



SLOVENSKI STANDARD

SIST EN 350-1:1995

01-november-1995

Trajnost lesa in lesnih izdelkov - Naravna trajnost masivnega lesa - 1. del: Navodila za osnove preskušanja in klasifikacije naravne trajnosti lesa

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

Dauerhaftigkeit von Holz und Holzprodukten - Natürliche Dauerhaftigkeit von Vollholz - Teil 1: Grundsätze für die Prüfung und Klassifikation der natürlichen Dauerhaftigkeit von Holz

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Durabilité du bois et des matériaux dérivés du bois - Durabilité naturelle du bois massif - Partie 1: Guide des principes d'essai et de classification de la durabilité naturelle du bois

Ta slovenski standard je istoveten z: EN 350-1:1994

ICS:

79.040 Les, hlodovina in žagan les Wood, sawlogs and sawn timber

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en

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EUROPEAN STANDARD

EN 350-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 1994

UDC 674.03:620.193.8:620.193.91

Descriptors: Wood, tests, durability, classifications, pest resistance, fungi, xylophagous animals, termites

English version

**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**

Durabilité du bois et des matériaux dérivés du bois - Durabilité naturelle du bois massif - Partie 1: Guide des principes d'essai et de classification de la durabilité naturelle du bois

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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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1 Scope

This part of EN 350 gives guidance on methods for the determination of the natural durability of untreated solid wood to attack by

- wood-destroying fungi
- insects (beetles and termites)
- marine organisms

and the principles of classification of the wood species based on the results of these test methods.

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 20-1 : 1992** Wood preservatives - Determination of the protective effectiveness against *Lyctus brunneus* (Stephens) - Part 1 : Application by surface treatment (Laboratory method).
- EN 46 : 1988** Wood preservatives - Determination of the preventive action against recently hatched larvae of *Hyloterpes bajulus* (Linnaeus) - (Laboratory method).
- EN 49-1 : 1992** Wood preservatives - Determination of the protective effectiveness against *Anobium punctatum* (De Geer) by egg-laying and larval survival - Part 1 : Application by surface treatment - (Laboratory method).
- EN 113 : 1980** Wood preservatives - Determination of toxic values of wood preservatives against wood destroying basidiomycetes cultured on an agar medium.
- EN 118 : 1990** Wood preservatives - Determination of preventive action against *Reticulitermes santonensis* De Feytaud - (Laboratory method).
- EN 252 : 1989** Field test method for determining the relative protective effectiveness of a wood preservative in ground contact.
- EN 275 : 1992** Wood preservatives - Determination of the protective effectiveness against marine borers.
- ISO 3131 : 1975** Wood - Determination of density for physical and mechanical tests.

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.

3.2 sapwood: Outer zone of wood that, in the growing tree, contains living cells and conducts sap.

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 conduct sap.

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

3.4 transition wood: wood in a zone between the true sapwood and the true heartwood

NOTE : This is only distinguishable in very few wood species (for example *Lophira alata*). In general its durability is intermediate between that of sapwood and heartwood, whereas its treatability is similar to that of heartwood.

3.5 test wood species: The species which is tested to determine its durability.

3.6 reference wood species: The species which is used in the test to be compared with the test wood species.

NOTE: Generally the sapwood of *Pinus sylvestris* and/or *Fagus sylvatica* is used as a reference wood species.

4 Principle of classification

The durability of a wood species to various wood destroying organisms is tested using methods based on relevant European Standards. The range of variation of properties within a species is taken into account by the use of replicate specimens. Results are compared with those of reference species.

Based on test results, the natural durability of the wood species to the various agencies of biological attack is classified within a five grade scale for fungal attack, a two grade scale for dry wood destroying beetles and a three grade scale for termites and marine organisms.

5 Sampling of the wood to be tested

5.1 The origin of test specimens and the number of replicates is of great importance to the validity of the test result.

The reliability of conclusions relating to the natural durability of a wood species increases with the number and diversity of growing sites from which trees are taken and the degree of replication of test specimens from those trees. The recommendations given in 5.2 to 5.6 should be regarded as minima.

NOTE: Information on sampling plans is given in ISO 2859-2.

5.2 A log should be taken from each of at least three trees of the species which is to be tested (see annex A).

Each log should be taken from the main trunk avoiding its extreme ends. Knots and other features which can influence durability should be avoided.

Each log should be of sufficient size to permit the required number of test specimens to be obtained from it. Dimensions for test specimens are given in the respective test methods noted in clause 6.

5.3 Depending upon the part of the wood species which is to be tested the minimum number of test specimens which should be taken for each test variable, for example "test method" or "test organism", is shown in table 1.

5.4 Test specimens should be cut and allocated systematically for a test series in a way which will provide a uniform distribution to the tests to which they are to be exposed.

NOTE: A scheme for this is shown in annex A.

5.5 Additional specimens should be taken to determine the density of the wood species at 12% (*m/m*) moisture content in accordance with ISO 3131.

