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Zaģļitna sredstva za les - Ugotavljanje uļinkovitosti preventivne zaģļite proti navadnemu trdoglavcu Anobium punctatum (De Geer) glede na ģtevilo pologenih jajļec in preģivelih liļink - 2. del: Postopek z globinsko impregnacijo lesa (Laboratorijska metoda)

Wood preservatives - Determination of the protective effectiveness against Anobium punctatum (De Geer) by egg-laying and larval survival - Part 2: Application by impregnation (Laboratory method)

Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber Anobium punctatum (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 2: Anwendung durch Volltränkung (Laboratoriumsverfahren)

Produits de préservation du bois - Détermination de l'efficacité protectrice vis a vis de Anobium punctatum (De Geer) par l'observation de la ponte et de la survie des larves - Partie 2 : Application par imprégnation (Méthode de laboratoire)

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This European Standard was approved by CEN on 3 February 2005.

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Foreword

This document (EN 49-2:2005) 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of an identical text or by endorsement, at the latest by September 2005, and conflicting national standards shall be withdrawn at the latest by September 2005.

This document supersedes EN 49-2:1992.

This document consists of two parts, Part 1 is required to enable effectiveness assessments of wood preservatives which are intended to be applied by surface treatment and Part 2 those which are intended to be applied by impregnation.

Significant technical differences between this document and EN 49-2:1992 are as follows:

a) introduction of new harmonised specifications for the test specimens used in the diverse biological tests;

b) acknowledgement of the terms given in EN 1001-1;

c) 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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

This document describes a laboratory method of testing which gives a basis for assessment of the effectiveness of a wood preservative, against *Anobium punctatum.* It allows the determination of the concentration at which the product prevents the development of infestation from egg laying.

The method simulates conditions which can occur in practice on timber which has been treated some time previously with a deeply penetrating wood preservative and on which eggs of *Anobium punctatum* are laid.

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 (see also Annex D for environmental, health and safety precautions).

1 Scope

This document specifies a method for the determination of the protective effectiveness or the toxic values of a wood preservative against *Anobium punctatum* (De Geer) by egg-laying and larval survival in wood which has been treated previously by full impregnation. This method is applicable to:

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

— organic formulations, as supplied or as prepared in the laboratory by dilution of concentrates;,

— organic water-dispersible formulations as supplied or as prepared in the laboratory by dilution of concentrates, and

— water-soluble materials, for example salts.

NOTE This method may be used in conjunction with an ageing procedure, for example EN 73.

2 Normative reference

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

3 Terms and definitions

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

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 (person or company providing the sample of woos preservative to be tested)

4 Principle

Depending on the test being carried out either

— On a set of test specimens of a susceptible wood species that is impregnated with a solution of the preservative, or

— if toxic values are to be determined, on several sets of test specimens of a susceptible wood species that are 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 gravid females of *Anobium punctatum.* The numbers of eggs laid, the numbers of eggs hatched, and the numbers of the surviving larvae are compared with those in untreated control test specimens. 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 control test specimens.

5 Test materials

5.1 Biological material

***Anobium punctatum* (De Geer)**

Adult males and females in good condition.

Adults to be used in the test shall be collected daily from naturally infested wood or laboratory culture (see Annex C).

Use recently emerged adults which have been recently collected; kept overnight in quarantine (see C.6); and then checked to ensure that they are undamaged, active, and free from any infestation by mites. Determine the sex (see Annex B) of the collected and checked adults and place the males and females in separate containers.

NOTE The proportion of males and females varies during the emergence period.

5.2 Products and reagents

5.2.1 Paraffin wax, for sealing the end sections of test specimens.

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

5.2.2 Paste, for securing filter paper. The paste shall be starch-free, non-toxic to *Anobium punctatum* and insoluble in the product under test.

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

5.2.3 Xylene, technical grade, mixed isomers.

5.2.4 Water, complying with grade 3 of EN 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 Filter paper, ordinary quality, medium-fast grade.

5.2.7 Fine cloth, of cotton or linen, with a mesh aperture of 0,3 mm to 0,6 mm.

5.3 Apparatus

5.3.1 Culturing chamber, with air circulation, controlled at (21 ± 2) °C, and at relative humidity (80 ± 5) %.

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

NOTE The conditioning of test specimens can 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 Treatment vessel(s), of a material that does not react with the preservative under test, for example of glass for organic products and of polyethylene for salts containing fluorine.

