SLOVENSKI STANDARD
oSIST prEN 460:2019

01-januar-2019

Trajnost lesa in lesnih izdelkov - Naravna trajnost masivnega lesa - Zahteve po trajnosti lesa, ki se uporablja v posameznih razredih ogroženosti

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

Dauerhaftigkeit von Holz und Holzprodukten - Natürliche Dauerhaftigkeit von Vollholz - Leitfaden für die Anforderungen an die Dauerhaftigkeit von Holz für die Anwendung in den Gebrauchsklassen

Durabilité du bois et des matériaux dérivés du bois - Durabilité naturelle du bois massif - Guide d'exigences de durabilité du bois pour son utilisation selon les classes de risque

Ta slovenski standard je istoveten z: **prEN 460**

ICS:

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

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EUROPEAN STANDARD

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Will supersede EN 460:1994

English Version

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

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 38.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 460:2018) has been prepared by Technical Committee CEN/TC 38 “Durability of wood and wood-based products”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 460:1994.

Compared to the current EN 460, the following modifications apply:

— general modifications.

Introduction

There is increasing need to understand and be able to communicate with users the service life of wooden components, especially in construction. Service life in the Construction Products Regulations is performance within an economically acceptable period, under normal exposure and normal maintenance. It is usually considered to be how many years a construction component will provide satisfactory function in its use environment. This standard is concerned with performance classification for wood and wood-based products, the first building block for understanding service life for construction products and other wood products.

Architects, construction engineers, the public, life cycle assessments (EN 15804) and other standards (e.g. ISO 15686 series) require information on service life of construction products. Internationally wood experts are currently developing methods and techniques to match data on durability of wood against biological hazards with service life expectation, considering numerous influencing factors. As long as reliable methods continue to be unavailable to prevent misleading interpretation of durability data and to avoid unjustified expectations of service life the following is stated:

As for other materials wood in outdoor applications or exposed to high moisture content will age in a distinct manner.

Wood utilized in the correct way can be in service for hundreds of years, as examples worldwide show.

At present due to the variety of conditions under which wood may be in service a direct, simple and reliable deduction from durability classes to service life under real-use conditions is not available.

In addition to the durability against biological hazards service life depends on wood species, construction details, climate, maintenance and many other issues.

The shorter the forecasting horizon the higher the probability that an estimated service life will be reached in practice.

If wood-destroying organisms are likely to attack wood in service, a suitable pathway for meeting service life needs to be selected. There are principally two pathways (i) by durability - either select a wood species of sufficient natural durability or ensure the durability characteristics of the wood are enhanced by treatment with a wood preservative, chemical modification or non-biocidal treatment to manage the challenge presented in the use environment or (ii) by design for durability - minimizing the moisture risk (or exposure dose) the wooden component is exposed to or by denying the access for organisms through construction measures. Typically it is a combination of both to deliver a reasonable service life.

This standard allows a user to choose a wood or wood-based material for a product and knowing its durability class alongside the use class of the end use environment establish a performance classification. No attempt has been made to quantify the working life that could be expected from a particular combination which is reflected in national interpretation documents (Annex D).

This standard includes scope for benchmark performance testing e.g. if the product performs better or equal to the existing product in service, which can be used for CE marking purposes.

1 Scope

This document gives guidance on the selection of wood species based on their biological durability and selection of wood materials based on their specific enhanced resistance (wood preservative treatment, wood modification and other non-biocidal methods) to attack by wood-destroying organisms for use as solid wood, as engineered wood products (e.g. glulam) and as wood based composites (e.g. plywood, wood polymer composites) in the use classes defined in EN 335.

This standard does not consider:

i) the durability characteristics of the glue used in engineered wood products or wood-based composites;

ii) the aesthetic function of wood products (discoloration, surface weathering, mould);

iii) the strategy for protection of products as it will be different based on priorities of the user and client and the type of product e.g. glulam compared to plywood.

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 335:2013, *Durability of wood and wood-based products — Use classes: definitions, application to solid wood and wood-based products*

EN 350, *Durability of wood and wood-based products — Testing and classification of the durability to biological agents of wood and wood-based materials*

CEN/TS 16818, *Durability of wood and wood-based products — Moisture dynamics of wood and wood-based products*

EN 599-1, *Durability of wood and wood-based products — Efficacy of preventive wood preservatives as determined by biological tests — Part 1: Specification according to use class*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
benchmark performance
performance of an existing product well-known in the market place in that end use

3.2
biological durability
quality of resistance against wood destroying organisms

Note 1 to entry: This inherent resistance is due to the presence of natural components that can exhibit different levels of toxicity towards biological organisms and/or to anatomical particularities or a specific constitution of certain wood-based materials.

3.3
component
product manufactured as a distinct unit to serve a specific function or functions

3.4
consequence of failure (COF)
significance of the components failure in service expressed as a risk and a tolerance of that risk

3.5
critical biological hazard (CBH)
biological hazard or hazards that are most significant for the end use application and its geographical location (see Annex E)

3.6
desired service life
how long a consumer requires a product to function

Note 1 to entry: National variation are refered in Annex D.

