

**Durability of wood and wood-based products –
Wood-based panels – Method of test for deter-
mining the resistance against wood-destroying
basidiomycetes**

Den europeiska förstandarden ENV 12038:2002 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av ENV 12038:2002.

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Durability of wood and wood-based products - Wood-based panels - Method of test for determining the resistance against wood-destroying basidiomycetes

Durabilité du bois et des matériaux dérivés du bois -
Panneaux à base de bois - Méthode d'essai pour
déterminer la résistance aux champignons basidiomycètes
lignivores

Dauerhaftigkeit von Holz und Holzwerkstoffen -
Holzwerkstoffplatten - Bestimmung der Beständigkeit
gegen holzerstörende Basidiomyceten

This European Prestandard (ENV) was approved by CEN on 23 December 2001 as a prospective standard for provisional application.

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Foreword

This document ENV 12038:2002 has been prepared by CEN/TC 38 "Durability of wood and wood-based products", the secretariat of which is held by AFNOR.

This document supersedes ENV 12038:1996.

Annexes A, B, C and F are informative.

Annexes D and E are 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 describes a laboratory test method in which small samples of the wood-based panel product under test are exposed to attack by a range of wood-destroying basidiomycete fungi in pure culture. The thickness of the test specimens varies, since it is dictated by the thickness of the wood-based panel product under test. In order to make comparisons of the decay resistance of wood-based panel products of different thicknesses, solid wood specimens of the same dimensions as the wood-based panel product test specimens are included. The effect of constituents giving temporary protection is avoided by testing after pre-conditioning of the cut specimens in a freely ventilated environment. The test method also includes a minimum moisture uptake requirement.

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

1 Scope

This European Prestandard specifies a method for assessing the resistance of wood-based panel products to attack by wood-destroying basidiomycete fungi growing in pure culture.

The method is applicable to uncoated, rigid wood-based panel products. It is applicable to the determination of the decay resistance of wood-based panel products:

- made from naturally durable materials;
- made from materials treated with preservatives prior to manufacture;
- treated with a preservative which is introduced during manufacture, for example as an additive to the adhesive;
- treated with preservative after manufacture.

NOTE 1 This method can be used in conjunction with an appropriate ageing procedure, for example EN 73 or EN 84.

NOTE 2 Wood-based panel products that have received a preservative treatment after manufacture can be susceptible to attack through the cut edges of the test specimens and the decay resistance indicated can be less than that of complete panels used in service.

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 73, *Wood preservatives - Accelerated ageing tests of treated wood prior to biological testing - Evaporative ageing procedure.*

EN 84, *Wood preservatives - Accelerated ageing tests of treated wood prior to biological testing - Leaching procedure.*

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

3 Term and definition

For the purposes of this European Prestandard, the following term and definition apply.

3.1

supplier

the sponsor of the test

4 Principle

Specimens prepared from the wood-based panel product(s) under test, after pre-conditioning, and control specimens of defined function are exposed to attack by pure cultures of wood-destroying basidiomycete fungi.

After a prescribed period of incubation under defined conditions, the loss in dry mass of the specimens is used as the criterion for determining the extent of attack. This, in comparison with the loss in mass of the size control specimens, is used to estimate the resistance of the wood-based panel product(s) to attack by the test fungi.

5 Test materials

5.1 Biological material

5.1.1 Test fungi

5.1.1.1 Obligatory test fungi for all types of panel products (see also annex A):

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

Loss in mass of Scots pine sapwood virulence control specimens in 16 weeks: a mass fraction of minimum 20 %

— *Pleurotus ostreatus* (Jacquin ex Fries) Quélet (FPRL 40C)

Loss in mass of beech virulence control specimens in 16 weeks: a mass fraction of minimum 20 %

5.1.1.2 Species to be used compulsorily on the nature of the test product (see also annex A):

For test products made only from softwood:

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

Loss in mass of Scots pine sapwood virulence control specimens in 16 weeks: a mass fraction of minimum 20 %

For test products made only from hardwood:

— *Coriolus versicolor* (Linnaeus) Quélet (CTB 863A)

Loss in mass of beech virulence control specimens in 16 weeks: a mass fraction of minimum 20 %

For test products made from a mixture of softwood and hardwood, both *Gloeophyllum trabeum* and *Coriolus versicolor* shall be used.

5.1.1.3 Optional test fungi

For specific regional uses or conditions, it is also possible to choose other fungi on an optional basis¹⁾.

5.1.1.4 Maintenance of strains

The strains shall be maintained and treated (frequency of subculturing, alternation of culture media etc.) in accordance with the instructions from their laboratory of origin (see annex A). The parent strain shall be maintained in the laboratory of its origin, so as to conserve and assure its vigour.

If tests are not undertaken regularly, or if a strain shows signs of degeneration, a new standard culture of the strain shall be obtained from the laboratory of origin for each test. When new strains are received, the virulence shall be tested to ensure that the mass loss achieved is above the minimum value given in annex A or annex B.

