



# SLOVENSKI STANDARD

## SIST EN 460:2023

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SIST EN 460:1995

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### Trajnost lesa in lesnih proizvodov - Navodilo za učinkovitost

Durability of wood and wood-based products - Guidance on performance

Dauerhaftigkeit von Holz und Holzprodukten - Leitfaden zur Bestimmung der Leistungsfähigkeit

Durabilité du bois et des matériaux à base de bois - Guide pour déterminer la performance

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Ta slovenski standard je istoveten z: **EN 460:2023**

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#### **ICS:**

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

**SIST EN 460:2023**

**en,fr,de**



EUROPEAN STANDARD

EN 460

NORME EUROPÉENNE

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ICS 79.040

Supersedes EN 460:1994

English Version

## Durability of wood and wood-based products - Guidance on performance

Durabilité du bois et des matériaux à base de bois -  
Guide pour déterminer la performance

Dauerhaftigkeit von Holz und Holzprodukten -  
Leitfaden zur Bestimmung der Leistungsfähigkeit

This European Standard was approved by CEN on 2 January 2023.

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## European foreword

This document (EN 460:2023) has been prepared by Technical Committee CEN/TC 38 “Durability of wood and wood-based products”, the secretariat of which is held by SIS.

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of an identical text or by endorsement, at the latest by August 2023, and conflicting national standards shall be withdrawn at the latest by August 2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 460:1994.

EN 460:2023 includes the following significant technical changes with respect to EN 460:1994:

- title change;
- the introduction of a decision process for performance specification of wood and wood-based products based on (i) materials and exposure, (ii) presentation of design life and (iii) articulation of consequence of failure.

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

**EN 460:2023 (E)****Introduction**

There is increasing need to understand the service life of wood products, especially in construction. Service life in the Construction Products Regulation (Regulation (EU) No 305/2011 (CPR) and its equivalent in non-EU countries) can be understood as performance within an economically acceptable period, under typical exposure and maintenance scenarios.

This document is concerned with the service life of wood materials and wood products, especially in construction. The purpose of this document is to provide guidance to help the user to select a wood or wood-based material based of appropriate biological durability based on information about the end use environment and the target service life.

For the service life of structures, refer to EN 1990 and EN 1995-1-1.

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## 1 Scope

This document gives guidance on the selection of wood and wood-based products for use in situations where they can be subject to degradation by fungi, wood destroying insects or marine borers. This guidance includes information on factors that can influence the service life of a wood or wood-based product when considering biological degradation. In many end uses, design, workmanship and maintenance will also influence the service life of the wood or wood-based product.

This document is a step toward the evaluation of the service life of a wood product.

This document does not consider:

- 1) the durability characteristics of the glue used in wood-based products;
- 2) the aesthetic function of wood products (discoloration, surface weathering, mould).

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1001-2, *Durability of wood and wood based products — Terminology — Part 2: Vocabulary*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1001-2 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>

- IEC Electropedia: available at <https://www.electropedia.org/>

### 3.1

#### **biological durability**

inherent resistance of a wood species or a wood-based material against wood-destroying organisms

Note 1 to entry: This can be a natural or a conferred durability.

### 3.2

#### **coating**

product, normally applied in a liquid form to a surface, that forms a film possessing protective properties

### 3.3

#### **component**

product manufactured as a distinct unit to serve a specific function or functions

### 3.4

#### **conferred durability**

improved resistance of a wood species to biological degradants provided by a treatment process (chemical, physical, etc.) such as wood preservation or wood modification

### 3.5

#### **consequence of failure (COF)**

significance of product failure in service determined by the outcome of a failure expressed in terms of personnel safety, economic loss, and/or damage to the environment

**EN 460:2023 (E)****3.6****critical biological hazard**

biological hazard (or hazards) most significant in the end use application and its geographical location

**3.7****design life**

service life intended by the designer

**3.8****likelihood of failure**

probability that a wood component will reach its limit state within the design life

**3.9****limit state**

state beyond which the structure (or product) no longer satisfies the relevant design criteria

[SOURCE : EN 1990:2002, Clause 3.1.2.14 (CEN/TC250/SC10 N 523)]

Note 1 to entry: The limit state is commonly reached before loss of function is complete.

**3.10****material resistance**

inherent ability of a material to endure a specific biological hazard through a combination of natural and/or conferred durability and moisture dynamic behaviour relevant for the different biological agents

**3.11****moisture dynamics**

physical characteristic of a wood material or wood product to respond to changing environmental conditions and take up and release moisture (vapour or liquid)<sup>23</sup>

Note 1 to entry: The moisture dynamics of a wood species or a wood-based material can be tested using the method described in CEN/TS 16818.

