SLOVENSKI STANDARD
SIST-TS ENV 839:2004

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Wood preservatives - Determination of the protective effectiveness against wood destroying basidiomycetes - Application by surface treatment

Wood preservatives - Determination of the protective effectiveness against wood destroying basidiomycetes - Application by surface treatment

Holzschutzmittel - Bestimmung der vorbeugenden Wirksamkeit gegen holzzerstörende Basidiomyceten - Anwendung mit Oberflächenverfahren

Produits de préservation du bois - Détermination de l'efficacité protectrice vis-a-vis des champignons basidiomycetes lignivores - Application par traitement de surface

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The period of validity of this ENV is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the ENV can be converted into a European Standard.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Contents

Foreword

This document ENV 839:2002 has been prepared by Technical Committee CEN/TC 38 "Durability of wood and derived materials", the secretariat of which is held by AFNOR.

This document supersedes ENV 839:1993.

This standard includes annexes A and C that are informative and an annex B that is normative.

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

Introduction

This European Prestandard specifies a laboratory method of test which gives a basis for assessing the effectiveness of a wood preservative, when applied as a surface treatment, against wood destroying basidiomycetes. It tests whether the applied treatment is able to prevent the penetration of the fungi into the untreated interior of the test specimens under the conditions of test.

This laboratory method provides one criterion by which the value of a product can be assessed. In making this assessment, the methods by which the preservative may be applied should be taken into account. It is also recommended that this information be supplemented by data from other relevant tests and above all by practical experience.

The procedures described in this standard method are intended to be carried out by suitably trained and/or supervised specialists.

1 Scope

This European Prestandard specifies a method of test for determining the protective effectiveness of a wood preservative, applied to the surface of the wood, against wood destroying basidiomycetes cultured on an agar medium.

The method is applicable to all products which are to be applied by superficial application processes. This includes :

organic solvent-based wood preservatives ; or

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

water-soluble products ; or

chemicals which are being studied as active ingredients for application by superficial processes.

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

2 Normative references

This European Prestandard 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 Prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN ISO 3696, *Water for analytical laboratory use - Specification and test methods (ISO 3696:1987).*

3 Terms and definitions

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

3.1
superficial application process
process which does not include particular features or procedures intended to overcome the natural resistance of wood to penetration by a wood preservative product in its ready to use form

3.2
representative sample
sample having its physical or chemical characteristics identical to the volumetric average characteristics of the total volume being sampled

3.3
supplier
sponsor of the test

4 Principle

Several series of test specimens of a susceptible wood species are end-sealed with a material to prevent penetration of the test product into the end grain of the specimens. The end-sealed specimens are treated with the wood preservative product under test using the process and application rate specified by the supplier.

NOTE Suitable application methods are brushing, pipetting and dipping.

The treated test specimens are exposed to attack by basidiomycetes in pure culture. The performance of the test product is assessed in terms of its ability to prevent visible decay and its ability to prevent colonization of the untreated interior of the test specimens.

5 Test materials and apparatus

5.1 Biological material

The test fungi to be used are as follows :

5.1.1 Obligatory fungus in all cases

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

Loss in mass of Scots pine sapwood in 16 weeks: a mass fraction of minimum 20 %.

5.1.2 Obligatory fungus for particular hazards

— *Coriolus versicolor* (Linnaeus) Quélet (CTB 863A) on hardwood and/or on softwood as appropriate.

Loss in mass of beech in 16 weeks: a mass fraction of minimum 20 %.

Loss in mass of Scots pine sapwood in 16 weeks: a mass fraction of minimum 15 %.

5.1.3 Two species to be used compulsorily on the basis of the nature of the test product

For all products except creosote-type products :

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

Loss in mass of Scots pine sapwood in 16 weeks: a mass fraction of minimum 20 %;

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

Loss in mass of Scots pine sapwood in 16 weeks: a mass fraction of minimum 20 %.

For creosotes and similar products :

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

Loss in mass of Scots pine sapwood in 16 weeks: a mass fraction of minimum 20 %;

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

Loss in mass of beech in 16 weeks: a mass fraction of minimum 20 %.

5.1.4 Optional fungi

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

NOTE When optional fungi are used, information similar to that given in annex A for the obligatory fungi should be included in the test report.

5.1.5 Maintenance of strains

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 A.2). The parent strain shall be maintained in the laboratory of its origin so as to conserve and to assure 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 A.2). When new strains are received, the virulence shall be tested to ensure the strain can achieve the minimum loss in mass (see 5.1.1, 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 ;

— 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 steam bath, stirring until completely dissolved.

Place in each culture vessel (5.3.1) 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 5.3.1 and sterilize in an 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 or water dispersible preservatives :

— water conforming to grade 3 of EN ISO 3696.

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

— suitably volatile liquids that leave no residue in the wood that would have 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.

