



SLOVENSKI STANDARD

SIST EN 20-1:1996

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Zaščitna sredstva za les - Določanje učinkovitosti preventivne zaščite proti rjavemu parketarju *Lyctus brunneus* (Stephens) - 1. del: Površinsko nanašanje - Laboratorijska metoda

Wood preservatives - Determination of the protective effectiveness against *Lyctus Brunneus* (Stephens) - Part 1: Application by surface treatment (laboratory method)

Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber *Lyctus Brunneus* (Stephens) - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)

Produits de préservation du bois - Détermination de l'efficacité protectrice vis-a-vis de *Lyctus Brunneus* (Stephens) - Partie 1: Application par traitement de surface (Méthode de laboratoire)

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ICS:

71.100.50 Kemikalije za zaščito lesa Wood-protecting chemicals

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EUROPEAN STANDARD

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Together with EN 20-2 supersedes
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English version

Wood preservatives - Determination of the protective effectiveness against Lyctus Brunneus (Stephens) - Part 1: Application by surface treatment (laboratory method)

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Produits de préservation du bois -
Détermination de l'efficacité protectrice
vis-à-vis de Lyctus Brunneus (Stephens) -
Partie 1: Application par traitement de surface
(Méthode de laboratoire)

Holzschutzmittel - Bestimmung der vorbeugenden
Wirkung gegenüber Lyctus Brunneus (Stephens) -
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(Laboratoriumsverfahren)

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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

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Foreword

This part of this European Standard 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 part of EN 20 together with EN 20-2 replaces EN 20:1974. This part of EN 20 is required to enable effectiveness assessments of preservatives which are intended to be applied by surface treatment.

National Standards identical to this European Standard shall be published at the latest by 93-01-31 and conflicting national standards shall be withdrawn at the latest by 93-01-31.

This part of this EN 20 was adopted by CEN and in accordance with the CEN/CENELEC Internal Regulations the following countries are bound to implement this European Standard : Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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INTRODUCTION

This Part of this EN 20 describes a laboratory method of test which gives a basis for assessment of the protective effectiveness of a wood preservative, when applied as a surface treatment, against Lyctus brunneus. It allows the determination of the concentration at which the product prevents the development of infestation from egg-laying.

It can also be used with formulations ready for use.

The species Lyctus brunneus is chosen because of its particular practical relevance and because it can be used easily in laboratory tests. The method can be used with other lyctid species, but the results may not be comparable with those obtained with Lyctus brunneus.

The test specimens are enriched with a defined nutrient solution, before exposure to egg-laying, in order to ensure uniformity of nutrient quality of test specimens between different laboratories.

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 further recommended that results from this test should be supplemented by those from other appropriate tests, and above all by comparison with practical experience.

When products which are very active at low concentrations are used it is very important to take suitable precautions to isolate and separate, as far as possible, operations involving chemical products, other products, treated wood, laboratory apparatus and clothing. Suitable precautions should include the use of separate rooms, areas within rooms, extraction facilities, conditioning chambers and special training for personnel.

1 SCOPE

This Part of EN 20 specifies a method for the determination of the protective effectiveness or the toxic values of a wood preservative against infestation by Lyctus brunneus (Stephens) when the product is applied as a surface treatment to wood.

This method is applicable to :

- water-insoluble chemicals which are being studied as active insecticides, or,
- organic 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, or
- water-soluble materials, for example salts.

NOTE : This method may be used in conjunction with ageing procedures, which do not remove the added nutrient.

2 NORMATIVE REFERENCES

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

ISO 835-1:1981 Laboratory glassware - Graduated pipettes - Part 1 : general requirements

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

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3 DEFINITIONS

For the purposes of this Part of EN 20, 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

Depending on the test being carried out either

a set of test specimens of a susceptible wood species is impregnated with a nutrient solution and then surface treated with a solution of the preservative ; or

if toxic values are to be determined, several sets of test specimens of a susceptible wood species are impregnated with a nutrient solution and then surface treated with a series of solutions in which the concentration of preservative is ranged in a given progression.

The treated test specimens are exposed to adult Lyctus brunneus and the resulting attack compared to that in untreated controls. If the preservative has been prepared in the laboratory by dilution of a concentrate or by dissolution of a solid, the resulting attack is also compared to that in solvent or diluent treated controls.

5 TEST MATERIALS AND APPARATUS

5.1 Biological material

Lyctus brunneus (Stephens), insects emerged from cultures not more than 48 h before use in the test, reared for at least two generations on non-enriched oak or no more than three generations on enriched oak.

NOTE : The culturing of Lyctus brunneus requires care in order to obtain a regular supply of adults which have not already laid eggs. The culturing technique, which experience has shown to be suitable, is described in annex B.

5.2 Products and reagents

5.2.1 Paraffin wax, for sealing the relevant surfaces of specimens to be treated with solutions in which water is the continuous phase.

NOTE : Paraffin wax with a setting point of 52 °C to 54 °C has been found to be suitable.

5.2.2 Gelatin, for sealing the relevant surfaces of specimens to be treated with solutions in which an organic solvent is the continuous phase.

5.2.3 Pasta, for securing filter paper. The paste shall be starch-free, non-toxic to Lyctus and insoluble in the product under test.

NOTE : Sodium carboxymethyl cellulose, food grade, has been found to be suitable.

5.2.4 Water, complying with grade 3 of ISO 3696.

5.2.5 Solvent or diluent, a volatile liquid that will dissolve or dilute the preservative but does not leave a residue in the wood at the end of the post-treatment conditioning period that has a toxic effect on the insects.

