m*) m.c. kg/m^3	Natural durability			Treatability		Sapwood width	Remark
					Fungi	Anobium	Termites	Heartwood	Sapwood		
3.9	*Antiaris toxicaria* Leschen. subsp. *welwitschii* (Engl.) C.C.Berg	X: ako O: antiaris	W./E. Africa	430-450-460	5	n/a	S	1	1	x	*Lyctus* S
3.10	*Aspidosperma peroba* Fr. All. *A.*sp.pl.	X: peroba rosa	S. America	650-750-800	3v	n/a	S	3	1	s	
3.11	*Aucoumea klaineana* Pierre	X: okoumé O: gaboon	W. Africa	430-440-450	4	n/a	S	3	n/a	s	
3.12	*Baillonella toxisperma* Pierre	X: moabi	W. Africa	770-800-830	1	n/a	D	3-4	n/a	m	
3.13	*Betula alleghaniensis* Britt.[= *B. lutea* Michx.f.]	E: yellow birch F: bouleau jaune d'Amérique D: Gelbbirke	E./N. America	550-670-710	5	S	S	1-2	1-2	x	
3.14	*Betula papyrifera* Marsh.	E: paper birch F: bouleau à papier D: Papierbirke	N. America	580-620-740	5	S	S	1-2	1-2	x	
3.15	*Betula pubescens* Ehrh., *B. pendula* Roth	E: European birch F: bouleau D: Gemeine Birke	Europe	640-660-670	5	S	S	1-2	1-2	x	
3.16	*Brachylaena hutchinsii* Hutch.	X: muhuhu	E. Africa	830-910-960	1	n/a	S	4	n/a	s	
3.17	*Calophyllum inophyllum* L., *C.* sp.pl	X: bintangor	S.E. Asia, Papua New Guinea	630-660-690	3	n/a	M	4	2	s	
3.18	*Canarium schweinfurthii* Engl.	X: aiélé O: African canarium	W./E. Africa	490-500-530	5	n/a	S	4	1	m	Sapwood *Lyctus* S

Table 3 — Natural durability and treatability of hardwood species

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					Fungi	Anobium	Termites	Heartwood	Sapwood		
3.19	*Carapa guianensis* Aubl., *C. surinamensis* Miq. *C* sp.pl.	X: andiroba O: crabwood	C./S. America	610-620-640	3-4	n/a	M	3	n/a	s	
3.20	*Carpinus betulus* L.	E: hornbeam F: charme D: Hainbuche	Europe	750-800-850	5	n/a	S	1	1	x	
3.21	*Carya glabra* (Mill.) Sweet, *C. ovata* (Mill.) K.Koch, *C. tomentosa* Nutt.	E: hickory F: hickory D: hickory	N. America	790-800-830	4	n/a	S	2	1	x	
3.22	*Castanea sativa* Mill.	E: sweet chestnut F: châtaignier D: Edelkastanie	Europe	540-590-650	2	S	M	4	2	s	Sapwood *Hesperophanes* S
3.23	*Cedrela odorata* L., *C. fissilis* Vell., *C.* sp.pl.	X: Cedro O: American “cedar”	C./S. America	450-490-600	2	n/a	M	3-4	1-2	s	
3.24	*Cedrelinga catenaeformis* Ducke	X: tornillo O: cedro rana	S. America	370-520-660	3	n/a	S	2-3	n/a	s	
3.25	*Ceiba pentandra* (L.) Gaertn. *Chlorophora excelsa* see *Milicia excelsa* *Chlorophora tinctoria* see *Maclura tinctoria*	X: fuma O: ceiba O: fromager	W. Africa Tropics generally	290-320-350	5	n/a	S	1	1	x	*Lyctus* S

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					Fungi	Anobium	Termites	Heartwood	Sapwood		
3.26	*Cordia alliodora* (Ruiz & Pav.) Cham., *C. goeldiana* Hub., *C.* sp.pl.	X: freijo	Brazil	520-540-550	2	n/a	M	3	1	s	
3.27	*Cylicodiscus gabunensis* Harms	X: okan	W. Africa	850-920-960	1	n/a	D	4	3	s	
3.28	*Daniellia thurifera* Bennett *D. klainei* Pierre, *D. ogea* (Harms.) Rolfe ex Holl., *D.* sp.pl.	X: faro O: daniellia O: ogea	W. Africa	480-490-510	4-5	n/a	S	2-3	1	b	
3.29	*Dicorynia guianensis* Amsh. *D. paraensis* Benth.	X: basralocus O: angélique	S. America	720-750-790	2v	n/a	M	4	2	s	
3.30	*Dipterocarpus alatus* Roxb. *D.* sp.pl.	X: keruing	S.E. Asia	740-750-780	3v	n/a	S	3v	2	s	
3.31	*Distemonanthus benthamianus* Baill.	X: movingui O: ayan	W. Africa	690-710-740	3	n/a	M	4	n/a	s	
3.32	*Dryobalanops aromatica* Gaertn., *D.* sp.pl.	X: kapur	S.E. Asia	630-700-790	1-2	n/a	M	4	1	m	
	Dumoria see *Tieghemella*										
	Fagara heitzii see *Zanthoxylum hetizii*										

