SLOVENSKI STANDARD
SIST EN 113:2002

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Nadomeġļ a:
SIST EN 113:1995

Zaġļ itna sredstva za les - Preskusna metoda za ugotavljanje preventivne uļ inkovitosti zaġļ itnih sredstev proti glivam odprtotrosnicam - Ugotavljanje toksiļ nih vrednosti

Wood preservatives - Test method for determining the protective effectiveness against wood destroying basidiomycetes - Determination of the toxic values

Holzschutzmittel - Prüfverfahren zur Bestimmung der vorbeugenden Wirksamkeit gegen holzzerstörende Basidiomyzeten - Bestimmung der Grenze der Wirksamkeit

Produits de préservation du bois - Méthode d'essai pour déterminer l'efficacité protectrice vis-a-vis des champignons basidiomycetes lignivores - Détermination du seuil d'efficacité

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71.100.50 Kemikalije za zaġļ ito lesa Wood-protecting chemicals

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EUROPEAN STANDARD **EN 113**

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English version

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This European Standard was approved by CEN on 1996-09-02. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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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

Contents

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 38 "Durability of wood and derived materials", the secretariat of which is held by AFNOR.

This European Standard supersedes EN 113:1980, EN 113:1980/A1:1981 and EN 113:1980/A2:1985.

The significant technical differences between this edition and EN 113 :1980 are as follows :

- application to water-dispersible formulations ;
- the use of only one fungus but *Coriolus versicolor* being only used for particular hazards ;
- taking into account of the correction value for the loss in mass ;
- new criteria of validity of test and interpretation of results ;
- complement to annex regarding test fungi.

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 March 1997, and conflicting national standards shall be withdrawn at the latest by March 1997.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This European Standard 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. Any deviation, however small, from the procedures given in this standard can influence the results, so it is important that the procedures given in this method are followed precisely.

1 Scope

This European Standard specifies a method for determining the toxic values of wood preservatives previously introduced into the wood by full impregnation against wood destroying basidiomycetes cultured on an agar medium.

This method is applicable to products which are capable of achieving uniform and complete penetration of the test specimens including :

- water-insoluble chemicals which are being studied as active ingredients; or

- organic water-insoluble formulations, as supplied or as prepared in the laboratory by dilution of concentrates; or

- organic water-dispersible formulations as supplied or as prepared in the laboratory by dilution of concentrates which are capable of achieving uniform and complete penetration of test specimens (see clause 7) by the procedure described in 8.2.2, or

- water-soluble products, for example salts.

NOTE : This method may be used in conjunction with an ageing procedure, for example EN 73.

2 Normative Reference

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 revisions. For undated references the latest edition of the publication referred to applies.

ISO 3696 : 1987 Water for analytical laboratory use - Specification and test methods

3 Definitions

For the purposes of this Standard, the following definitions apply :

3.1 representative sample

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

3.2 supplier

The sponsor of the test.

4 Principle

Impregnation of several series of test specimens of a susceptible wood species with solutions in which the concentrations of preservative are ranged in a given progression.

Exposure of these test specimens to attack by basidiomycetes in pure culture to establish the toxic values of the product under test.

5 Test materials and apparatus

5.1 Biological material

The test fungi to be used as follows:

5.1.1 Obligatory fungus in all cases (see also annex D).

- *Coniophora puteana* (Schumacher ex Fries) Karsten (BAM Ebw. 15) on softwood.

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

5.1.2 Obligatory fungus for particular hazards (see also annex D)

- *Coriolus versicolor* (Linnaeus) Quélet (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*).

5.1.3 Two species to be used compulsorily on the basis of the nature of the product (see also annex D).

For creosotes and similar products

- *Lentinus lepideus* Fries ex Fries (BAM Ebw. 20) on softwood

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

- *Lentinus cyathiformis* (Schaeffer ex Fries) Bresadola (CTB 67-02 B) on hardwood.

