SLOVENSKI STANDARD
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Trajnost lesa in lesnih izdelkov - Razlagalni dokument za standarde, ki so povezani z zahtevami glede učinkovitosti in s specifikacijami sredstev za zaščito lesa

Durability of wood and wood-based products - Interpretation document for standards related to efficacy requirements and specifications of wood preservatives

Dauerhaftigkeit von Holz und Holzprodukten - Anwendungsdokument für Normen zu Anforderungen an die Wirksamkeit und Eigenschaften von Holzschutzmitteln

Durabilité du bois et des produits dérivés - Document d'interprétation des normes relatives aux exigences d'efficacité et aux spécifications des produits de préservation du bois

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Durability of wood and wood-based products - Interpretation document for standards related to efficacy requirements and specifications of wood preservatives

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Contents

Page

European foreword

This document (CEN/TR 17810:2022) has been prepared by Technical Committee CEN/TC 38 “Durability of wood and wood-based products”, the secretariat of which is held by AFNOR.

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Introduction

CEN standards are regarded as the preferred reference for the assessment of the efficacy of wood preservatives for the authorization of biocidal products in the European market, in compliance with the Biocidal Products Regulation (528/2012).

Efficacy requirements are specified in EN 599-1 (preventive action) and EN 14128 (curative action).

This document aims to provide information on the technical and scientific background of the test methods listed in the CEN standards, in particular those published by CEN/TC 38, as well as to outline the tools available to support efficacy claims for wood preservatives.

1 Scope

This document is intended to facilitate the interpretation and use of the European Standards where the testing and specification of wood preservative products are described. It aims to assist users (manufacturers, specifiers, authorities, etc.) to correlate the choice of selected test methods, wood substrates and biological agents with the efficacy requirements of wood preservatives based on their claimed target organisms and end use. This document is a source of supplementary information to the relevant standards and cannot be used as a standalone document.

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 599-1:2009+A1:2013, *Durability of wood and wood-based products - Efficacy of preventive wood preservatives as determined by biological tests - Part 1: Specification according to use class*

EN 1001 (all parts), *Durability of wood and wood-based products - Terminology*

EN 14128, *Durability of wood and wood-based products - Efficacy criteria for curative wood preservatives as determined by biological tests*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 599-1, EN 1001 (all parts) and EN 14128 apply.

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

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

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

4 General principles

The test methods and efficacy criteria discussed in this document characterize the ability of a preservative to protect wood from attacking organisms. The techniques adopted in each of the test methods are not intended to reproduce any particular industrial wood treatment, but to obtain satisfactory penetration and distribution of the preservative in the test specimens. It should also be emphasized that the test conditions are the most favourable for wood decay and, in the case of laboratory tests, the decay organisms used were selected as representative of a wider variety of organisms that can affect the wood in use. In general, the test methods make it possible to determine the preventive or the curative action of a preservative against wood destroying organisms, e.g. insects, fungi and marine borers. In the case of preventive treatments, the test requirements for a preservative are specified in EN 599-1 and depend on the use class as defined in EN 335. In the case of curative treatments, the test requirements for a preservative are specified in EN 14128.

5 Selection of wood substrates for the products under test

5.1 Testing against decay fungi

For testing against brown rot fungi, pine sapwood is used because this is a suitable representative for all wood species, both softwoods and hardwoods. Brown rots are not tested on hardwoods because of their lower virulence on these types of woods.

However, since a product can be less effective in hardwoods than in softwoods against white rot or soft rot fungi and if efficacy in hardwoods is specifically required, data from tests on hardwoods, of which beech is a suitable representative, are necessary.

5.2 Testing against termites

For testing against European termites, pine sapwood is used because this is a suitable representative for all wood species, both softwoods and hardwoods.

For termites of tropical species the choice of the wood substrate depends on the feeding habits of the individual species.

5.3 Testing against beetle larvae

Test standards for beetle larvae specify wood species based on the feeding preferences of the relevant beetle species. For example, pine sapwood is used for *Hylotrupes bajulus* and oak sapwood is used for *Lyctus brunneus*. The wood species specified in the test standard is then representative of all wood species to which that beetle can cause damage.