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					Fungi	Anobium	Termites	Heartwood	Sapwood		
3.33	*Endospermum medullosum* L.S. Smith *E* sp.pl.	X: sesendok O: kauvula	S.E. Asia Fiji	420-480-530	5	n/a	S	1	1	n/a	
3.34	*Entandrophragma angolense* (Welw.) C.DC., *E. congoense* (De Wild.) A. Chev.	X: tiama O: gedu nohor	W./E. Africa	550-560-570	3	n/a	S	4	3	b	
3.35	*Entandrophragma candollei* Harms	X: kosipo O: omu	W. Africa	640-670-720	2-3	n/a	M	3	1	s	
3.36	*Entandrophragma cylindricum* Sprague	X: sapelli O: sapele	W. Africa	640-650-700	3	n/a	M	3	2	m	
3.37	*Entandrophragma utile* Sprague	X: sipo O: utile	W./E. Africa	590-640-660	2-3	n/a	M	4	2	m	
3.38	*Eperua falcata* Aubl., *E jenmanii* Oliver, *E* sp.pl.	X: walaba	S.America	890-900-910	1	n/a	D	4	3	s	
3.39	*Eribroma oblonga* (Mast.) Bod.	X: eyong	W. Africa	700-730-800	4	n/a	S	3-4	1	x	
3.40	*Eucalyptus diversicolor* F.v.M.	O: karri	Australia	800-880-900	2	n/a	n/a	4	1	s	
3.41	*Eucalyptus globulus* Labill.	O: southern blue gum	cultivated in Europe	700-750-800	5	n/a	S	3	1	s	
3.42	*Eucalyptus marginata* Sm.	O: jarrah	Australia	790-830-900	1	n/a	M	4	1	s	
3.43	*Euxylophora paraensis* Hub.	X: pau amarello	S. America	730-770-810	1	n/a	D	3-4	n/a	x	Durability to fungi based on limited data

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					Fungi	Anobium	Termites	Heartwood	Sapwood		
3.44	*Fagus sylvatica* L.	E: European beech F: hêtre D: Buche	Europe	690-710-750	5	S	S	1(4)	1	x	*Hesperophanes* S, Treatability (4) refers to red-heart if present
3.45	*Fraxinus excelsior* L.	E: European ash F: frêne D: Esche	Europe	680-700-750	5	S	S	2	2	(x)	
3.46	*Gambeya africana* (G. Don.) Pierre *G. lacourtiana* (De Wild.) Aubrév. & Pellegr., *G. subnuda* Pierre	X: longhi	W. Africa	700-730-800	4	n/a	M	2	1	x	*Lyctus* S
3.47	*Gonystylus bancanus* (Miq.) Kurz G.sp.pl.	X: ramin	S.E. Asia	560-630-670	5	n/a	S	1	1	x	*Lyctus* S
3.48	*Gossweilerodendron balsamiferum* (Verm.) Harms	X: tola O: tola branca O: agba	W. Africa	480-500-510	2-3	n/a	S	3	1	m	
3.49	*Guarea cedrata* (A.Chev.) Pellegr., *G. laurentii De Wild.*	X: bossé clair O: guarea	W. Africa	570-580-630 (for *G. cedrata*)	2v	n/a	S	4	1	m	
3.50	*Guarea thompsonii* Sprague & Hutch	X: bossé foncé	W. Africa	600-690-850	2	n/a	S	4	1	m	
3.51	*Guibourtia arnoldiana* (De Wild. & Th. Dür.) J.Léonard	X: mutényé	W. Africa	760-820-880	3	n/a	M	3-4	2	s	

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					Fungi	Anobium	Termites	Heartwood	Sapwood		
3.52	*Guibourtia demeusii* (Harms) J. Léonard, *G. pellegriniana* J. Léonard, *G. tessmannii* (Harms) J. Léonard	X: bubinga	W. Africa	700-830-910	2	n/a	D	4	1	s	
3.53	*Guibourtia ehie* (A. Chev.) J. Léonard	X: ovéngkol O: amazakoué	W. Africa	720-780-820	2	n/a	D	3	1	m	
3.54	*Hallea ciliata* (Aubrév. & Pellegr.) Leroy, *H. rubrostipulata* (K.Schum.) Leroy, *H. stipulosa (DC.) Leroy*	X: abura O: bahia	W./E. Africa	550-560-600	5	n/a	S	2	1	m	
3.55	*Heritiera simplicifolia* (Mast) Kosterm., *H. javanica* (B1.) Kosterm., *H. sumatrana* (Miq.) Kosterm.	X: mengkulang	S.E. Asia	680-710-720	4	n/a	S	3	2	s	
3.56	*Heritiera utilis* (Sprague) Kosterm., *H. densiflora* (Pellegr.) Kosterm.	X: niangon	W. Africa	670-680-710	3	n/a	M	4	3	m	
3.57	*Intsia bijuga* (Colebr.) O Ktze., *I.* sp.pl.	X: merbau O: hintsy O: intizia	S.E. Asia Papua New Guinea	730-800-830	1-2	n/a	M	4	n/a	m	
3.58	*Juglans nigra* L.	E: American walnut F: noyer d'Amérique D: Amerikanischer Nußbaum	N. America	550-620-660	3	n/a	n/a	3-4	1	s	

