SLOVENSKI STANDARD
SIST EN 152-1:1996

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Metode preskušanja zaščitnih sredstev za les - Laboratorijska metoda za določanje preventivne učinkovitosti zaščitnega sredstva proti glivam modrivkam - 1. del: Nanašanje s premazovanjem

Test methods for wood preservatives - Laboratory method for determining the preventive effectiveness of a preservative treatment against blue stain in service - Part 1: Brushing procedure

Prüfverfahren für Holzschutzmittel - Laboratoriumsverfahren zur Bestimmung der vorbeugenden Wirksamkeit einer Schutzbehandlung von verarbeitetem Holz gegen Bläuepilze - Teil 1: Anwendung im Streichverfahren

Méthodes d'essais des produits de préservation des bois - Méthode de laboratoire pour déterminer l'efficacité préventive d'un traitement de protection du bois ouvré contre le bleuissement fongique - Partie 1: Application par brossage

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English version

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European Committee for Standardization
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B R I E F H I S T O R Y

This European Standard was drawn up by the Technical Committee CEN/TC 38 "Methods of test for wood preservatives", the Secretariat of which is held by AFNOR.

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C O N T E N T S

0 INTRODUCTION

The test method described in this European Standard is a laboratory method combined with natural weathering, which provides a basis for assessment of the effectiveness of a wood preservative in preventing the development of blue staining fungi in wood in service where disfigurement may be considered important, such as external decorative timber and joinery. The method permits the determination of the effectiveness of undiluted preservatives applied by superficial treatments such as brushing (1).

The method may also be used to test preparations in which the proportions of the individual components have been varied and so establish for the active ingredients the limit of their effectiveness.

The method is only suitable for testing preparations which are intended to prevent the occurrence of blue staining fungi in wood in service. It is not suitable for assessing the temporary preventive effectiveness of anti-stain preservatives on roundwood or on freshly cut wood. The method does not permit the determination of the fungicidal properties of the surface coating applied to the wood after the priming coat.

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

1 OBJECT

This European Standard lays down a method for determining the effectiveness of a preparation applied by brushing or similar superficial treatment (e.g. spraying, spraying tunnel or dipping) 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 system (2).

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(1) Part 2 of this standard lays down the method for determining the effectiveness of a wood preservative applied by immersion process or double vacuum technique.

(2) 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.

2 FIELD OF APPLICATION

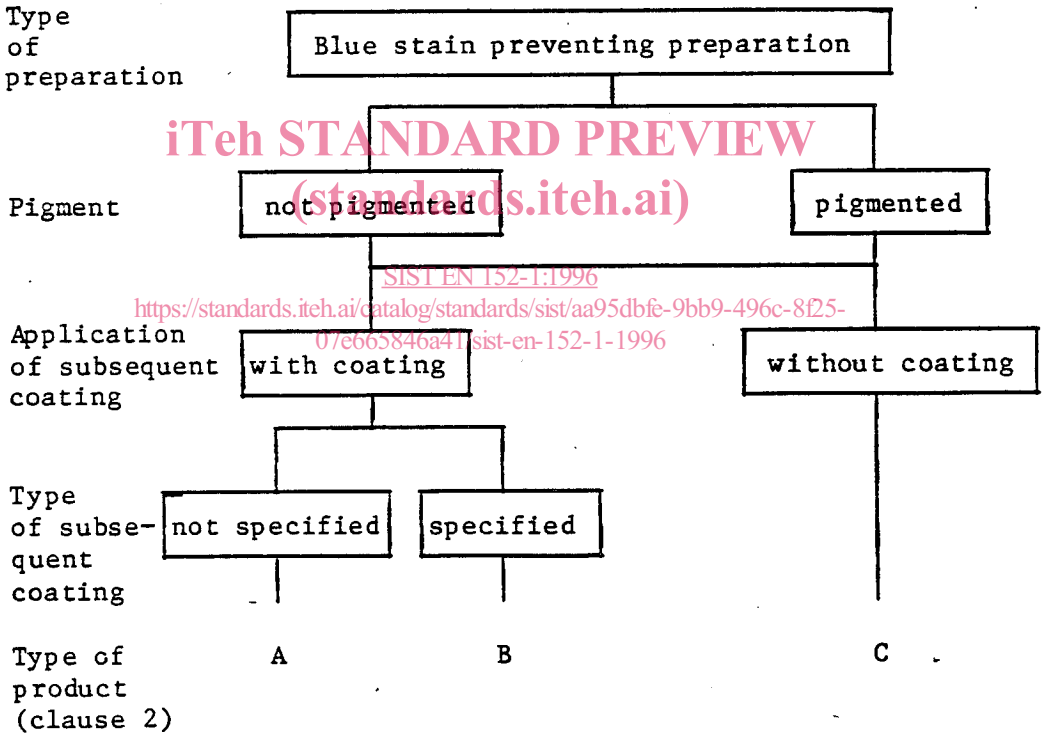
This method is applicable to the following types of preparations applied by superficial treatments such as brushing (see Figure 1) :