**3.12****natural durability**

inherent resistance of a wood species to attack by wood-destroying organisms

**3.13****overlay**

one or more sheets or films, for example impregnated paper, plastics, resin film, metal that protect a wood surface

**3.14****performance**

ability of a wood species or a wood-based material to withstand deterioration over time and fulfil essential functions

**3.15****permeability to water**

ease with which water penetrates a wood-based matrix (wood of a particular species, wood-based material)



### 3.16 service life

period of time after installation during which a building, structure or component parts meet or exceed the performance requirements

Note 1 to entry: This standard does not consider the service life of entire structures, it is limited to the properties of the material and service life of components.

### 3.17 serviceability

ability of a structure or structural member to satisfy, with planned maintenance, its design performance requirements over the design service life

[SOURCE : EN 1990:2002, Clause 3.1.2.3 (CEN/TC 250/SC 10 N 523)]

### 3.18 wood modification

non-biocidal process of a chemical, biological, or physical alteration of the cell wall substance of wood, resulting in a permanent desired property enhancement to primarily enhance biological durability and dimensional stability

Note 1 to entry: This includes thermal modification and chemical modification.

### 3.19 wood preservative treatment

application of wood preservative products in liquid form for the preventive treatment of wood resulting in a desired improvement of their properties in order to protect them from degradation by wood destroying fungi, wood-destroying insects (termites and beetles) or marine borers

Note 1 to entry: The usual processes are superficial (soaking or spraying) or penetrating treatment (double vacuum autoclave or vacuum autoclave and pressure).

## 4 Performance

### 4.1 General

When wood-destroying organisms are likely to degrade wood in service, a suitable approach for meeting service life needs to be selected. There are two principal approaches:

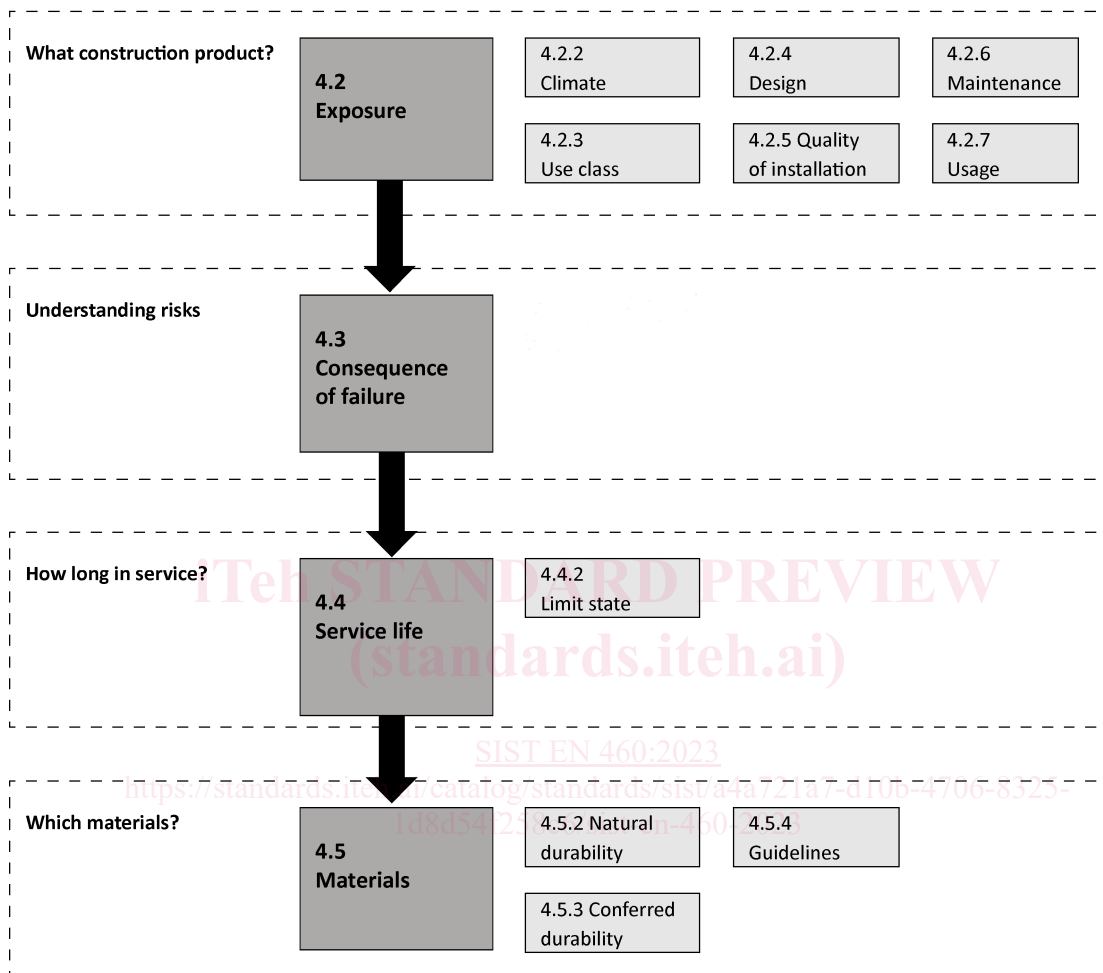
- 1) by design - changing the habitat conditions e.g. with wood destroying fungi minimizing the moisture risk to which the wooden component is exposed or e.g. with insects by denying the access through construction measures;
- 2) by durability - either select the heartwood of a wood species of sufficient natural durability or ensure sufficient conferred durability by treatment with a wood preservative, wood modification or non-biocidal treatment to manage the challenge presented in the use environment.