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					Fungi	Anobium	Termites	Heartwood	Sapwood		
3.59	*Juglans regia* L.	E: European walnut F: noyer D: Nußbaum	Europe	630-670-680	3	S	S	3	1	s	*Hesperophanes* S
3.60	a) *Khaya ivorensis* A. Chev., a) *K. anthotheca* (Welw.) C.DC., b) *K. grandifolia* C.DC.	X: acajou d'Afrique O: African mahogany O: khaya O: khaya mahogany	W./E. Africa	a) 490-520-530 b) 650-720-800	3	n/a	S	4	2	s	
3.61	*Koompassia malaccensis* Maing.	X: kempas	S.E. Asia	850-860-880	2	n/a	S	3	1-2	s	Sapwood *Lyctus* S
3.62	*Lophira alata* Banks ex Gaertn.	X: azobé O: ekki O: bongossi	W. Africa	950-1 060-1 100	2v[a]	n/a	D	4	2	s	A broad transition wood between heartwood and sapwood has a natural durability to fungi of 3
3.63	*Lovoa trichilioides* Harms, *L.* sp.pl.	X: dibétou E: African walnut	W./E. Africa	520-550-590	3-4	n/a	S	3-4	2	s	
3.64	*Maclura tinctoria* (L.) D.Don ex Steudl. [= *Chlorophora tinctoria* Gaud.]	X: moral O: fustic	C./S. America	750-890-960	1	n/a	D	3-4	n/a	s	

[a] Very durable in water-contact.

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					Fungi	Anobium	Termites	Heartwood	Sapwood		
3.65	*Mansonia altissima* A. Chev.	X: mansonia O: bété	W. Africa	610-620-630	1	n/a	D	4	1	s	
3.66	*Milicia excelsa* (Welw.) C.C. Berg [= *Chlorophora excelsa* (Welw.) Benth. & Hook f.] *M. regia* (A. Chev.) C.C. Berg	X: iroko O: kambala	W./E. Africa	630-650-670	1-2	n/a	D	4	1	m	Sapwood *Lyctus* S
3.67	*Millettia laurentii* De Wild., *M. stuhlmannii* Taub.	X: wengé	W./E. Africa	780-830-900	2	n/a	D	4	n/a	s	
	Mimusops see *Tieghemella*										
3.68	*Nauclea diderrichii* (De Wild. & Th.Dür) Merrill *N. gilletii* Merrill	X: bilinga O: opepe O: badi	W. Africa	740-750-780	1	n/a	D	2	1	s	
3.69	*Nesogordonia papaverifera* (A. Chev.) R. Capuron, *N.* sp.pl.	X: kotibé O: danta	W./E. Africa	710-730-760	3v	n/a	M	3-4	1-2	s	
3.70	*Nothofagus menziesii* (Hook.f.) Oerst.	O: silver beech	New Zealand	540-550	5	n/a	n/a	4	1	m	
3.71	*Nothofagus procera* (Poepp. & Endl.) Oerst.	X: rauli	S. America	530-580-610	4	n/a	S	2	2	s	
3.72	*Nothofagus pumilio* Kras.	X: lenga	S. America	530-540-550	5	n/a	S	4	n/a	s	
3.73	*Ocotea rodiaei* (Rob. Schomb.) Mez	X: greenheart	S. America	980-1 030-1 150	1	n/a	D	4	2	s	

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					Fungi	Anobium	Termites	Heartwood	Sapwood		
3.74	*Ocotea rubra* Mez	X: louro vermelho O: red louro	S. America	600-620-650	2	n/a	D	4	2	m	
3.75	*Oxystigma oxyphyllum* (Harms) J. Léonard	X: tchitola	W. Africa	590-610-640	3	n/a	M	3-4	1	b	
3.76	*Peltogyne venosa* (Vahl) Benth., *P. confortiflora* Benth., *P. lecointei* Ducke *P.* sp.pl.	X: amarante O: purpleheart	C./S. America	830-860-880	2-3	n/a	D	4	1	s	
3.77	*Pericopsis elata* (Harms Van Meeuwen	X: afrormosia	W. Africa	680-690-710	1-2	n/a	D	4	1	vs	
3.78	*Pometia pinnata* Forst.,	X: kasai E: taun	S.E. Asia, Papua New Guinea	650-710-750	3	n/a	M	3-4	2	m	
3.79	*Populus canescens* Sm., *P. nigra* L., *P. alba* L. *P.* hybrid	E: poplar[a] F: peuplier[a] D: Pappel[a]	Europe	420-440-480	5	S	S	3v	1v	x	*Hesperophanes* S
3.80	*Pseudosindora palustris* Sym. *Sindora* sp.pl.	X: sepetir	S.E. Asia	650-660-670	2	n/a	S	4	2	b	
3.81	*Pterocarpus soyauxii* Taub. *P* sp.pl.	X: padouk d'Afrique	W. Africa	720-740-820	1	n/a	D	2	n/a	m	
3.82	*Pterygota macrocarpa* K. Schum., *P. bequaertii* De Wild.	X: koto	W. Africa	510-560-630	5	n/a	S	1	1	x	*Lyctus* S

[a] The data cover most of the poplar hybrides cultivated in Europe.

