SLOVENSKI STANDARD
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Trajnost lesa in lesnih proizvodov - Preskusna metoda proti glivam odprtotrosnicam - 1. del: Ocenjevanje biocidne učinkovitosti zaščitnih sredstev za les

Durability of wood and wood-based products - Test method against wood destroying basidiomycetes - Part 1: Assessment of biocidal efficacy of wood preservatives

Dauerhaftigkeit von Holz und Holzprodukten - Prüfverfahren gegen Holz zerstörende Basidiomyceten - Teil 1: Bewertung der bioziden Wirksamkeit von Holzschutzmitteln

Durabilité du bois et des matériaux dérivés du bois - Méthode d'essai vis-à-vis des champignons basidiomycètes - Partie 1 : Détermination de l'efficacité protectrice de produits de préservation

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ICS:

71.100.50 Kemikalije za zaščito lesa Wood-protecting chemicals

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EUROPEAN STANDARD

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Durability of wood and wood-based products - Test method against wood destroying basidiomycetes - Part 1: Assessment of biocidal efficacy of wood preservatives

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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 113-1:2018) 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 European Standard supersedes EN 113:1996 and EN 113:1996/A1:2004.

Compared to current EN 113, the following modifications are:

— a second part has been included;

— the first part corresponds to the EN 113:1996 document;

— the two parts of the new EN 113 deal with similar testing but relate to a different scope.

Introduction

This document specifies a laboratory method of test, which gives a basis for the assessment of effectiveness of a wood preservative against wood destroying basidiomycetes. By using this method it is possible to determine the loading at which impregnated wood of a susceptible species may be regarded as adequately protected under the conditions of test.

This laboratory method provides one criterion by which the efficacy of a product can be assessed, and this criterion should be used to judge the likely effectiveness of the preservative taking into account the methods of application likely to be used.

The procedures described in this standard method are intended to be carried out by suitably trained and/or supervised specialists. Appropriate safety precautions should be observed throughout the use of the standard.

1 Scope

This document specifies a method for determining the efficacy of wood preservatives applied to wood by penetration treatment against wood destroying basidiomycetes cultured on a malt extract agar medium.

The method is applicable to formulated products or to their active ingredients.

NOTE This method can be used in conjunction with an ageing procedure, for example EN 73 or EN 84.

Annex A (informative) contains an example of a test report.

Annex B (informative) contains some methods of sterilization.

Annex C (informative) contains information on the test vessels.

Annex D (informative) contains information on test fungi.

Annex E (informative) contains a recommended but non-comprehensive list of optional fungi.

2 Normative references

There are no normative references in this document.

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
representative sample
sample having its physical or chemical characteristics identical to the volumetric average characteristics of the total volume being sampled

3.2
supplier
sponsor of the test

4 Principles

Test specimens of a susceptible wood species impregnated with increasing concentrations of wood preservative solutions and reference timber test specimens are exposed to attack by pure cultures of basidiomycetes. After a prescribed period of incubation under defined conditions, the percentage loss in dry mass of the test specimens is used to establish the biocidal efficacy of the product under test.

5 Test material and apparatus

5.1 Biological material

5.1.1 General

The test fungi to be used as follows:

5.1.2 Obligatory fungi in all cases (see also Annex D)

— *Coniophora puteana* (Schumach.) P. Karst) (BAM Ebw. 15) on softwood:

Loss in mass in percentage in 16 weeks of Scots pine sapwood specimens: minimum 20 % *(m/m).*

— *Rhodonia placenta* (Fr.) Niemelä, K.H. Larss. and Schigel[1] (FPRL 280) on softwood:

Loss in mass in percentage in 16 weeks of Scots pine sapwood specimens: minimum 20 % *(m/m).*

— *Gloeophyllum trabeum* (Persoon) Murrill (BAM Ebw. 109) on softwood:

Loss in mass in percentage in 16 weeks of Scots pine sapwood specimens: minimum 20 % *(m/m).*

5.1.3 Obligatory fungus for particular hazards (see also Annex D)

— *Trametes versicolor* (L.) Lloyd[2] (CTB 863 A) on hardwood and/or on softwood, as appropriate:

Loss in mass in percentage in 16 weeks of beech specimens: minimum 20 % *(m/m);* of Scots pine sapwood specimens: minimum 15 % *(m/m).*

NOTE For specific regional uses or conditions, it is also possible to select other fungi on an optional basis[3].