3.7
design life (DL)
service life intended by the designer as support to the client to enable specification decisions

3.8
estimated service life (ESL)
service life that a building or parts of a building would be expected to have in a set of specific in-use conditions, determined from the reference service life data, having taken into account any differences from the reference in-use conditions

3.9
exposure dose
scale which respresents the extent to which the product is challenged by moisture, temperature and organisms as a result of climate and design

3.10
limit state
point where a product is deemed to have failed

Note 1 to entry: The limit state is reached earlier than loss of function (failure) occurs.

Note 2 to entry: For Use Class 3 models this is the on-set of decay.

3.11
material resistance
intrinsic ability of a material to endure a specific biological challenge

3.12
material resistance dose
scale that represents a combination of inherent durability and its moisture dynamic behaviour relevant for the different biological agents

3.13
moisture dynamics
physical characteristic of a wood species or wood product to respond to environmental conditions and take on and release moisture (vapour or liquid)

3.14
performance class
scale to enable classification of broad performance outcome as short, medium or long

3.15
performance level
behaviour of the product in terms of its effectiveness in service defined as a combination of exposure dose and material resistance dose

3.16
permeability to water
ease with which water penetrates a wood-based matrix (wood of a particular species, wood-based material) and is released by evaporation

3.17
reference service life (RSL)
service life of a product, component, assembly or system which is known to be expected under a particular set of in-use conditions which can form the basis for estimating the service life under other in-use conditions

3.18
service life
period of time after installation during which a component part meets or exceeds the performance requirements due to the amount of deterioration that can be tolerated before the component fails

3.19
wood modification
process of a chemical, biological or physical change of wood resulting in a permanent desired property enhancement to primarily enhance biological durability and dimensional stability e.g. thermal modification and acetylation

Note 1 to entry: The mode of modification action should be nonbiocidal.

4 Use class

The service situations in which wood is susceptible to biological attack have been divided into five Use classes which are defined in EN 335. Guidance on the application of these use classes to solid wood is given in EN 335. The required efficacy of preventive wood preservatives according to Use classes are specified in EN 599-1.

5 Durability classes

Classification systems for the durability of solid wood and wood-based materials on resistance to attack by various wood-destroying organisms are given in EN 350.

6 Consequence of failure

This is an important element to plan the service life of wooden components. The higher the consequences of failure the more conservative measures have to be taken to secure the performance targets. The consequence of failure of structural elements is the highest as a life safety issue, the consequence of failure of a cladding board is lower concerning life safety. Further targets are in the Construction Product Regulations (CPR) which lists seven essential basic requirements for construction works. CoF often considers life safety and ease of maintenance or replacement (Annex D).

If CoF are unacceptable then higher material resistance or techniques to reduce exposure dose need to be selected. Although different components can fall into the same Use class, the likelihood of failure or the consequence of failure can be quite different and these should be assessed in accordance with a recognized process. Each component should be classified based on the likelihood and the severity of the consequences of failure.

7 Material resistance in the various Use classes

7.1 General

The natural durability of a wood species should be considered separately for each wood-destroying organism. In practice supplies of sawn timber may include sapwood as well as heartwood. If the proportion of sapwood present is such that its loss would have adverse implications for the performance of the component, or if the sapwood and heartwood cannot be distinguished, the durability of the whole component should be regarded as equivalent to that of the sapwood.

In addition to the natural durability, there are other factors that influence performance (chemical and physical) which should also be taken into consideration in the selection of a wood species and the decision whether or not its durability requires enhancement to meet a desired service life.

In Use Class 3 the significance of moisture dynamics is of most influence compared with other Use Class aplications. Wood with low permeability may acquire lower moisture contents under intermittent wetting conditions, compared to a more permeable species, and will therefore have a reduced risk of fungal attack under such service conditions.

Moisture has a significant influence on the mechanical and physical properties and on the biological durability of wood and wood-based products. For example, the test method described in the European Technical Specification CEN/TS 16818 provides a basis for assessment of the moisture dynamics of wood and wood-based products in service. The method permits the determination of the water uptake and moisture release which may provide important information on the susceptibility to the onset of fungal attack in certain end uses.

Information on some further factors is given in Annex A.

For each product application, the performance against biological agents needs to be considered, and the critical biological hazard needs to be identified.

7.2 Durability: wood-destroying fungi

Guidance on the use of a wood species in the various use classes depending upon their degree of natural durability is given in Table 1. In many cases the natural durability of the chosen wood species will be sufficient to meet service life expectations. If the natural durability of the chosen species is inadequate, a means to enhance material durability or means to reduce the exposure shall be considered. Wood and wood-based products of lower durability may be used if exposure control data and/or moisture dynamic data are available and sufficient as illustrated with a flow diagram in Figure 1. Annexes A, B, and C provide guidance on verifying the effect of exposure control data and/or moisture dynamic data.

Table 1 — Wood-destroying fungi — Recommended minimum durability classes of wood species for use classes

Use Class	Performance class		
	short	**medium**	**long**
1	5	5	5
2	5	4	3
3.1	4	4	3
3.2	3	3	2
4	2	2	1
5	2	1	1
	Performance class		
	short	medium	long
Design working life category according to EC0 EN 1990:2002, Table 2.1	1 and 2	3	4 and 5