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					Fungi	Anobium	Termites	Heartwood	Sapwood		
3.83	*Pycnanthus angolensis* (Welw.) Warb.	X: ilomba	W./E. Africa	440-480-510	5	n/a	S	1	1	x	*Lyctus* S
3.84	*Quercus alba* L., *Q. prinus* L., *Q. lyrata* Walt., *Q. michauxii* Nutt., *Q.* sp.pl.	E: American white oak F: chêne blanc d'Amerique D: Amerikanische Weißeiche	N. America	670-730-770	2-3	S	M	4	2	s	Sapwood *Lyctus* S
3.85	*Quercus cerris* L.	E: Turkey oak F: chêne chevelu D: Zerreiche	Europe	710-770-860	3	n/a	M	4	1	b	Sapwood *Lyctus* n/a, *Hesperophanes* S
3.86	*Quercus robur* L., *Q. petraea* (Matt.) Liebl.	E: European oak F: chêne rouvre D: Eiche	Europe	670-710-760	2	S	M	4	1	s	Sapwood *Lyctus* S, *Hesperophanes* S
3.87	*Quercus rubra* L., *Q. falcata* Michx., *Q. shumardii* Buck., *Q.* sp.pl.	E: American red oak F: chêne rouge d'Amérique D: Amerikanische Roteiche	N. America	650-700-790	4	n/a	S	2-3	1	s	Sapwood *Lyctus* S

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					Fungi	Anobium	Termites	Heartwood	Sapwood		
3.88	*Rhodognaphalon brevicuspe* Roberty, *R. schumannianum* Robyns	X: kondroti	W./E. Africa	470-480-490	5	n/a	S	1	1	b	
3.89	*Robinia pseudoacacia* L.	E: robinia F: robiner faux-acacia D: Robinie	N. America Europe	720-740-800	1-2	S	D	4	1	vs	
3.90	*Shorea laevis* Ridl., *S. altrinervosa* Sym., *S. glauca* King, *S* sp.pl. (section *Shorea*)	X: balau (Yellow) O: bangkirai	S.E. Asia	700-930-1 150	2	n/a	D	4	1-2	s	
3.91	*Shorea collina* Ridl. *S. guiso* (Blco.) Bl. (section *Shorea*) *S. kunstleri* King *S* sp.pl. (section *Brachypterae*)	X: red balau	S.E. Asia	750-800-900	3-4	n/a	M	4v	2	s	
3.92	*Shorea curtisii* Dyer ex King. *S. pauciflora* King, *S.* sp.pl. (section *Rubroshorea*)	X: dark red meranti[b]	S.E. Asia	600-680-730	2-4[a]	n/a	M	4v	2	s	

[a] To maximize the probability of obtaining class 3 natural durability wood, select wood of a density of at least 670 kg/m^3 (measured at a moisture content between 12 % (*m*/*m*) and 17 % (*m*/*m*).

[b] "Meranti" from Malaysia (*Shorea, Parashorea* and *Pentacme* species; also known as seraya and lauan from other origins) refers not to a specific wood species, but to a mixed commercial group of east-Asian hardwoods. The individual species within each group can have different durability and treatability properties and it is, therefore, difficult to assign a single rating to such mixed species consignments.

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					Fungi	Anobium	Termites	Heartwood	Sapwood		
3.93	*Shorea leprosula* Miq., *S. parvifolia* Dyer *S.* sp.pl. (section *Rubroshorea*)	X: light red meranti[a]	S.E. Asia	490-520-550	3-4	n/a	S	4v	2	m	
3.94	*Shorea resina-nigra* Foxw., *S. faguetiana* Heim, *S* sp.pl. (section *Richetia*)	X: yellow meranti[a]	S.E. Asia	560-630-660	4	n/a	S	3-4	2	m	
3.95	*Shorea assamica* Dyer., *S.* sp.pl. (section *Anthoshorea*)	X: white meranti[a]	S.E. Asia	600-630-670	5	n/a	S	3v	2	s	
	Sindora see *Pseudosindora*										
3.96	*Swietenia macrophylla* King,	X: mahogany E: American mahogany	C./S. America Caribbean	510-550-580 700-720-770	2	n/a	S	4	2-3	m	
3.97	*Tectona grandis* L.f.	X: teak	Asia cultivated in Asia and in other countries	650-680-750	1	n/a	M	4	3	s	
		F: teck			1-3	n/a	M-S	n/a	n/a	n/a	
3.98	*Terminalia ivorensis* A. Chev.	X: framiré O: idigbo	W. Africa	520-550-560	2-3	n/a	S	4	2	(x)	

[a] "Meranti" from Malaysia (*Shorea, Parashorea* and *Pentacme* species; also known as seraya and lauan from other origins) refers not to a specific wood species, but to a mixed commercial group of east-Asian hardwoods. The individual species within each group can have different durability and treatability properties and it is, therefore, difficult to assign a single rating to such mixed species consignments.

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					Fungi	Anobium	Termites	Heartwood	Sapwood		
3.99	*Terminalia superba* Engl. & Diels	X: limba O: afara	W. Africa	550-560-600	4	n/a	S	2	1	(x)	*Lyctus* S
3.100	*Tieghemella heckelii* Pierre ex A. Chev., *T. africana* Pierre [= *Dumoria* sp.pl., = *Mimusops* sp.pl]	X: makoré O: douka	W. Africa	620-660-720	1	n/a	D	4	2	m	
3.101	*Tilia cordata* Mill., *T. platyphyllos* Scop., *T. x europaea* L.	E: European lime F: tilleul D: Linde	Europe	520-540-560	5	n/a	S	1	1	x	
3.102	*Triplochiton scleroxylon* K. Schum.	X: obeche D: Abachi F: samba E: wawa O: ayous	W. Africa	370-390-400	5	n/a	S	3	1	x	*Lyctus* S
3.103	*Turraeanthus africanus* (Welw.) ex C.DC.) Pellegr.	X: avodiré	W. Africa	540-550-560	4	n/a	s	4	1	x	
3.104	*Ulmus carpinifolia* Gled. [= *U. campestris* L.p.p.], *U. glabra* Huds. [= *U. montana* With.], *U. procera* Salisb. [= *U. campestris* L.p.p.], *U. x hollandica* Mill., *U. laevis* Pall. [= *U. effusa* Willd.],	E: elm F: orme D: Rüster Feldulme	Europe	630-650-680	4	S	S	2-3	1	s	

Table 3 — Natural durability and treatability of hardwood species

The common names are listed alphabetically in Annex A. A summary of the meaning of the symbols is given in Annex C.