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[1] Former name: *Poria placenta* (Fries) Cooke sensu J. Eriksson [Synonym: *Poria monticola* Murrill]

[2] Former name: *Coriolus versicolor* (Linnaeus) Quelet

[3] See Annex E for a non-comprehensive list of optional fungi.

5.1.4 Maintenance of strains

The strains shall be maintained and treated so that its virulence is conserved and ensured (see Annex D).

The strains shall be maintained and treated (frequency of subculturing, alternation of culture media, etc.) in accordance with the instructions of their laboratory of origin (see D.2).

NOTE 1 The parent strain is maintained in the laboratory of its origin so as to conserve and to ensure its vigour.

If tests are not undertaken regularly or if a strain shows signs of degeneration a new standard culture of the strain should be obtained from the laboratory of its origin for each test (see D.2).

When new strains are received, the virulence shall be tested to ensure the strain can achieve the minimum loss in mass (see 5.1.2 and 5.1.3).

5.2 Products and reagents

5.2.1 Culture medium

The culture medium is a malt agar medium with the following composition:

— malt extract:

  — in concentrated form: (50 ± 0,5) g; in powder form: (40 ± 0,5) g.

— agar causing no inhibition of growth of fungi: (20 ± 0,5) g to (30 ± 0,5) g;

— de-ionized water; quantity to make up to 1000 g.

NOTE Preferably use water conforming to grade 3 of ISO 3696.

Prepare this medium by warming the mixture in a boiling water bath or a steam bath, stirring until completely dissolved.

Place in each culture vessel a sufficient quantity of the medium to provide a minimum depth of 3 mm to 4 mm when in its in-use position. Close the vessels as specified in 5.3.9 and sterilize in the autoclave at 121°C for 20 min. Let the vessels cool in their in-use position.

5.2.2 Solvents and diluents

For water soluble preservatives:

— de-ionized water (see 5.2.1).

For preservatives to be diluted or dissolved in an organic solvent:

— suitably volatile liquids, that leave no residue in the wood having a toxic effect on the fungi at the end of the post-treatment conditioning period.

NOTE Toluene and xylene of recognized analytical grade have been found suitable.

5.3 Apparatus

5.3.1 Conditioning chamber

Well ventilated and maintained at (20 ± 2)°C and (65 ± 5)% relative humidity.

5.3.2 Culture chamber

Incubator or room, dark and maintained at (22 ± 2)°C and (70 ± 5)% relative humidity.

5.3.3 Drying oven

Maintained at (103 ± 2)°C.

5.3.4 Treatment vessels

Of a material that does not react with their contents.

5.3.5 Ballast

To prevent floating of test specimens. The ballast shall not react with any materials with which they come into contact during the test.

5.3.6 Safety equipment and protective clothing

Appropriate for the test product and the test solvents, to ensure the safety of the operator.

5.3.7 Vacuum vessels

Fitted with stopcocks.

5.3.8 Vacuum pump

Fitted with a pressure gauge and capable of attaining a pressure of 0,7 ± 0,1 kPa.

5.3.9 Kolle flasks or equivalent culture vessels

With a capacity of between 400 mL and 650 mL, providing a flat surface area of between 85 cm^2 and 120 cm^2 for the medium (see Figures 1, 2 and 3 in Annex C) and allowing air exchange.

NOTE Kolle flasks are usually plugged with a wad of cotton wool. Other culture vessels are usually fitted with leakproof lids, the centres of which are pierced with a round hole of typically 15 mm diameter and plugged with a wad of cotton wool.

5.3.10 Test specimen supports

Made of glass, stainless steel or any other inert material, that is to say, with no risk of having any effect on the culture medium, the fungus, the wood or the product impregnated, or of being itself modified. The supports are used to prevent direct contact of the specimens with the culture medium, but shall not separate them from it by more than 3 mm.

If abnormally high moisture contents are experienced consistently, use of specimen supports of approximately 5 mm thick may help to control the problem. If thicker specimen supports are used, this should be recorded in the test report.

5.3.11 Drying vessel(s)

Provided with a close-fitting cover and containing supports that will give minimum contact with the treated test specimens to be placed on them. The vessels and supports shall be of materials that do not react with the test solvent or test preservative.

