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Zaščitna sredstva za les - Ugotavljanje preventivne učinkovitosti zaščitnega sredstva proti glivam modrivkam - Laboratorijska metoda

Wood preservatives - Determination of the protective effectiveness of a preservative treatment against blue stain in wood in service - Laboratory method

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Holzschutzmittel - Bestimmung der vorbeugenden Wirksamkeit einer Schutzbehandlung von verarbeitetem Holz gegen Bläuepilze - Laboratoriumsverfahren

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Produits de préservation du bois - Détermination de l'efficacité préventive d'un traitement de protection du bois mis en œuvre contre le bleuissement fongique - Méthode de laboratoire

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71.100.50 Kemikalije za zaščito lesa Wood-protecting chemicals

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EUROPEAN STANDARD
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Wood preservatives - Determination of the protective effectiveness of a preservative treatment against blue stain in wood in service - Laboratory method

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This European Standard was approved by CEN on 24 September 2011.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword.....	4
Introduction	5
1 Scope	6
2 Normative references	6
3 Terms and definitions	7
4 Principle.....	7
5 Test materials.....	8
5.1 Biological material.....	8
5.2 Products and reagents.....	8
5.3 Apparatus	10
5.4 Other material.....	11
6 Sampling.....	11
7 Test specimens	11
7.1 Species of wood.....	11
7.2 Wood quality	12
7.3 Preparation of sticks and blocks	12
7.4 Preparation of test specimens	13
7.5 Number of test specimens.....	13
8 Procedure	14
8.1 Treatment of the wood test specimens.....	14
8.2 Pre-conditioning of the test specimens prior to fungal test.....	17
8.3 Fungal test.....	17
8.4 Test conditions and duration of test.....	18
8.5 Assessment of the test specimens.....	18
9 Validity of results	19
10 Reporting the results.....	20
11 Test report	20
Annex A (normative) Detailed information on coating products	22
A.1 General.....	22
A.2 Alkyd coating material for organic solvent based preparations (5.2.2.2).....	22
A.3 Acrylic coating material for water based preparations (5.2.2.3).....	24
Annex B (normative) Preparation of a spore suspension of the test fungi	27
Annex C (informative) Information regarding sterilisation procedures.....	28
C.1 Ionising irradiation.....	28
C.2 Steam	28
Annex D (informative) Figures on equipment and diagrams	29
Annex E (informative) Instructions on the test procedure.....	34
Annex F (normative) Artificial weathering cycle.....	36
F.1 Introduction	36
F.2 Apparatus – minimum requirements	36
F.3 Weathering cycles	37
F.4 Criteria to select weathering cycles.....	42
F.5 Conditioning.....	42

Annex G (informative) Example of a test report	43
Annex H (informative) Environmental, health and safety precautions within chemical/biological laboratory	44
Bibliography	45

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SIST EN 152:2012

<https://standards.iteh.ai/catalog/standards/sist/3827314d-7ace-4637-8bb4-a3f06a4096a8/sist-en-152-2012>

EN 152:2011 (E)**Foreword**

This document (EN 152:2011) 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 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 May 2012, and conflicting national standards shall be withdrawn at the latest by May 2012

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 152-1:1988, EN 152-2:1988.

Significant technical differences between this standard and EN 152-1 and EN 152-2:1988 are as follows:

- a) introduction of a new harmonised specification for the test specimens used in the diverse biological tests;
- b) merging of Part 1 relating to the brushing procedure and Part 2 concerning the application by methods other than brushing;
- c) taking into account of the terms given in EN 1001-1 and the definitions of EN 1001-2;
- d) introduction of an informative Annex to take account of consideration for minimisation of environmental and health hazards caused by the use of this biological test.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

The test method described in this European Standard is a laboratory method combined with pre-conditioning (natural or artificial weathering), which provides a basis for assessment of the effectiveness of a wood preservative or wood preservative systems in preventing the development of blue stain fungi in wood in service where disfigurement can be considered important, such as external decorative timber and joinery. The method permits the determination of the effectiveness of undiluted preservatives and may also be used to test preparations in which the proportions of the individual components (active ingredients) have been varied and so establish for the active ingredients the limit of their effectiveness.