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

For all other products

- *Poria placenta* (Fries) Cooke sensu J. Eriksson (FPRL 280) on softwood.

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

- *Gloeophyllum trabeum* (Persoon ex Fries) Murrill (BAM Ebw. 109) on softwood.

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

5.1.4 For specific regional uses or conditions, it is also possible to select other fungi on an optional basis[1)].

5.1.5 Maintenance of strains. The strains shall be maintained and treated (that is frequency of subculturing, alternation of culture media, etc.) in accordance with the instructions from their laboratory of origin (see annex D.2). The parent strain shall be maintained in the laboratory of its origin such that its vigour is conserved and assured.

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

- water conforming to grade 3 of ISO 3696; quantity to make up to 1000 ml.

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.

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1) See annex E for a recommended but non-comprehensive list of optional fungi.

5.2.2 Solvents and diluents

For water soluble preservatives :

- water conforming to grade 3 of ISO 3696.

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.

5.2.3 **Fumigant** (if necessary)

Xylene technical grade.

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, for example of glass for organic products and of plastics materials for salts containing fluorine.

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 maintaining a pressure of (0,7 ± 0,1) kPa[2)].

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2) 100 kPa = 1 bar

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 up to 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.

NOTE : 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, for example glass for organic products or plastics material for salts containing fluorine.

5.3.12 Equipment for chemical gas or 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

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.

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

7 Test specimens

7.1 Species of wood

The species of wood to be used shall be susceptible to attack by fungi and shall be readily impregnated by liquids.

The reference species are Scots pine (*Pinus sylvestris* Linnaeus) representing softwoods, and beech (*Fagus sylvatica* Linnaeus) representing hardwoods.

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.

NOTE : Wood that has been kiln dried at temperatures below 60°C may be used.

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 annual growth rings and 6 annual growth rings per 10 mm.

7.3 Provision of test specimens

Cut the specimens from planed strips having a cross section of (25 x 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 5000 specimens and originating from at least 20 planks.

7.4 Dimensions and density of test specimens

The dimensions of each specimen, measured at 12 % (*m*/*m*) moisture content, shall be

(50 $\pm$ 0,5) mm x (25 $\pm$ 0,5) mm x (15 $\pm$ 0,5) mm.

NOTE : A moisture meter of the two-pronged electrical conductivity type 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 $\pm$ 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 from the mean value of the batch by $\pm$ 10 %. This tolerance is increased to $\pm$ 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 test specimens : These are the impregnated specimens 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_2 Untreated test specimens :

$e_{2.1}$ Control specimens : These are non-impregnated test specimens, equal in number to the treated test specimens e_1 and of the same wood species which are placed one in each culture vessel with the treated test specimens.

$e_{2.2}$ Virulence control specimens: Six of these non-impregnated specimens of the appropriate timber species are subjected to attack by each wood destroying fungus.

e_3 Treated check test specimens for calculation of the correction value : These are test specimens treated in exactly the same way as the e_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) resulting from factors other than attack by the test fungi.

Mark each specimen so that it can be identified throughout the test.

NOTE : It is advisable to treat more specimens than the minimum number required to select those having the uptake nearest to the target.

8 Procedure

8.1 Preparation of test specimens

8.1.1 Conditioning of test specimens before treatment

Place the numbered test specimens in the oven (see 5.3.3) and leave them there for 18 h[3)]. Cool to room temperature in a desiccator and weigh to the nearest 0,01 g to determine the initial dry mass, (m_0). Replace the test specimens in the desiccator and store them there in order to keep them dry until impregnation.

Calculate the mean density of the specimens of each species using the mean mass and the specimen volume.

8.2 Treatment of test specimens

8.2.1 Preparation of treatment solutions/dilutions

Prepare a series of concentrations (by mass) of the preservative in the appropriate solvent or diluent (see 5.2.2).

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3) In the case of supplementary tests (see 7.1) using species of wood other than beech and pine sapwood, this drying time may need to be longer than 18 h; the drying time should be such that the test specimens reach constant mass.