No.	Scientific name	Common name	Origin	Density/range of mean values at 12 % (*m/m*) m.c. kg/m^3	Natural durability			Treatability		Sapwood width	Remark
					Fungi	Anobium	Termites	Heartwood	Sapwood		
3.105	*Virola surinamensis* (Rolf) Warb, *V* sp.pl., *Dialyanthera* sp.pl.	X: virola O: baboen E: light virola	S. America	440-440-480	5	n/a	S	1-2	1	x	*Lyctus* S
3.106	*Vochysia hondurensis* Sprague, *V. tetraphyalla* DC., *V.* sp.pl.	X: quaruba	C./S. America	450-490-510	4	n/a	S	3	2	m	
3.107	*Zanthoxylum heitzii* (Aubrév. & Pellegr.) Waterman [*Fagara heitzii* Aubrév. & Pellegr.]	X: olon	W. Africa	500-550-640	3	n/a	M	2-3	2-3	x	

Table 4 — Classification of commercial groupings

The common names are listed alphabetically in Annex A. A summary of the meaning of the symbols is given in Annex C.

For commercial purposes timbers which are of different species are sometimes grouped together and sold under a single name. These groups of species will not behave in the same way as a clearly defined single species. With respect to durability and treatability, the following table shows the least durability, and the highest resistance to preservative treatment normally found in species within the group. The species showing least durability is often not the same as the species showing greatest resistance to treatment. Treatment for the most resistant species may result in overtreatment of more permeable species within the group.

No.	Grouping name	Scientific name of wood species grouped	Origin	Natural durability				Treatability	
				Fungi	Hylotrupes	Anobium	Termites	Heartwood	Sapwood
4.1	Douglas fir/larch	*Pseudotsuga menziesii* (Mirb.) Franco *Larix occidentalis* Nutt.	Canada & USA	3	S	S	S	4	3
4.2	European whitewood[a]	*Picea* sp.pl., *Abies* sp.pl.	Europe	4	SH	SH	S	3–4	3
4.3	Fichte/Tanne	*Picea* sp.pl., *Abies* sp.pl.	C. Europe	4	SH	SH	S	3–4	3
4.4	hem-fir	*Tsuga* sp.pl., *Abies* sp.pl.	Canada & USA	4	SH	SH	S	3	2
4.5	Kiefer/Lärche	*Pinus sylvestris,* *Larix* sp.pl.	C. Europe	3–4	S	S	S	4	2v
4.6	spruce/pine/fir (S.P.F.)	*Picea* sp.pl., *Pinus* sp.pl., *Abies* sp.pl.	Canada	4	SH	SH	S	3–4	3v
4.7	western whitewood	*Picea* sp.pl., *Pinus* sp.pl., *Abies* sp.pl., *Tsuga* sp.pl.	USA	4	SH	SH	S	3–4	3v

[a] In Scandinavia this term refers to spruce alone.

4.6 Convention on international trade in endangered species (CITES)

When selecting a wood species listed in this Part of EN 350, consideration should be given to whether the selected species is protected by the Convention on International Trade in Endangered Species (CITES).

Table 5 — Wood species listed in this standard which are classed as durable (D) and moderately durable (M) against marine organisms

The common names are listed alphabetically in Annex A. A summary of the meaning of the symbols is given in Annex C.

No.	Common name	Durability class	Table 3 reference no.
5.1	afrormosia	M	**3.77**
5.2	azobé	M	**3.62**
5.3	basralocus	D	**3.29**
5.4	bilinga/opepe	M	**3.68**
5.5	greenheart	D	**3.73**
5.6	sapelli	M	**3.36**
5.7	teak (Asian origin)	M	**3.97**

NOTE The list in this table is not exhaustive and other timbers listed in this Part of EN 350 may also be durable or moderately durable to marine organisms.

Annex A (informative)
Alphabetical list of common names

The following list contains all common names mentioned in this standard in alphabetical order. The numbers refer to the respective wood species in Table 2 (No. **2.1** to **2.20**), Table 3 (No. **3.1** to **3.107**), and Table 5 (No. **5.1** to **5.7**) and to the respective commercial groupings in Table 4 (No. **4.1** to **4.7**).

The capital letters following the common names refer to the origin of the name.