NOTE: For this purpose, the specimens mentioned in 5.6 may be used.

5.6 If the test method uses mass loss for assessing organism attack, a minimum of three additional specimens should be cut from each zone of each log from which test specimens have been taken, for the purpose of calculating theoretical oven-dry mass (6.1.2) before exposure.

Table 1 : Minimum sampling requirements

Part of log to be tested	Zone from which test specimens are to be taken	*)Minimum number of test specimens from each log	*)Minimum number of test specimens for the wood species for each test variable
Sapwood	Sapwood	5	15
Heartwood	The outer part of the heartwood as close as practicable to the sapwood.	5	30
	The inner part of the heartwood as close as practicable to the pitch, but excluding the region within 3 cm of the pitch	5	
If heartwood and sapwood cannot clearly be distinguished	<u>Log diameter 500 mm or less</u> The outer part of the cross section as close as practicable to the cambium.	5	30
	<u>The inner part of the cross section as close as practicable to the pitch, but excluding the region within 3 cm of the pitch.</u>	5	
	<u>Log diameter more than 500 mm</u> Sample as above + the part of the cross section as close as practicable to the region 0,33 of the radius of the tree from the cambium.	15 (including 10 above)	45 (including 30 above)
Transition wood	Transition zone	5	15
*)This does not include additional specimens that are required for the determination of density or oven-dry mass.			

6 Test methods and classification

6.1 General principles

6.1.1 In the absence of specific European Standard test methods to assess natural durability, test methods should be based on appropriate European Standard test methods designed for testing the effectiveness of wood preservatives.

NOTE 1 : in EN 350-2 the natural durabilities of selected wood species are classified on the basis of general experience.

NOTE 2 : in practice not all of the tests outlined in clause 6 need to be carried out. Only those tests which provide the data required to classify the natural durability of the test wood species to the organisms relevant to the intended end-use, need to be undertaken.

6.1.2 If a test procedure has mass loss as a criterion for assessing organism attack and if the respective standard requires oven-dry mass to be determined this operation should be performed as follows:

- Before exposure :

condition the test specimens and the oven-dry mass specimens (5.6) in a well-ventilated conditioning chamber controlled at $(20 \pm 2)^\circ\text{C}$ and $(65 \pm 5)\%$ relative humidity until constant mass is obtained. Weigh all specimens.

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- After conditioning :

a) expose the test specimens as given in the test method

NOTE : Test specimens to be used in biological tests should not be oven-dried prior to the test.

b) dry the oven-dry mass specimens (5.6) at $(103 \pm 2)^\circ\text{C}$ until constant mass is obtained. Calculate the average percentage moisture content of the oven-dry mass specimens after conditioning (u).

c) calculate the theoretical oven-dry mass of each test specimen before test as follows

$$M_{to} = 100 M_u / (100 + u)$$

where

M_{to} is the theoretical oven-dry mass, expressed in grams, of test specimens

M_u is the mass, expressed in grams, of test specimens after conditioning

u is the average percentage moisture content of test specimens after conditioning.

- After exposure :

Oven dry all specimens at $(103 \pm 2)^\circ\text{C}$ until constant mass is obtained.

The corrected mass loss is the difference between the calculated initial oven-dry mass (theoretical oven-dry mass) and the final oven-dry mass of each test specimen.

6.1.3 If one of the test methods (6.1.1) on which the natural durability test is based requires the use of untreated control specimens, those wood species should be used as the reference species.

If several wood species are tested at the same time, one set of reference specimens is sufficient.

If laboratory test vessels are used reference specimens and test specimens should be tested in separate vessels.

6.1.4 The properties of the test specimen should, as far as possible, be representative for the wood species being tested even if this does not follow the instruction given on sample selection in the relevant test standard.

EXAMPLE 1: If the test method excludes the use of "wood of resinous appearance", but the species to be tested normally has a naturally resinous appearance, this exclusion should be ignored.

EXAMPLE 2: If the test method requires a certain number of growth rings per centimetre this restriction should be ignored.

6.1.5 The sample selection requirement for reference specimens should follow the instructions of the relevant test method.

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6.2 Natural durability to wood-destroying fungi

6.2.1 General

Natural durability to wood-destroying fungi can be assessed by either field tests (6.2.2) or laboratory tests (6.2.3).

If field test data from a temperate climate site are available, they should take precedence over the data from laboratory tests.

If no data from field tests are available, a provisional classification using the data from laboratory tests is possible.

6.2.2 Field test

The field test should be based on EN 252, but using an appropriate number of stakes of the test wood species (see clause 5) in place of the impregnated test stakes described in that standard. Reference stakes of *Pinus sylvestris* sapwood and *Fagus sylvatica* should be used throughout the test. They should be replaced as necessary when they fail.

Field tests for the natural durability should start in early spring (March/April). Inspections should be carried out twice a year in September/October and March/April.