A fungicidal preparations with or without pigment, used in conjunction with unspecified varnishes or paint coatings,

B fungicidal preparations with or without pigment, used in conjunction with specified varnishes or paint coatings,

C fungicidal preparations with or without pigment, used without subsequent varnish or paint coating.

FIGURE 1 - DESIGNATION OF DIFFERENT TYPES OF PREPARATIONS FOR PREVENTING BLUE STAIN IN SERVICE



It is also possible to test the effectiveness of a combined protective system which involves the application of one preparation by one of the non-brushing techniques prescribed in Part 2 followed by a subsequent application of a different preparation by the brushing procedures prescribed in Part 1.

3 WORKING PRINCIPLE

The basic principles of the test method are to provide for infection by blue-stain fungi into the treated face and into the untreated part behind the treated one and observe the development of infection into the treated face.

- A series of wood specimens (test specimens) of the given timber species are treated on one face with the product under test. The treatment differs according to the type of preparation (clause 2) (Annex E table 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 1) or as otherwise specified by the manufacturer 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 1) or as otherwise specified by the manufacturer followed by a surface coating strictly according to the manufacturers 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 1) or as otherwise specified by the manufacturer but with no subsequent application of coating.

- Treated specimens are exposed to weathering.

- Test specimens are then exposed in the laboratory to the action of a mixed culture of two fungi causing blue-stain in service.

For purposes of comparison, it is recommended that an appropriate reference product of known performance be included in the test.

4 MATERIALS

4.1 BIOLOGICAL MATERIAL

The test fungi to be used in all tests are (3)

- Aureobasidium pullulans (de Barry) Arnaud, strain P 268 (4), source Hann - Münden

- Sclerophoma pithyophila (Corda) v. Höhn, strain S 231 (5), source Hann - Münden

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(3) Maintain the strains on two per cent 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 Materialprüfung, Unter den Eichen 87, D 1000 Berlin 45 and from the Commonwealth Mycological Institute, Ferry Lane, Kew, London UK.

(4) Identical to strain n° IMI 269 216 of culture deposited at CMI, Kew.

(5) Identical to strain n° IMI 269 217 of culture deposited at CMI, Kew.

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.

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.

4.2 CHEMICALS

4.2.1 Nutrient medium

For the preparation of a spore suspension of the test fungi a solution of malt buffered to pH 4.2 with citric acid shall be used. It shall contain 20 g/l concentrated malt extract or dried malt with a nitrogen content of 0,9 $\pm$ 0,3 % m/m (See Annex B for an example of a nutrient solution).

4.2.2 Coating material

Unpigmented varnish based on low viscosity, long oil alkyd resin, with driers and without any fungicidal or fungistatic components (see Annex A).

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

4.2.3 Priming coating material for control specimens

Linseed oil varnish based on water-free and filtered specimen (see Annex A).

4.2.4 White spirit

For the characteristics of the white spirit see Annex A.

4.2.5 End sealer

Any appropriate material which is resistant to the solvents employed and to the weathering procedure. The varnish (4.2.2) is suitable.

4.2.6 Sterilant (if necessary, see 7.3.2)

An ethylene oxide-based sterilant or propylene oxide (see Annex C).

4.2.7 An hydrated, laminar, aluminium-iron-magnesium silicate exfoliated to give particles of 1 mm to 3 mm with an apparent density of 80 kg/m^3 to 90 kg/m^3. Particles of less than 1 mm shall be eliminated by sieving prior to use, to ensure the absence of free water and prevent any significant agglomeration of the particles.