It should be used to assess the value of the protection, taking into account the method of application and in particular the suppliers specifications. It is recommended that the results of these tests should be supplemented by further suitable tests and especially by practical experience.

Suitable precautions should include the use of separate rooms, areas within rooms, extraction facilities, conditioning chambers and special training for personnel (also see Annex H for environmental, health and safety precautions).

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EN 152:2011 (E)

1 Scope

This European Standard specifies a method which is only suitable for testing preparations and systems which are intended to prevent the occurrence of blue stain fungi in wood in service. It is not suitable for assessing the temporary preventive effectiveness of anti-stain preservatives on round wood or on freshly cut wood. The method is not intended for the determination of the fungicidal properties of the surface coating applied to the wood after the priming coat.

This European Standard lays down a method for determining the effectiveness of a preparation applied by e.g. brushing, spraying, spraying tunnel, dipping or vacuum and pressure treatments resulting in an equivalent retention of product in preventing the development of blue stain fungi in wood in service. It is also applicable where a primer paint is used in conjunction with the preservative system¹⁾.

This method is applicable to the following types of preparations or systems:

— type A: fungicidal preparations with or without pigment, used in conjunction with unspecified varnishes or paint coatings;

or

— type B: fungicidal preparations with or without pigment, used in conjunction with specified varnishes or paint coatings;

or

— type C: fungicidal preparations with or without pigment, used without any subsequent paint, varnish or other coating.

NOTE It is also possible to test the effectiveness in preventing blue stain in service of a combined protective system which involves the application of one preparation by a penetrating treatment technique followed by a subsequent application of a different preparation by a superficial treatment method.

2 Normative references

The following referenced documents are indispensable for the application 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 927-6:2006, *Paints and varnishes — Coating materials and coating systems for exterior wood — Part 6: Exposure of wood coatings to artificial weathering using fluorescent UV lamps and water*

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

1) The method may also be used for first coat (primer) paints required to give protection during storage of components on-site (see Annex E). These are tested as for preparations of type C.

3 Terms and definitions

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

3.1

representative sample

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

[EN 1001-2, 4.71]

3.2

supplier

sponsor of the test (person or company providing the sample of wood preservative to be tested)

[Adapted from EN 1001-2, 4.83]

4 Principle

The basic principles of the test method are to provide the conditions for infection by blue stain fungi into the treated face and into the cut surface behind the treated face (for surface treatments) and to observe the development of infection into the treated face.

A series of blocks of the given timber species are treated with the preparation under test on all faces except the end-grain faces. Subsequently the blocks are cut in the direction of the grain such that two specimens are produced. The treatment differs according to the type of preparation (Annex E, Table E.1) and specifications for its use:

- Type A Preparations designed to be used with unspecified varnish or paint coatings are tested using the application rate appropriate to the preparation (Annex E, Table E.2) or as otherwise specified by the supplier followed by the standard test varnish.
- Type B Preparations designed to be used with specified varnish or paint coatings are tested using the application rate appropriate to the preparation (Annex E, Table E.2) or as otherwise specified by the supplier followed by a surface coating strictly according to the supplier's specification.
- Type C Preparations designed to be used without subsequent varnish or paint coatings are tested using the application rate appropriate to the product (Annex E, Table E.2) or as otherwise specified by the supplier but with no subsequent application of coating.
- Treated test specimens are exposed to pre-conditioning (natural or artificial weathering).
- Weathered test specimens are then exposed in the laboratory to the action of a mixed culture of two fungi causing blue stain in service.

NOTE Preparations designed to be used solely in use class 2 (EN 335) may be preconditioned by using the evaporative aging method in EN 73 in place of the natural or artificial weathering procedures in this standard.