5.4 Testing against marine borers

For testing against marine borers, pine sapwood is used because this is a suitable representative for all wood species, both softwoods and hardwoods. When a specific claim for hardwoods is made, hardwoods species of local importance should be used.

6 Treating the test specimens with the product under test

Wood preservatives can be applied in practice by penetrating treatment (e.g. diffusion treatment, double vacuum process, vacuum/pressure process), by superficial application (e.g. brush and spray techniques, dipping, also combined with injection). Depending on the intended application process of the product in practice, whether penetrating, superficial, or both, the corresponding application process specified in the relevant test method will be used, even though this may not correspond precisely with the process intended for the test product in practice. The techniques adopted in each of the test methods are intended to obtain satisfactory penetration and distribution of the preservative in the test specimens.

NOTE 1 The brv for curative products used by injection is derived from superficial treatments, since there are no standard methods using injection currently available.

Tests for penetrating processes commonly require a range of preservative retentions to be tested. The intention is to deliver a result in terms of the “toxic values” of the wood preservative, i.e. the lowest concentration or retention used in the test at which the wood is adequately protected and the next concentration or retention below this, at which the wood is not adequately protected. The range of retentions is achieved by diluting the wood preservative in water or an appropriate solvent.

When testing ready to use products at one single retention level, dilution may be necessary to achieve the required retention of the wood preservative in the penetration process, while ensuring that the application rate recommended by the manufacturer is not exceeded.

NOTE 2 EN 113-1 tests the efficacy against basidiomycete fungi of a wood preservative impregnated into wood blocks using a pressure process. However, the brv derived from this test can be used to determine the efficacy of a preservative intended for application by a superficial process. In this case, as described in EN 599-1, the brv expressed in g/m^2 for superficial application can be calculated multiplying by 2 the brv expressed in kg/m^3 derived from the EN 113-1 test. The calculation is based on the assumption that superficially applied preservatives penetrate on average 2 mm into the wood, though evidence of penetration is not required for these products.

7 Artificial ageing of treated wood

Artificial ageing procedures, which can be carried out in the laboratory, have been designed to account for the most relevant factors responsible for the loss of activity of treatments, i.e. evaporation (EN 73) and leaching (EN 84). When both ageing procedures are required, two sets of samples are to be prepared, each one being subjected to one ageing procedure before testing. The small dimensions of the test specimens lead to considerable acceleration of the ageing process. The effect of artificial ageing cannot be directly correlated to a certain time of use, mainly due to the multiple and varying environmental factors which affect wood performance in service.

Artificial weathering cycles using UV light exposure are an alternative option to natural weathering in the blue-stain test EN 152.

Ageing tests are not required when testing the curative efficacy of products, as the product is designed to eradicate an existing infection and not to provide protection over extended periods of time.

8 Wood attacking organisms

8.1 General

Since there can be no question of testing the efficacy of wood preservatives against all the biological agents liable to attack wood in service, several factors were taken into account in the selection of the most suitable organisms to act as representatives to cover all wood attacking organisms that may be encountered:

— the economic importance of the damage done by these organisms to wood in service, their frequency and geographical distribution;

— the extent to which they represent a type of deterioration;

— their suitability to be cultivated/reared under laboratory conditions;

— the amount of damage that they are able to cause in a relatively short time;

— the confidence that can be placed in the test results, justified by past experience, especially with regard to reproducibility of results.

8.2 Fungi

8.2.1 General

The fungi included represent the major types of rot that are liable to destroy wood in service and the blue-stain fungi which cause discoloration to the wood surface. Account is also taken of the specificity of these organisms for softwoods or hardwoods or, alternatively, their broad spectrum of action. In addition to the above factors, the choice of decay fungi in the test standards is also influenced by their tolerance to certain categories of fungicide.

The definition of the fungi used as test organisms has not been limited to the designation of the species, but also involves specifying the strain to be used. The virulence of the attacks and their sensitivity to the fungicides varies not only from one species to another but also from one strain to another. Regular checks are therefore made, to ensure that the organism retains its capacity for destructive action against the wood. A virulence control is usually part of the test set-up.

The obligatory use of these strains to characterize a product may be complemented by using additional optional fungi if these are of particular interest for a geographical region or for a particular envisaged end use. ln these cases, it is necessary to be assured of the performance of the chosen species and strains under the artificial conditions of laboratory tests, based on the virulence criteria defined in the relevant standard test.