5.2.4 End-seal compound

A material resistant to the penetration of the test product and the test fungi, or separate materials for each, and without any fungistatic or fungicidal activity within the test specimen.

NOTE Two brush coats of Tivosan 6031 diluted 1:1 with acetone or three brush coats of a 2-component epoxy lacquer, with drying between each application, have been found to be suitable.

5.3 Apparatus

5.3.1 *Culture vessels*, Kolle flasks or equivalent 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.

NOTE 1 Examples of suitable vessels are given in EN 113.

NOTE 2 Kolle flasks are usually plugged with a wad of cotton wool. Other culture vessels are usually fitted with leak proof 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.

5.3.2 *Drying oven*, capable of being controlled at (103 ± 2) °C.

5.3.3 *Desiccators*, with efficient desiccant (silica gel for example).

5.3.4 *Conditioning chamber*, well ventilated and controlled at (20 ± 2) °C and (65 ± 5) % relative humidity.

5.3.5 *Drying supports*, that will give a minimum contact with the treated test specimens. The supports shall be of a material that does not react with the test solvent or test preservative, for example glass for organic products**.**

5.3.6 *Culture chamber*, (incubator or room), dark and controlled at (22 ± 2) °C and (70 ± 5) % relative humidity.

5.3.7 *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 test product, or of being itself modified. Supports may be capable of holding either one or two test specimens. 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 in the test specimens are experienced consistently, use of specimen supports of approximately 5 mm thick can help to control the problem. If thicker specimen supports are used, this should be recorded in the test report.

5.3.8 *Ordinary laboratory equipment*, including a balance capable of weighing to the nearest of 0,01 g and an autoclave.

6 Sampling of the preservative

The sample of the preservative shall be representative of the product to be tested. Samples shall be stored and handled in accordance with any written instructions 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 penetrated 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 can be used.

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

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

7.3 Provision of the test specimens

Prepare planed strips having a cross section of (25 ± 0,5) mm × (15 ± 0,5) mm. The longitudinal faces shall be parallel to the direction of the grain. The annual rings shall have a contact angle of (45 ± 15)° to the broad faces. Make transverse cuts, neatly to give sharp edges and a fine-sawn finish to the end-grain surfaces, to give test specimens (50 ± 0,5) mm long.

NOTE For treatment, drying and ageing, the test specimens can be retained in planed strips of a length sufficient to provide one test specimen for exposure to each of the test fungi. Each strip should be end-sealed prior to treatment.

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 five planks.

7.4 Dimensions and density of specimens

The dimensions of each test specimen at a mass fraction of (12 ± 2) % moisture content shall be (50 ± 0,5) mm x (25 ± 0,5) mm x (15 ± 0,5) mm.

NOTE A moisture meter of the two-pronged electrical conductivity type is suitable for assessing moisture content.

The total surface area of the faces to be treated is theoretically 40 cm^2 but an allowance shall be made for any encroachment of the sealing compound on to these faces.

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

7.5 Number and distribution of test specimens

The test specimens are divided into :

— e_1 treated test specimens :

  — these are the treated test specimens subjected to attack by the wood destroying fungi. Use at least six test specimens for each combination of preservative, quantity to be applied, preservative concentration, test fungus and for each timber species.

NOTE The treated test specimens are assessed by visual examination for decay and colonisation by the test fungi. If loss in mass is to be used as an additional method of assessment, this should be carried out on a parallel series of treated test specimens; treated check test specimens (see e_3 specimens in EN 113) will also be required.

— e_2 untreated test specimens :

  — $e_{2.1}$ untreated control specimens: these are untreated 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 together with a treated test specimen ;

  — $e_{2.2}$ virulence control specimens: these are untreated test specimens which are subjected to attack by the test fungi to monitor vigour. Use six of these for each combination of test fungus and timber species used in the test.

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

8 Procedure

8.1 Preparation of the untreated test specimens

Place the numbered untreated test specimens ($e_{2.1}$ and $e_{2.2}$) in the oven (5.3.2) and leave them there for 18 h to 24 h [1)]. Cool to room temperature in a desiccators (5.3.3) and weigh to the nearest 0,01 g to determine the initial dry mass (m_0). Place the specimens in the conditioning chamber (5.3.4) until they need to be sterilized (8.3).

NOTE Untreated test specimens are not end-sealed.

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1) In the case of supplementary tests (7.1) using species of wood other than Scots pine sapwood or beech, this drying time may need to be longer than 18 h to 24 h; the drying time should be such that the test specimens achieve constant mass. This can be established by selecting at random from the batch being dried 10 test specimens; after drying and cooling as directed, determine the total mass, return the specimens to the oven and repeat the operation at intervals of not less than 4 h. Constant mass is achieved when the total mass of the selected specimens does not lose more than 0,05 g between weighings.