EN 152:2011 (E)

5 Test materials

5.1 Biological material

The test fungi to be used in all tests are²⁾

- *Aureobasidium pullulans* (de Bary) Arnaud, strain P 268³⁾, source Hann. Münden;
- *Sydowia polyspora* (Bref. & Tavel) E. Müller (syn. *Sclerophoma pithyophila* (Corda) v. Höhnel) strain S 231⁴⁾, source Hann. Münden.

Use the test fungi as a mixed culture in the form of a spore suspension. The technique for the preparation of this spore suspension is described in Annex B.

NOTE If desired, spore suspensions of other blue stain fungi of national importance can be used in additional series of tests. The type and extent of the growth of these fungi are to be described in the test report.

5.2 Products and reagents

5.2.1 Nutrient medium

A nutrient medium of malt buffered to pH 4,2 shall be used for the preparation of a spore suspension (see 8.3.4) of the test fungi. It shall contain 20 g/l dried malt or an equivalent amount of concentrated malt extract with a nitrogen content of mass fraction of $(0,9 \pm 0,3)$ %. The buffer shall be a citrate buffer solution composed of:

- | | |
|--|-----------|
| — Citric acid monohydrate,
(analytical reagent grade) | 12,5 g; |
| — 1 mol/l NaOH | 120 ml; |
| — 0,1 mol/l HCl | 390 ml; |
| — water to make up | 1 000 ml. |

5.2.2 Coating material

5.2.2.1 General

Tests can be performed for a specific coating material which has been specified by the supplier.

Otherwise a generic coating material can be used as detailed under 5.2.2.2 and 5.2.2.3 below.

2) Maintain the strains on 2 % malt agar and subculture them at intervals not exceeding 6 months. Obtain new cultures if there is evidence of degeneration such as loss of pigmentation or the ability to produce conidia. Cultures can be obtained from Bundesanstalt für Materialforschung und -prüfung, Unter den Eichen 87, 12205 Berlin or from the CABI Bioscience, Bakeham Lane, Egham, Surrey TW20 9TY UK.

3) Identical to strain no. IMI 269 216 of culture deposited at CABI Bioscience, Egham.

4) Identical to strain no. IMI 269 217 of culture deposited at CABI Bioscience, Egham.

5.2.2.2 For organic solvent preservative products

An unpigmented varnish based on low viscosity, long oil alkyd resin, with driers and without any fungicidal or fungistatic components (see A.2). Two options are provided whether or not UV protection is present.

NOTE The varnish may be stored unopened for up to 2 years, but once the container has been opened, unused quantities should not be stored longer than 1 week for further use.

5.2.2.3 For waterborne preservative products

An unpigmented varnish based on low viscosity acrylic resin, with an in-can preservative for the resin (see A.3).

NOTE The varnish may be stored unopened for up to half a year, but once the container has been opened, unused quantities should not be stored longer than 1 week for further use.

5.2.3 Test product without active ingredients

If additional controls are requested, the product under test without the active ingredient(s) (see 7.5.2).

5.2.4 Solvents and diluents

5.2.4.1 White spirit

For the characteristics of the white spirit see Annex A (A.2.1.2).

5.2.4.2 Water

Complying with grade 3 of EN ISO 3696. [SIST EN 152:2012](https://standards.iteh.ai/catalog/standards/sist/3827314d-7ace-4637-8bb4-a3f06a4096a8/sist-en-152-2012)

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5.2.5 End sealer

The end sealer is necessary to prevent the product penetrating along the end grain. Any appropriate material which is resistant to the solvents employed during treatment. 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 Three brush coats of a 2-component epoxy lacquer, with drying between each application, have been found to be suitable.

5.2.6 Sterilant (see 8.3.2)

Access to radiation sterilisation facilities or autoclave available.

5.2.7 Hydrated, laminar, aluminium-iron-magnesium silicate (e.g. vermiculite)

Exfoliated to give particles of 1 mm to 3 mm with an apparent density of 80 kg/m³ to 90 kg/m³. Particles of less than 1 mm shall be eliminated by sieving prior to use.

