

SLOVENSKI STANDARD

SIST EN 350-2:1995

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Trajnost lesa in lesnih izdelkov - Naravna trajnost masivnega lesa - 2. del: Naravna trajnost in možnost impregnacije izbranih, v Evropi pomembnih vrst lesa

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

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

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

Ta slovenski standard je istoveten z: EN 350-2:1994

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EUROPEAN STANDARD

EN 350-2

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English version

**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

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 part of this European standard has been drawn up by WG 2 "Natural durability" of the technical Committee CEN/CT 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, Luxemburg, 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

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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

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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 tables 2 and 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 ATIBT¹ 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 | iTeH STANDARD PREVIEW (standards.iteh.ai) | Explanation |
|--------|--|--------------|
| X | SIST EN 350-2:1995 | 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 Tables 2, 3 and 4. Wood properties may vary according to the geographical source.

Information on density (in kilogram per cubic metre) 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.

¹ Association Technique Internationale des Bois Tropicaux.

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, SH_Y, SH_A, DL, ST.

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.

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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 tables 2 to 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*.

| Durability class | Description |
|------------------|-------------|
| D | durable |
| S | susceptible |

In tables 2 and 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 tables 2 and 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 Remarks 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).

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).

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.

Table 1 : Classification of the treatability of wood

| Treatability class | Description*) | Explanation | | | | | | | | |
|---|------------------------------|--|---------|-----------|---------|----------------------|---------|-----------|---------|---------------------|
| 1 | Easy to treat | Easy to treat; sawn timber can be treated 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 | | | | | | | | |
| <p>*) Historically treatability data may use other descriptive terms which approximate to the treatability classes as follows:</p> <table> <tbody> <tr> <td>class 1</td> <td>permeable</td> </tr> <tr> <td>class 2</td> <td>moderately resistant</td> </tr> <tr> <td>class 3</td> <td>resistant</td> </tr> <tr> <td>class 4</td> <td>extremely resistant</td> </tr> </tbody> </table> | | | class 1 | permeable | class 2 | moderately resistant | class 3 | resistant | class 4 | extremely resistant |
| class 1 | permeable | | | | | | | | | |
| class 2 | moderately resistant | | | | | | | | | |
| class 3 | resistant | | | | | | | | | |
| class 4 | extremely resistant | | | | | | | | | |

4.4 Sapwood/Heartwood

In tables 2 and 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.

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4.5 Additional notes in tables 2 and 3

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Where necessary the following additional notes are used:

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

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).