5.1.2 Solid wood stock

5.1.2.1 Wood species

The following species shall be used for the test:

— Scots pine sapwood (*Pinus sylvestris* Linnaeus)

— Beech (*Fagus sylvatica* Linnaeus)

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

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5.1.2.2 Quality of the wood

The wood shall be free from visible 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 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.

5.1.2.3 Virulence control specimens

Prepare planed strips from the solid wood stock having a cross-section $(25 \pm 0,5)$ mm x $(15 \pm 0,5)$ mm. The longitudinal faces shall be parallel to the direction of the grain. The annual rings shall not be parallel to the faces (contact angle greater than 10°) but otherwise can run in any direction. Make transverse cuts, neatly to give sharp edges and a fine-sawn finish to the end-grain surfaces, to give virulence control specimens $(50 \pm 0,5)$ mm long.

The dimensions of each virulence control specimen at a mass fraction of (12 ± 2) % moisture content²⁾ shall be $(50 \pm 0,5)$ mm x $(25 \pm 0,5)$ mm x $(15 \pm 0,5)$ mm.

The specimens shall originate from a minimum of three trees or shall be taken from a stock originally of more than 500 specimens.

5.1.2.4 Size control specimens

Prepare planed strips from the solid wood stock having a cross-section $(50 \pm 0,5)$ mm x thickness³⁾ of the wood-based panel product under test. Make transverse cuts, neatly to give sharp edges and a fine-sawn finish to the end-grain surfaces, to give size control specimens $(50 \pm 0,5)$ mm long. The annual rings of the specimens shall be orientated as for the virulence control specimens (5.1.2.3).

The dimensions of each size control specimen at a mass fraction of (12 ± 2) % moisture content²⁾ shall be $(50 \pm 0,5)$ mm x $(50 \pm 0,5)$ mm x thickness of the wood-based panel product.

The oven dry density shall be $(0,48 \pm 0,05)$ g/cm³ for the Scots pine specimens and $(0,67 \pm 0,05)$ g/cm³ for the beech specimens.

5.2 Other materials and reagents**5.2.1 Water**

Water conforming to grade 3 of EN ISO 3696 shall be used throughout.

5.2.2 Culture medium

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

- malt extract : in concentrated form: $(50 \pm 0,5)$ g;
in powder form: $(40 \pm 0,5)$ g.
- agar causing no inhibition of growth of fungi: $(20 \pm 0,5)$ g to $(30 \pm 0,5)$ g.

²⁾ A moisture meter of the two pronged electrical conductivity type is suitable for assessing moisture content.

³⁾ Measured to an accuracy of 0,5 mm.

— water (5.2.1): quantity to make up to 1 000 ml.

Warm the mixture in a boiling water bath or a steam bath; stir until completely dissolved.

NOTE The quantity of culture medium required in each culture vessel varies with the thickness of the test product (see 8.4).

5.2.3 Additive for *Pleurotus ostreatus*

Anhydrated, laminar, aluminium-iron-magnesium silicate⁴⁾ exfoliated to yield particles up to 3 mm diameter. Particles less than 2 mm diameter shall be removed by sieving. Before use, mix the sample of additive well. The additive shall be used only once.

5.3 Apparatus

5.3.1 *Conditioning supports*, made of glass, stainless steel or any other inert material, that is to say with no risk of having any effect on the test specimens. The supports shall provide free circulation of air around the test specimens whilst having a minimum of contact with the test specimens.

5.3.2 *Conditioning room*, well ventilated and controlled at (20 ± 1) °C and (65 ± 5) % relative humidity.

5.3.3 *Culture chamber* (incubator or room), dark and controlled at (22 ± 1) °C and (70 ± 5) % relative humidity.

5.3.4 *Culture vessels*, with a capacity of between 400 ml and 650 ml, made of a material which can be sterilized by autoclaving and which does not have a toxic effect on the fungi. The vessels shall be provided with leakproof lids, the centre of which shall be pierced with a round hole of up to 15 mm diameter and plugged so as to allow ventilation but to prevent access by contaminating fungi. The vessels shall be a minimum of 65 mm in depth and have a cross-sectional area of between 55 cm² and 90 cm².

NOTE A suitable culture vessel is shown in annex C.

5.3.5 *Ventilated drying oven*, capable of being controlled at (103 ± 2) °C.

5.3.6 *Desiccators*, with an efficient desiccant, for example silica gel.

5.3.7 *Equipment for chemical gas sterilization or access to a radiation service* (see annex D).

5.3.8 *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 or the test product or of being itself modified. The supports shall prevent direct contact between the test specimens and the culture medium but shall not separate them from it by more than 3 mm.

NOTE Two sizes of test specimen supports can be required to support specimens of 50 mm x 50 mm and 50 mm x 25 mm respectively.

5.3.9 *Safety equipment and protective clothing*, appropriate for the test procedures, to ensure the safety of the operator.

5.3.10 *Ordinary laboratory equipment*, including a balance readable to the nearest 0,01g and an autoclave.

6 Test product

6.1 General

A minimum of three replicate panels of the wood-based panel product under test shall be sampled. Ensure that the panels are clean and as free as possible of contaminants that might give misleading results.

⁴⁾ Vermiculite is suitable.