Efficacy against soft-rot fungi is assessed in laboratory tests using naturally contaminated soil, therefore there cannot be a strict control over the type of organisms involved.

8.2.2 Basidiomycetes

Products intended for protection against basidiomycetes, are tested in all cases against brown rot fungi. No single fungus has been found to adequately represent all brown rot fungi. EN 113-1 requires tests to be conducted against three brown rot fungi which together are considered appropriate representatives for all brown rot fungi. All three fungi shall be used in the test to adequately test the efficacy of a wood preservative against brown rot fungi.

In cases where protection against white rot is required, a single white rot fungus (*Trametes versicolor*) has been found to be an appropriate representative for all white rot fungi.

Obligatory species and strains are listed in the relevant standards.

NOTE Figure A.1 in Annex A shows the pathways to determine which tests are required depending on the claimed efficacy of the product.

8.2.3 Soft rot

Efficacy against soft rot fungi (Ascomycetes) is assessed in laboratory soil tests (ENV 807). The challenge organisms are naturally present in the substrate and do not need to be cultivated. This implies a certain variation of the microorganisms in different tests, however careful selection of soil and the correct control of soil moisture content ensures that soft rot is a significant decay hazard.

8.2.4 Blue-stain fungi

Efficacy against blue stain fungi is required as an additional test for products claimed to protect wood from blue-stain (EN 152). A spore suspension containing a mix of spores of two blue staining fungi is used. Preservative treated test blocks may also be subject to blue stain fungi other than those used in the spore suspension during the natural weathering procedure described in the test method (where this is used).

8.2.5 Sapstain and mould fungi

Efficacy against sapstain and mould fungi is assessed in a field test described in CEN/TS 15082 using a susceptible pine species as the reference species (e.g. Scots pine, Corsican pine, maritime pine). Additional wood species may be used, if they are of particular importance for certain countries.

8.3 Insects

8.3.1 Coleoptera

8.3.1.1 General

Three insect species of great economic importance in Europe, belonging to the order Coleoptera, have been included, for which there are specific test methods which may vary according to whether the action is curative or preventative:

— *Hylotrupes bajulus* (Linnaeus), Cerambycidae;

— *Anobium punctatum* (de Geer), Ptinidae;

— *Lyctus brunneus* (Stephens), Bostrichidae.

The methods for assessing the efficacy against insects are different depending on the types of insect in question, their method of entry into the wood and their feeding habits, and on whether the preservatives are to be used for preventative treatment on sound wood or for the curative treatment of wood that has already been infested by insects.

Existing EN or national standards can be adapted to test other insect species than those listed in the scope of this document, provided that the adaptations are clearly described and that the biology of the test organisms is taken into account and considered prior to their phylogenetic or systematic relationship.

8.3.1.2 Testing of preventative preservatives

For products applied by a penetrating process, the methods in EN 47 for *Hylotrupes bajulus*, EN 49-2 for *Anobium punctatum* and EN 20-2 for *Lyctus brunneus* make it possible to determine the toxic values of the preservatives necessary to prevent the development of larvae. The test method varies depending on what is most appropriate for the insect. EN 47 specifies the use of *Hylotrupes bajulus* larvae within a maximum of three days of hatching. An optional additional test may be conducted using larvae of various sizes allowing data to be acquired on how this affects efficacy.

EN 49-2 and EN 20-2 specify the use of eggs and larvae hatching from these eggs from *Anobium punctatum* and *Lyctus brunneus*, respectively.

For superficially applied preservatives, EN 46-1 for *Hylotrupes bajulus* and EN 49-1 for *Anobium punctatum* measure the efficacy on the basis of penetration of recently hatched larvae through a treated surface layer and their establishment in the deeper parts that have not been impregnated by the preservative. The possible effect of a superficially applied wood preservative on eggs of *Hylotrupes bajulus* can be tested according to EN 46-2. For *Lyctus brunneus*, EN 20-1 tests the ability of a superficially applied preservative to prevent the development of infestation from egg-laying.

NOTE Figure A.2 shows the pathways to determine which tests are required depending on the claimed efficacy of the product.