Typically, it is a combination of both.

This standard provides information to aid the user in the choice of a wood or wood-based material for a product, knowing its use class with the corresponding end use environment and the envisioned target service life. No attempt has been made to quantify the service life that could be expected from a particular combination. This is considered in national interpretation documents e.g. standards, guidelines, technical reports and service life prediction tools.

## EN 460:2023 (E)

A schematic diagram to illustrate a decision-making process for determining the performance of a wood product is shown in Figure 1. The features defining the exposure of a material or product are multifaceted. Considered together, the exposure and the service life requirement for the product is the framework for identifying suitable wood and wood-based materials to meet these requirements.



**Figure 1 — Schematic illustration of a decision process for performance specification linked to clauses in this document**

## 4.2 Exposure

### 4.2.1 General

The exposure is the challenge presented to the wood material or product and comprises many features. The performance of each component will deteriorate or improve at a rate depending on climate, use class, design, quality of installation, maintenance and usage.

### 4.2.2 Climate

The geographical location indicates the local climate and most significantly for wood products in UC 3 (e.g. exterior wood cladding) the moisture availability, as well as solar UV radiation, which can impact on

the rate of deterioration. The geographical location also determines whether biological hazards are likely to be present or not (e.g. termites).

Furthermore, consideration should be given to the micro-climate in service (e.g. accumulation of condensation under a waterproof roof covering). The possibility to estimate the moisture situation (e.g. hygrothermal simulations) should follow EN 15026.

#### 4.2.3 Use class

The service situations in which wood is exposed to different environments and the corresponding likelihood of susceptibility to biological degradation have been divided into use classes which are defined in EN 335. Guidance on the application of these use classes to solid wood is given in EN 335. (See ISO 15686-8:2008, Annex A, Clauses A.1.5 Factor D – Factor category – indoor environment and A.1.6 Factor E — Factor category: outdoor environment).

#### 4.2.4 Design

The design detailing and workmanship of the wood material in a component has a significant impact on the performance of the component. Poor design features that enable water trapping increase exposure and can accelerate degradation whilst good design that excludes moisture ingress and/or easily allows redrying during the service life of the component can reduce exposure and avoid degradation. National guidelines for product categories should be referred to for best practice design features. (See ISO 15686-8:2008, Annex A, Clause A.1.3 Factor B — Factor category: design level).

Enhancing performance by design means taking planning, constructive, building physics and organizational measures which prevent or limit a reduction in the functionality of wood and wood-based materials, especially by fungi, insects or marine borers during their service life, and also prevent damage from excessive swelling and shrinkage of the wood and wood-based materials.

Some of these measures are enshrined in national building guidelines. These measures include restriction or limitation of access of humidity, insects or marine borers to wood and wood-based materials e.g. by covering or coating, calculations or simulations of moisture subject to climate conditions and protection against undesirable changes in the moisture content of the materials during storage, transport, assembly and installation.

In many cases, the desired performance of any measures adopted can only be ensured if the measures and the wood component are maintained to an appropriate level (4.2.6).

#### 4.2.5 Quality of installation

The activity of installing a wood product into service is known to have an impact on performance and national best practice construction site guidance should be available. (See ISO 15686-8:2008, Annex A, Clause A.1.4 Factor C — Factor category: work execution level).

#### 4.2.6 Maintenance

Maintenance is the combination of technical, administrative and organizational measures during the service life of an object, which serve to maintain or restore its functional condition so that it can fulfil the required function. In many end uses, maintenance can significantly extend service life. Statements concerning service life or requirements of durability for wood materials and wood products can only be based on maintained buildings.

Basic measures of maintenance are regular servicing (e.g. cleaning of surfaces and gutters), inspection, repair and improvement. A typical maintenance schedule, depending on the exposure and the actual component, could be:

- servicing and cleaning in specific intervals depending on 4.2.2, 4.2.3, 4.2.4, 4.2.7 and Annex A;
- inspection by the user or owner when servicing and cleaning;