5.3.12 Equipment for steam sterilization or access to a radiation source

See Annex B.

5.3.13 Ordinary laboratory equipment

Including a balance capable of weighing to an accuracy of 0,01 g and a desiccator with an efficient desiccant (for example, silica gel).

6 Sampling of the preservative

Ensure that the sample of preservative shall be representative of the product to be tested. Samples shall be stored and handled in accordance with any written recommendations from the supplier.

For the sampling of preservatives from bulk supplies, the procedure given in EN 212 should be used.

7 Classification, designation and coding

7.1 Wood species

The species of wood to be used shall be susceptible to attack by fungi and shall be readily impregnated by liquids. The following species shall be used for the test:

— Scots pine (*Pinus sylvestris* Linnaeus) sapwood for products intended to be used on softwoods;

— Beech (*Fagus sylvatica* Linnaeus) for products intended to be used on hardwoods.

For testing products intended to be used on hardwoods against brown rot, Scots pine sapwood shall be used.

Additional tests may be undertaken using other species corresponding to the above characteristics, and of particular importance for certain countries, but if so this shall be stated in the test report.

7.2 Wood quality

The wood shall be free from cracks, stain, decay, insect damage or other defects. The wood shall not have been water-stored, floated, chemically treated or steamed or kiln-dried above 60°C.

The Scots pine shall be exclusively sapwood containing little resin and having between 2,5 annual growth rings per 10 mm and 8 annual growth rings per 10 mm. The proportion of late wood in the annual rings shall not exceed 30 % of the whole.

The beech shall be even-grained, free from tyloses, discolouration and red heart. It shall have between 2 and 6 annual growth rings per 10 mm.

7.3 Provision of test specimens

Condition the wood to (12 ± 2) % (*m/m*) moisture content or conditioned at 65 ± 5 % RH and 20 ± 2 °C for at least 2 weeks. Cut the specimens from planed strips having a cross section of (25 × 15) mm, on which the growth rings may run in any direction with the exception of a completely tangential orientation on the broad faces which is unacceptable.

The longitudinal faces shall be parallel to the direction of the grain. Transverse cuts shall be made neatly to give sharp edges.

The specimens shall originate from a minimum of three trees or shall be taken at random from a stock originally of more than 500 specimens and originating from at least 5 planks.

7.4 Dimensions and density of test specimens

The dimensions of each specimen, measured at 12 ± 2 % (*m/m*) moisture content or conditioned at 65 ± 5 % RH and 20 ± 2 °C for at least 2 weeks, shall be (50 ± 0,5) mm x (25 ± 0,5) mm x (15 + 0,5) mm.

NOTE A two-prong electrical conductivity moisture meter is suitable for assessing moisture content.

The volume of each specimen is theoretically 18.75 cm^3, but the dimensions of each test specimen shall be checked so that the actual volume is known. If the tolerance is no more than ± 0.2 mm, the volume of all specimens can be taken as 18.75 cm^3.

In a batch of treated specimens, the density of an individual specimen is permitted to differ by ± 10 % from the mean value of the batch. This tolerance is increased to ± 20 % for the untreated test specimens. The mean density of the specimens used for the test shall be recorded in the test report.

7.5 Number and distribution of test specimens

The specimens are divided into:

— e_1 Treated specimens:

  — $e_{1.1}$ Test specimens: these are the impregnated specimens (submitted to drying, conditioning, and any appropriate ageing) subjected to attack by the wood destroying fungi. Use at least four treated test specimens for each preservative concentration (including a solvent or diluent control (concentration = 0)), for each fungus and for each timber species;

  — $e_{1.2}$ Check test specimens for calculation of the correction value: These are test specimens treated in exactly the same way as the $e_{1.1}$ test specimens, at least four per concentration, which are placed, after drying, conditioning and any appropriate ageing in uninoculated culture vessels, two in each vessel. Variations in mass of these specimens make it possible to determine the correction value (C) of the variations in mass of the treated test specimens ($e_{1.1}$) resulting from factors other than attack by the test fungi.

— e_2 Untreated specimens:

  — $e_{2.1}$ Control specimens: These are non-impregnated test specimens, equal in number to the treated test specimens $e_{1.1}$ and of the same wood species which are placed one in each culture vessel with the treated test specimens;