Letter	Explanation
X	ATIBT name
D	German name
E	English name
F	French name
O	Other names
ComGr	Commercial grouping

Common name	See No.
Abachi (D)	**3.102**
abura (X)	**3.54**
acajou d'Afrique (X)	**3.60**
afara (O)	**3.99**
African canarium (O)	**3.18**
African mahogany (O)	**3.60**
African walnut (E)	**3.63**
afrormosia (X)	**3.77, 5.1**
afzelia (O)	**3.3**
agathis (X)	**2.2**
agba (O)	**3.48**
Ahorn (D)	**3.1**
aiélé (X)	**3.18**
ako (x)	**3.9**
alder (E)	**3.4**
amarante (X)	**3.76**
amazakoué (O)	**3.53**
America cedar (O)	**3.23**
American mahogany (E)	**3.96**
American pitch pine (E)	**2.10a**
American red oak (E)	**3.87**
American walnut (E)	**3.58**
American white oak (E)	**3.84**
Amerikanische Roteiche (D)	**3.87**
Amerikanische Weißeiche (D)	**3.84**
Amerikanischer Nußbaum (D)	**3.58**
andiroba (X)	**3.19**
anegré (O)	**3.7**
angélique (O)	**3.29, 5.3**
aningré (X)	**3.7**
antiaris (O)	**3.9**
ash, European (E)	**3.45**
aulne (F)	**3.4**
Austrian pine (E)	**2.12**
avodiré (X)	**3.103**
ayan (O)	**3.31**
ayous (O)	**3.102**
azobé (X)	**3.62, 5.2**
baboen (O)	**3.105**
badi (O)	**3.68, 5.3**
bahia (O)	**3.54**
balau, yellow (X)	**3.90**
balau, red (X)	**3.91**
bangkirai (O)	**3.90**
basralocus (X)	**3.29, 5.3**
beech, European (E)	**3.44**
beech, silver (O)	**3.70**
bété (O)	**3.65**
bilinga (X)	**3.68, 5.3**
bintangor (X)	**3.17**
birch, European (E)	**3.15**
birch, paper (E)	**3.14**
birch, yellow (E)	**3.13**
Birke, Gemeine (D)	**3.15**
blue gum, southern (O)	**3.41**
bongossi (O)	**3.62**
bossé clair (X)	**3.49**
bossé foncé (X)	**3.50**
bouleau (F)	**3.15**
bouleau jaune d'Amérique (F)	**3.13**
bouleau à papier (F)	**3.14**
Brasilkiefer (D)	**2.3**
bubinga (X)	**3.52**
Buche (D)	**3.44**
canarium, African (O)	**3.18**
Caribbean pitch pine (E)	**2.9**
cedar, American (O)	**3.23**
cedar, western red (D, E, F)	**2.19**
cedar, yellow (D, E, F)	**2.4**
cedro (X)	**3.23**
cedro rana (O)	**3.24**
ceiba (O)	**3.25**
cerejeira (X)	**3.5**
charme (F)	**3.20**

Common name	See No.	Common name	See No.
châtaignier (F)	**3.22**	framiré (X)	**3.98**
chêne blanc d'Amérique (F)	**3.84**	freijo (X)	**3.26**
chêne chevelu (F)	**3.85**	frêne (F)	**3.45**
chêne rouge d'Amérique (F)	**3.87**	fromager (O)	**3.25**
chêne rouvre (F)	**3.86**	fuma (X)	**3.25**
chestnut, sweet (E)	**3.22**	fustic (O)	**3.64**
Contorta Kiefer (D)	**2.11**	gaboon (O)	**3.11**
Corsican pine (E)	**2.12**	gedu nohor (O)	**3.34**
crabwood (O)	**3.19**	Gelbbirke (D)	**3.13**
cryptomeria (F)	**2.5**	Gemeine Birke (D)	**3.15**
daniellia (O)	**3.28**	greenheart (X)	**3.73, 5.5**
danta (O)	**3.69**	guarea (O)	**3.49**
dark red meranti (X)	**3.92**	Hainbuche (D)	**3.20**
dibétou (X)	**3.63**	Hem-Fir (ComGr)	**4.4**
Douglas (F)	**2.17**	hemlock, western (D,E, F)	**2.20**
Douglas fir (E)	**2.17**	hêtre (F)	**3.44**
Douglas fir/larch (ComGr)	**4.1**	hickory (D,E,F)	**3.21**
Douglasie (D)	**2.17**	hintsy (O)	**3.57**
douka (O)	**3.100**	hornbean (E)	**3.20**
doussié (X)	**3.3**	horse-chestnut, European (E)	**3.2**
Edelkastanie (D)	**3.22**	idigbo (O)	**3.98**
Eibe (D)	**2.18**	if (F)	**2.18**
Eiche (D)	**3.86**	ilomba (X)	**3.83**
ekki (O)	**3.62, 5.2**	intzia (O)	**3.57**
elm (E)	**3.104**	iroko (X)	**3.66**
epicéa (F)	**2.7**	jarrah (O)	**3.42**
erable sycomore (F)	**3.1**	kambala (O)	**3.66**
Erle (D)	**3.4**	kapur (X)	**3.32**
Esche (D)	**3.45**	karri (O)	**3.40**
European ash (E)	**3.45**	kasai (X)	**3.78**
European beech (E).	**3.44**	kauri (O)	**2.2**
European birch (E)	**3.15**	kauvula (O)	**3.33**
European horse-chestnut (E)	**3.2**	kempas (X)	**3.61**
European lime (E)	**3.101**	keruing (X)	**3.30**
European oak (E)	**3.86**	khaya (O)	**3.60**
European walnut (E)	**3.59**	khaya mahogany (O)	**3.60**
European whitewood (ComGr)	**4.2**	Kiefer (D)	**2.16**
eyong (X)	**3.39**	Kiefer, Contorta (D)	**2.11**
faro (X)	**3.28**	Kiefer/Lärche (ComGr)	**4.5**
Feldulme (D)	**3.104**	Kiefer, Seestrand (D)	**2.13**
Fichte (D)	**2.7**	Kiefer, Weymouths (D)	**2.15**
Fichte, Sitka (D)	**2.8**	kondroti (X)	**3.88**
Fichte/Tanne (ComGr)	**4.3**	kosipo (X)	**3.35**
fir (E)	**2.1**	kotibé (X)	**3.69**
fir, Douglas (E)	**2.17**	koto (X)	**3.82**
Föhre (D)	**2.16**	krabak (O)	**3.8**