NOTE The water holding capacity of the vermiculite should allow the wood moisture content to stay below 100 % at any time.

5.2.8 Reference product

The reference product used shall comply with the composition or equivalent specified in Table 1.

Table 1 — Composition of the reference product

Component ^{b)}	Quantity (mass fraction in %)
Vialkyd VAF 4349/80 K-60	5,00
Dowanol PM	3,00
Preventol A 4 S (87,5 – 92,5 % DCFN ^{a)})	0,55 (approx. 0,49 DCFN)
Methylethylketoxim	0,20
Octa Soligen Trockner 69	0,10
Shellsol D 60	91,15
^a DCFN = dichlofluanide. ^b Example(s) of suitable product(s) available commercially. This information is given for the convenience of users of this EN 152 standard and does not constitute an endorsement by CEN of these products.	

The product containing dichlofluanide at this concentration shall be applied at 80 g/m² in combination with a varnish coating. If an alternative reference product is used, the concentration chosen should provide a performance equivalent to the specified concentration of DCFN. Evidence of equivalence shall be recorded in the test report.

5.2.9 Fumigant (if necessary)

Xylene technical grade.

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5.3 Apparatus

5.3.1 Incubation room, with the following climatic conditions: (22 ± 2) °C and (70 ± 5) % relative humidity.

5.3.2 Conditioning room at (20 ± 2) °C and (65 ± 5) % relative humidity.

5.3.3 Saw with blades giving a fine-sawn finish

5.3.4 Weathering site for open air weathering of wood specimens in special racks :

- weathering racks: frames to take the wood specimens at 45° (see Figure D.5). The frames shall be constructed of inert material (e.g. plastics, aluminium). In the racks the wood test specimens shall be free on all sides and be secured against being dislodged;
- as a weathering site, any free area without extremes of environmental conditions with regard to humidity, dryness, UV radiation or industrial pollution is suitable. The site shall be free from tall vegetation (max. 0,5 m);
- erection of the weathering racks, the following are to be observed:
 - they shall at no time be in the shade of trees, houses or other structures;
 - the wood test specimens shall face the direction in which the exposure conditions are expected to be most severe;

NOTE In Central Europe and France this is to the South West and in the UK to the South.

- the wood test specimens shall be placed 1 m to 2 m above the ground .

5.3.5 Device for artificial weathering (UV equipment with spray option, UVS)

A device providing spray of demineralised water of approximately 4 l/min and UV-light at a wave length of 340 nm (UVA), preferable produced by fluorescent tubes, programmable for different weathering cycles including alternating UV-radiation, spraying and condensation of different duration and controllable temperature during the radiation and the condensation periods.

5.3.6 Culture vessels with a capacity of 400 cm³ to 600 cm³ and an internal area of base of 90 cm² to 120 cm² (see Annex D for an example of a culture vessel).

5.3.7 Sterilisers

- access to ionising-radiation services (Annex C);
- autoclave, adjustable at (102 ± 2) °C and (121 ± 1) °C, and, if the autoclave is not adjustable at (102 ± 2) °C, a steaming chamber (Annex C).

5.3.8 Measuring magnifying glass with reading accuracy of 0,1 mm.

5.3.9 Usual laboratory equipment, especially:

- analytical balance with accuracy 0,01 g.
- various brushes.
- abrasive paper, grit size 120 and 180.
- drying oven, adjustable at (103 ± 2) °C.

5.4 Other material

Corrosion resistant nails of length of approx. 30 mm and diameter of approx. 1,5 mm to support wood specimens during weathering (see Figure D.3).

6 Sampling

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

A species of wood that is very susceptible to blue stain shall be used:

obligatory for every test is Scots pine sapwood (*Pinus sylvestris* Linnaeus).

NOTE Additional tests may be carried out using other species but, if so, this should be stated in the test report.