4.3 APPARATUS

4.3.1 Incubation room with the following climatic conditions : 22 ± 1 °C and 70 ± 5 % relative humidity.

4.3.2 Conditioning room at 20 ± 2 °C and 65 ± 5 % relative humidity.

In place of a conditioning room a closed vessel containing a saturated ammonium nitrate solution with solid material at 20 ± 2 °C can be used.

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

- weathering racks : frames to take the wood specimens on horizontal bars at 45° (see figure 3 in Annex D). The frames shall be constructed of inert material (eg plastics, aluminium). In the racks the wood specimens shall be free on all sides and be secured against slipping.

- 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.

- 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 specimens shall face the direction in which the exposure conditions are expected to be most severe. In Central Europe and France this is to the South West and in the UK to the South

  . the wood specimens shall be placed 1 m to 1,5 m above the ground

  . the wood specimens shall be situated at least 0,5 m above any possible vegetation.

4.3.4 **Culture vessels** with a capacity of 400 cm^3 to 600 cm^3 and an internal area of base of 90 cm^2 to 120 cm^2 (see in Annex D an example of culture vessel).

4.3.5 **Steriliser**

- apparatus for chemical sterilization or access to ionizing-radiation service (Annex C).

- autoclave, adjustable up to 120 °C, or if no autoclave is available : steaming chamber.

4.3.6 **Measuring magnifying glass** with reading accuracy of 0,5 mm.

4.3.7 **Usual laboratory equipment**, especially :

- analytical balance with accuracy 0,001 g

- various brushes

- abrasive paper, grit size 80 and 180

- viscometer (flow cup 4, ISO 2431) (6)

- drying oven, adjustable up to 150 °C

4.4 **OTHER MATERIAL**

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

5 SAMPLE OF WOOD PRESERVATIVE

The sample shall be representative of the preparation to be tested.

6 WOOD SPECIMENS

6.1 WOOD SPECIES

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

- obligatory for every test : pine sapwood (Pinus sylvestris Linnaeus)

- if desired, other susceptible wood species may be used in additional series of tests.

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(6) ISO 2431 - 1984 "Paints and varnishes - Determination of flow time by use of flow cups".

6.2 WOOD QUALITY

Sound, straight grain, knot-free and uniformly grown wood shall be used exclusively. The wood shall be stain-free. Wood with a resinous appearance shall be avoided.

Wood from the immediate vicinity of the top or the lowest 1 m of the trunk is unsuitable.

The wood shall show a rate of growth of : 2,5 - 8 annual rings/cm.

The proportion of latewood shall be less than 30 %.

The wood shall not have been floated, stored in water or heated above 60 °C or treated with chemicals.

The wood specimens shall only be stored for a short time because after 12 to 18 months the susceptibility to blue-stain fungi can become markedly reduced. If the wood is deep frozen in the fresh condition it can be stored at - 18 °C up to 2 years if it is sealed in air-tight wrapping. It may be stored for a longer period, if the susceptibility to blue stain is tested prior to use.

Note : If trees are winter felled and immediately converted into 70 mm boards which are then kiln dried and stored under suitable conditions, battens prepared within 18 months of felling develop adequate amounts of stain. However after more than 6 months of storage the susceptibility to blue stain of each batten employed should be tested prior to use.

6.3 PREPARATION OF THE WOOD SPECIMENS

Prepare battens of suitable length in multiples of 110 mm with a cross section of about 50 mm X 15 mm from the green or defrosted wood and with the annual rings forming an angle of 45 $\pm$ 10° with the edges (see figure 4, Annex D). Number the battens and mark them on the side which was originally towards the centre in the trunk.

Dry the battens carefully to achieve a moisture content of 12 % to 15 % preferably by artificial drying at a maximum of 60 °C.

Plane the battens after drying to a cross section of 40 mm X 10 mm and round the longitudinal edges of the large face which was originally towards the outside of the trunk with a moulding knife (2 mm radius of curvature).

Cut wood specimens 110 mm long from these battens serially.

Smooth the rounded edges and the face between them with sandpaper grit size 80 and clean off sanding dust. Sanding can be dispensed with, if the planing produces a smooth level surface without planer marks (sanding of the battens may be undertaken before cross-cutting).