Common name	See No.	Common name	See No.
larch (E)	**2.6**	oak, European (E)	**3.86**
Lärche (D)	**2.6**	obeche (X)	**3.102**
lati (X)	**3.6**	ogea (O)	**3.28**
lenga (X)	**3.72**	okan (X)	**3.27**
light red meranti (X)	**3.93**	okoumé (X)	**3.11**
light virola (E)	**3.105**	olon (X)	**3.107**
limba (X)	**3.99**	omu (O)	**3.35**
lime, European (E)	**3.101**	opepe (O)	**3.68, 5.4**
Linde (D)	**3.101**	orme (F)	**3.104**
lodgepole pine (E)	**2.11**	ovèngkol (X)	**3.53**
longhi (X)	**3.46**	padouk d'Afrique (X)	**3.81**
louro vermelho (X)	**3.74**	paper birch (E)	**3.14**
louro, Red (O)	**3.74**	Papierbirke (D)	**3.14**
mahogany (X)	**3.96**	Pappel (D)	**3.79**
mahogany, African (O)	**3.60**	Parana pine (D, E)	**2.3**
mahogany, American (E)	**3.96**	pau amarello (X)	**3.43**
mahogany, Khaya (O)	**3.60**	peroba rosa (X)	**3.10**
makoré (X)	**3.100**	peuplier (F)	**3.79**
mansonia (X)	**3.65**	pin de Murray (F)	**2.11**
maple, (E)	**3.1**	pin de parana (F)	**2.3**
maple, Norway (E)	**3.1**	pin laricio de Corse (F)	**2.12**
maritime pine (E)	**2.13**	pin maritime (F)	**2.13**
maronnier d'Inde (F)	**3.2**	pin noir d'Autriche (F)	**2.12**
mélèze (F)	**2.6**	pin radiata (X)	**2.14**
mengkulang (X)	**3.55**	pin sylvestre (F)	**2.16**
meranti, dark red (X)	**3.92**	pin weymouth (F)	**2.15**
meranti, light red (X)	**3.93**	pine, Austrian (E)	**2.12**
meranti, white (X)	**3.95**	pine, Corsican (E)	**2.12**
meranti, yellow (X)	**3.94**	pine, lodgepole (E)	**2.11**
merbau (X)	**3.57**	pine, maritime (E)	**2.13**
mersawa (X)	**3.8**	pine, Parana (D, E)	**2.3**
moabi (X)	**3.12**	pine, radiata (O)	**2.14**
moral (X)	**3.64**	pine, Scots (E)	**2.16**
movingui (X)	**3.31**	pine, southern (X)	**2.10b**
muhuhu (X)	**3.16**	pine, Weymouth (E)	**2.15**
muténýé (X)	**3.51**	pine, yellow (E)	**2.15**
niangon (X)	**3.56**	Pitch Pine (D)	**2.10a**
Norway maple (E)	**3.1**	pitch pine (D, X)	**2.9**
Norway spruce (E)	**2.7**	pitch pine, American (E)	**2.10a**
noyer (F)	**3.59**	pitch pine, Caribbean (E)	**2.9**
noyer d'Amerique (F)	**3.58**	pitchpin (F)	**2.9, 2.10a**
Nußbaum (D)	**3.59**	poplar (E)	**3.79**
Nußbaum, Amerikanischer (D)	**3.58**	purpleheart (O)	**3.76**
oak, Turkey (E)	**3.85**	quaruba (X)	**3.106**
oak, American red (E)	**3.87**	radiata pine (O)	**2.14**
oak, American white (E)	**3.84**	ramin (X)	**3.47**

