SLOVENSKI STANDARD
oSIST prEN 20-2:2022

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Zaščitna sredstva za les - Določanje učinkovitosti preventivne zaščite proti rjavemu parketarju Lyctus brunneus (Stephens) - 2. del: Globinska impregnacija lesa (laboratorijska metoda)

Wood preservatives - Determination of the protective effectiveness against Lyctus brunneus (Stephens) - Part 2: Application by impregnation (Laboratory method)

Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber Lyctus brunneus (Stephens) - Teil 2: Anwendung durch Volltränkung (Laboratoriumsverfahren)

Produits de préservation du bois - Détermination de l'efficacité protectrice vis-à-vis de Lyctus Brunneus (Stephens) - Partie 2 : Application par traitement en profondeur (Méthode de laboratoire)

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71.100.50	Kemikalije za zaščito lesa	Wood-protecting chemicals

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English Version

Wood preservatives - Determination of the protective effectiveness against Lyctus brunneus (Stephens) - Part 2: Application by impregnation (Laboratory method)

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Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber Lyctus brunneus (Stephens) - Teil 2: Anwendung durch Volltränkung (Laboratoriumsverfahren)

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 38.

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

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European foreword

This document (prEN 20-2:2022) has been prepared by Technical Committee CEN/TC 38 “Durability of wood and wood-based panels”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 20-2:1993.

Significant technical differences between this document and EN 20-2:1993 are as follows:

a) the source of peptone is no longer specified (5.2.6);

b) other wood species than oak may be used for the test under certain circumstances (7.1);

c) tests with solvent control may be omitted, when the solvent is water (7.5);

d) test duration was alined with EN 20-1 and extended to 20 weeks (8.6);

e) new pictures were used for Figure B.1, Figure B.2 and Figure B.3.

NOTE Test results obtained according to earlier versions of this document and when the tests had started before this version of EN 20-2 was published are considered valid.

Introduction

This Part of the EN 20 series describes a laboratory method of testing which gives a basis for assessment of the protective effectiveness of a wood preservative against *Lyctus brunneus*. It allows the determination of the concentration at which the preservative completely prevents the development of infestation from egg-laying in fully impregnated wood of susceptible species.

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 might 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 appropriates 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 and conditioning chambers as well as special training for personnel.

1 Scope

This part of the EN 20 series specifies a method for the determination of the protective effectiveness or the toxic values of a wood preservative against infection by *Lyctus brunneus* (Stephens) in wood which has been treated previously by full impregantion.

This method is applicable to:

— water-insoluble chemicals which are being studied as active insecticides; or

— organic formulsation, as supplied or as prepared in the laboratory by dilution of concentrates.

This method is applicable to water-based preservatives.

NOTE This method can be used in conjuction with ageing procedures, which do not remove the added nutrient.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1
representative sample
sample having its physical or chemical characteristics identical to the volumetric average characteristics of the total volume being sampled

3.2
supplier
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 nutrient solution and then impregnated with a solution of the preservative; or

— if toxic values are to be determined, several sets of tests specimens of a susceptible wood species are impregnated with a nutrient solution and then impregnated 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 preservation 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 48h before use in the test.

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 experiences 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 test specimens to be treated with solutions

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

5.2.2 Filter paper, ordinary quality medium-fast grade

5.2.3 Paste, 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 effet on the insects

CAUTION — Do not use benzene or other solvents which pose on health risk.

5.2.6 Peptone

5.2.7 D (+)-glucose

5.2.8 Filter paper ordinary quality, medium-fast grade

5.2.9 Fine cloth of cotton of 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 ± 2) °C, and at relative humidity (75 ± 5) %

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

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 ± 2) °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 of their vapours.

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

5.3.6 Treatment vessels, of material that does not react withnthewood preservative under test; for example, glass for organic products

5.3.7 Vacuum vessel(s), fitted with stopcocks

5.3.8 Vaccum pump, fitted with a pressure gauge and capable of maintaining a pressure of 700 Pa

5.3.9 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

5.3.10 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 container, 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.

5.3.12 Drying vessel(s), capable of holding sets of five test specimens (7.4), provided with a cloes-fitting cover and containing support that will give minimum contact with treated test specimens to be place on them. The vessels and supports shall be of materials that do not react with the preservative under test, for example glass

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

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

— 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.

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 pedunculate oak, *Quercus robur* Linnaeus.

Other wood species, with demonstrated susceptiblity to *Lyctus brunneus* (Stephens), like *Triplochiton scleroxylon*, may be used instead of European oak.

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-grainded 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 test specimens

Remove the bark from the freshly cut billets and then cut them into lengths (from which strips 25 mm × 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)[1].

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

Cut the sapwood of the dried billets into planted strips 25 mm × 15 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.

The specimens required for a test shall be taken from at least tow lots each corresponding to a different tree or two sapwood strips taken diametrically opposed positions in the same log. The specimens from the two sources shalle 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 ± 0,5) mm × (25 ± 0,5) mm × (15 ± 0,5) mm

For the purpose of calculating the mass of preservative retained per unit volume of wood (8.3.2) the nominal volume of each test specimen shall be taken as 18,75 cm^3.

Mark each specimen so that it can be identified throught 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).

Control test specimens under c) may be omitted if the solvent or diluent is water accoding to 5.2.4.

[1] As determined in accordance to ISO 3130.

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 hem 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 vaccum pump (5.3.7) to 700 Pa. Hold the specimens at this pressure far 15 min. Allow the rutrient 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.

Retain for testing only test specimens absorbing between 300 kg/m^3 and 600 kg/m^3 of nutrient solution.

8.1.3 Drying of test specimens

Dry the specimens in the drying chamber (5.3.3) at (30 ± 2) °C for on week.

8.2 Conditioning of specimens before end sealing

Transfer the dried test specimesn to the conditioning chamber (5.3.2) and condition them for one week.

8.3 Treatment of test specimens

8.3.1 Preparation of treatment solutions

8.3.1.1 General

Seal the end-grain surfaces as follows:

8.3.1.2 Solid preservatives

Dissolve the preservative in an appropriate solvent (5.2.5) to the required concentration, or to a series of concentrations if toxic values are to be determined.

All treatment solutions shall be freshly prepared.

8.3.1.3 Liquid preservatives

If appropriate, use the preservative without further preparation other than any necessary stirring. If it is a concentrate, or if toxic values are to be determined, dilute the preservative with the diluent to the required working concentration, using the procedure specified by the supplier.

All treatment solutions shall be freshly prepared.

8.3.1.4 Toxic values

If toxic values are to be determined, prepare a series of at least five concentrations by mass, distributed evenly about the expected toxic values. A solvent or diluent control, i.e. treatment at concentration 0, shall also be used. If the approximate toxic values are unknown, the concentrations shall form a widely spaced geometric progression for a first test and a more closely spaced geometric or arithmetic progression for subsequent tests.

All treatment solutions shall be freshly prepared.