CAUTION : Do not use benzene or other solvents which pose a health risk.

5.2.6 Peptone prepared as an enzymatic hydrolysate of meat

5.2.7 D (+)-glucose

5.2.8 Filter paper ordinary quality, medium-fast grade

5.2.9 Fine cloth of cotton or linen, with a mesh aperture of less than 0,3 mm.

5.3 Apparatus

5.3.1 **Culturing chamber**, with air circulation, controlled at $(26 \pm 1)^\circ\text{C}$, and at relative humidity $(75 \pm 5)\%$.

5.3.2 **Conditioning chamber**, well ventilated, controlled at $(20 \pm 2)^\circ\text{C}$ and relative humidity $(65 \pm 5)\%$.

NOTE : The conditioning of specimens may be carried out in the laboratory work area (see 5.3.4) provided that this has the conditions specified for the conditioning chamber (see 5.3.2).

5.3.3 **Drying chamber**, well ventilated, controlled at $(30 \pm 2)^\circ\text{C}$.

5.3.4 **Laboratory work area**, well ventilated, where treatment of the test specimens is carried out.

CAUTION : It is essential to follow safety procedures for handling flammable and toxic materials. Avoid excessive exposure of operators to solvents or their vapours.

5.3.5 **Testing chamber**, with conditions identical to those of the culturing chamber (see 5.3.1).

5.3.6 **Vacuum vessel(s)**, fitted with stopcocks.

5.3.7 **Vacuum pump**, fitted with a pressure gauge and capable of maintaining a pressure of 700 Pa (1).

5.3.8 **Weights**, to provide ballast for the test specimens. The weights shall not react with any materials with which they come into contact during the test.

5.3.9 **Pipette**, of type specified in ISO 835, Part 1, Class B : graduated pipette with no waiting time. Capacity 1 ml with an accuracy of $\pm 0,01$ ml.

5.3.10 **Safety equipment and protective clothing**, appropriate for the test product and the test solvent, to ensure the safety of the operator.

5.3.11 **Test containers**, suitable for holding the test specimens and of material resistant to the solvents used.

NOTE : Jars of approximately 60 mm diameter and 100 mm height have been found to be suitable.

(1) 100 Pa = 1 mbar

5.3.12 Ordinary laboratory equipment, including a balance capable of weighing to an accuracy of 0,01 g.

5.3.13 X-ray apparatus, (optional) with tungsten target and beryllium window, with voltage and current continuously variable in the ranges :

- . Voltage : 10 kV to 50 kV,
- . Current : 0 mA to 15 mA.

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

The test shall be carried out on European oak. This shall comprise sessile oak, Quercus petraea (Mattuschka) Lieblin, and for pedunculate oak, Quercus robur Linnæus.

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7.2 Quality of wood

Use only sound sapwood with between 2 annual growth rings per 10 mm and 10 annual growth rings per 10 mm, straight-grained without knots. The wood, having few tyloses, shall not have been floated or subjected to any chemical treatment and shall be dried without delay as described in 7.3.

7.3 Provision of the test specimens

Remove the bark from the freshly cut billets and then cut them into lengths (from which strips 25 mm x 15 mm in cross-section will be cut). Immediately place the billets in the drying chamber (5.3.3) stacked with spaces between individual billets so as to allow movement of air through the stack. Retain the billets in the drying chamber until their moisture contents are reduced to 15 % (m/m) (2).

NOTE : Moisture meters of the two pronged electrical conductivity type are suitable for assessing moisture content.

Cut the sapwood of the dried billets into planed strips 25 mm x 15 mm cross section and with the wide longitudinal faces oriented tangentially. Cut the specimens for test from the planed strips. The individual specimens for test shall be cut cleanly and shall have sharp edges.

(2) As determined in accordance to ISO 3130

The specimens required for a test shall be taken from at least two lots each corresponding to a different tree or two sapwood strips taken from diametrically opposed positions in the same log. The specimens from the two sources shall be combined and the test specimens taken at random from them.

7.4 Dimensions of test specimens

The dimensions of each specimen after one week in the conditioning chamber (5.3.2) shall be :

$$(50 \pm 0,5) \text{ mm} \times (25 \pm 0,5) \text{ mm} \times (15 \pm 0,5) \text{ mm}$$

NOTE : The total surface area of the longitudinal faces is theoretically 40 cm².

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

7.5 Number of test specimens

Use :

- a) for each preservative and each concentration : five specimens (see 7.4),
- b) for a complete test of any given preservative : five untreated control specimens (see 7.4),
- c) if a solvent or diluent (water included) is used : five control specimens (7.4) treated with that solvent or diluent (5.2.4 or 5.2.5).

8 PROCEDURE

8.1 Prior impregnation of the test specimens with a nutrient solution

8.1.1 Composition of the nutrient solution

Dissolve 2 g of the peptone (5.2.6) and 10 g of the glucose (5.2.7) in 100 ml water (5.2.4).

8.1.2 Method of impregnation of nutrient solution

Weigh each test specimen, place them in a beaker and ballast them with weights (5.3.8) to prevent them floating. Place the beaker in the vacuum vessel (5.3.6), and reduce the pressure using the vacuum pump (5.3.7) to 700 Pa. Hold the specimens at this pressure for 15 min. Allow the nutrient solution (8.1.1) into the beaker so as to cover the specimens. Bring the specimens back to atmospheric pressure, adding further solution if necessary to keep the specimens covered.

Leave the specimens immersed for 1 h in the solution and then reweigh them after draining for 1 min.

Determine the uptake of nutrient solution for each test specimen.