Common name	See No.
rauli (X)	**3.71**
red balau	**3.91**
red cedar, western (D,E,F)	**2.19**
red louro (O)	**3.74**
red oak, American (E)	**3.87**
redwood (E)	**2.16**
robinia (E)	**3.89**
Robinie (D)	**3.89**
Robinier faux-acacia (F)	**3.89**
Roßkastanie (D)	**3.2**
Roteiche, Amerikanische (D)	**3.87**
Rüster (D)	**3.104**
samba (F)	**3.102**
sapele (O)	**3.36, 5.6**
sapelli (X)	**3.36, 5.6**
sapin (F)	**2.1**
Schwarzkiefer (D)	**2.12**
Scots pine (E)	**2.16**
Seestrand Kiefer (D)	**2.13**
sepetir (X)	**3.80**
sesendok (X)	**3.33**
silver beech (O)	**3.70**
sipo (X)	**3.37**
sitka (F)	**2.8**
Sitka Fichte (D)	**2.8**
sitka spruce (E)	**2.8**
southern blue gum (O)	**3.41**
southern pine (X)	**2.10b**
S.P.F. (ComGr)	**4.6**
spruce, Norway (E)	**2.7**
spruce/pine/fir (ComGr)	**4.6**
spruce, sitka (E)	**2.8**
Strobe (D)	**2.15**
sugi (D, E)	**2.5**
sweet chestnut (E)	**3.22**
sycomore, erable (F)	**3.1**
sycamore (E)	**3.1**
Tanne (D)	**2.1**
taun (E)	**3.78**
tchitola (X)	**3.75**
teak (X)	**3.97, 5.7**
teck (F)	**3.97, 5.7**
tiama (X)	**3.34**
tilleul (F)	**3.101**
tola (X)	**3.48**
tola branca (O)	**3.48**
tornillo (X)	**3.24**
Turkey oak (E)	**3.85**
utile (O)	**3.37**
virola (X)	**3.105**
virola, light (E)	**3.105**
walaba (X)	**3.38**
walnut, African (E)	**3.63**
walnut, American (E)	**3.58**
walnut, European (E)	**3.59**
wawa (E)	**3.102**
Weißeiche, Amerikanische (D)	**3.84**
Weißtanne (D)	**2.1**
wengé (X)	**3.67**
western hemlock (D,E,F)	**2.20**
western red cedar (D,E,F)	**2.19**
western whitewood (ComGr)	**4.7**
Weymouth pine (E)	**2.15**
Weymouth, pin (F)	**2.15**
Weymouthskiefer (D)	**2.15**
white meranti (X)	**3.95**
white oak, American (E)	**3.84**
whitewood, European (ComGr)	**4.2**
whitewood, western (ComGr)	**4.7**
yellow (Balau)	**3.90**
yellow birch (E)	**3.13**
yellow cedar (D,E,F)	**2.4**
yellow meranti (X)	**3.94**
yellow pine (E)	**2.15**
yew (E)	**2.18**
Zerreiche (D)	**3.85**

Annex B (informative)
Scheme for assigning the durability rating for the various organisms

Table B.1

Organism	Very durable	Durable	Moderately durable	Slightly durable	Not durable
Fungi, field tests	1_F	2_F	3_F	4_F	5_F
Fungi, laboratory tests[a]	1_B	2_B	3_B	4_B	5_B
Hylotrupes bajulus	D_{Hy}			S_{Hy}/SH_{Hy}	
Anobium punctatum	D_A			S_A/SH_A	
Lyctus brunneus	D_L			S_L	
Termites	D_T		M_T	S_T	
Marine organisms	D_{Ma}		M_{Ma}	S_{Ma}	

[a] So far not applicable as the classification in this Part of EN 350 is is only the basis of field tests or general experience.

Explanation of symbols:

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

Subscripts:

A:	*Anobium punctatum*	B:	Basidiomycetes
F:	Field tests	Hy:	*Hylotrupes bajulus*
L:	*Lyctus brunneus*	Ma:	Marine organisms
T:	Termites		

Annex C (informative) Explanation of symbols in Table 2 and Table 3

Column **Common name** (the capital letters before the name refer to the origin of the name):

- X: ATIBT[a] name
- D: German name
- E: English name
- F: French name
- O: Other names

Columns **Natural durability**

For fungi

- 1: very durable
- 2: durable
- 3: moderately durable
- 4: slightly durable
- 5: not durable

For insects and marine borers

- D: durable
- M: moderately durable
- S: susceptible
- SH: heartwood is also known to be susceptible

- n/a: insufficient data available
- v: the species exhibits an unusually high level of variability

Column **Treatability**

- 1: easily treated
- 2: moderately easy to treat
- 3: difficult to treat
- 4: extremely difficult to treat

- n/a: insufficient data available
- v: the species exhibits an unusually high level of variability

Column **Sapwood width**

- vs: very small (< 2 cm)
- s: small (2 cm to 5 cm)
- m: medium (5 cm to 10 cm)
- b: broad (> 10 cm)
- x: no distinct differentiation between heartwood and sapwood
- (x): generally no distinct differentiation between heartwood and sapwood

[a] Association Technique Internationale des Bois Tropicaux.

Annex D (informative) Bibliography

EN 351-1, *Durability of wood and wood-based products — Preservative-treated solid wood — Part 1: Classification of preservative penetration and retention*[2)].

[2)] In course of preparation.

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National annex NA (informative)
Committees responsible

The United Kingdom participation in the preparation of this European Standard was entrusted by the Technical Sector Board for Building and Civil Engineering (B/-) to Technical Committee B/515, upon which the following bodies were represented:

British Telecommunications
British Wood Preserving and Damp-proofing Association
Chemical Industries' Association
Creosote Council
Department of the Environment (Building Research Establishment)
Electricity Industry in United Kingdom
Institute of Wood Science
Timber Research and Development Association
Timber Trade Federation
Wood Panel Products Federation

National annex NB (informative)
Cross-references

Publication referred to	Corresponding British Standard
	BS EN 335 *Hazard classes of wood and wood-based products against biological attack*
EN 335-1:1992	Part 1:1992 *Classification of hazard classes*
EN 350-1:1994	BS EN 350 *Durability of wood and wood-based products — Natural durability of solid wood*
	Part 1:1994 *Guide to the principles of testing and classification of the natural durability of wood*
EN 351-1[a]	BS EN 351 *Durability of wood and wood based products — Preservative-treated solid wood*
	Part 1: *Classification of preservative penetration and retention*[a]
EN 460:1994	BS EN 460:1994 *Durability of wood and wood-based products — Natural durability of solid wood — Guide to the durability requirements for wood to be used in hazard classes*

[a] In preparation.

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