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 Drying vessel(s), capable of holding sets of five test specimens (7.5), provided with a close-fitting cover and containing supports that will give minimum contact with treated test specimens to be placed on them. The vessels and supports shall be of a material that does not react with the preservative under test, for example glass for organic compounds and polyethylene for products containing fluorine.

5.3.7 Vacuum vessel(s), fitted with stopcocks, capable of receiving the treatment vessels (5.3.3).

5.3.8 Vacuum pump, fitted with a pressure gauge and capable of maintaining a pressure of 700 Pa[1)].

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 containers, suitable for holding the test specimens and of material resistant to the solvents used, and fitted with perforated covers to provide a good exchange of air.

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

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.

5.3.14 Protective gloves

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.

1) 100 Pa = 1 mbar.

7 Test specimens

7.1 Species of wood

The reference species is European oak. This shall be either sessile oak (*Quercus petraea* (Mattuschka) Lieblin) or pedunculate oak (*Quercus robur* Linnaeus).

NOTE Additional tests may be carried out using other timber species[2] but, if so, this should be stated in the test report.

7.2 Wood quality

The wood shall be free from visible cracks, stain, decay, insect damage and other defects. The wood shall not have been water-stored, floated, chemically treated or steamed. The wood shall originate from trees preferably felled in winter. The trees shall be cut immediately after felling and the timber rapidly air dried. The wood shall not have been stored for more than three years.

The wood shall be exclusively sapwood [3] and having between two annual rings per 10 mm and 10 annual rings per 10 mm.

NOTE It is recommended to use test specimens of similar growth rate within a single test.

7.3 Provision of test specimens

Prepare planed strips having a cross-section of (25 ± 0,5) mm × (15 ± 0,5) mm [4] removing a minimum of 2 mm from any surfaces exposed during drying. The longitudinal faces shall be parallel to the direction of the grain. The annual rings shall be parallel to the broad faces (contact angle of less than 5°). Make transverse cuts, neatly to give sharp edges and a fine-sawn finish to the end-grain surfaces, to give test specimens (50 ± 0,5) mm long.

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

7.4 Dimensions of test specimens

The dimensions of each test specimen after reaching equilibrium in the conditioning chamber (5.3.2) shall be (50 ± 0,5) mm × (25 ± 0,5) mm × (15 ± 0,5) mm.

For the purposes of calculating the mass of preservative retained per unit volume of wood (8.1.2.2) the nominal volume of each test specimen shall be taken as 18,75 cm^3.

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

7.5 Number of test specimens

Use:

a) five test specimens (see 7.4) for each preservative and each concentration:);

b) five untreated control test specimens (see 7.4) for a complete test of any given preservative;

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2) The growth of young larvae of *Anobium punctatum* is slow in test specimens from resinous wood. Results from test specimens in resinous wood should be compared with those obtained from oak test specimens.

3) It is not essential in this test for the starch content to be high.

4) These test specimens may be taken from the trunk of the tree or the large branches.

c) five control test specimens (7.4) treated with that solvent or diluent (5.2.4 or 5.2.5) if a solvent or diluent (water included) is used.

It is advisable to treat more than the specified number of test specimens so that, after weighing, any test specimens with abnormally high or low retentions can be rejected from the batch.

8 Procedure

8.1 Preparation of the test specimens

8.1.1 Conditioning of test specimens before treatment

Allow the test specimens to condition in the conditioning chamber (5.3.2), for a minimum of two weeks.

8.1.2 Treatment of the test specimens

8.1.2.1 Preparation of the treatment solution

8.1.2.1.1 Solid preservatives

Water-soluble preservatives:

— dissolve the preservative in the water (5.2.4) to the required concentration, or to a series of concentrations if toxic values are to be determined.

Non-water-soluble 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.

8.1.2.1.2 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 manufacturer.

All treatment solutions shall be freshly prepared.

8.1.2.1.3 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.

8.1.2.2 Impregnation

Carry out impregnation in ascending order of concentration, starting with the solvent control (concentration = 0).

The following procedure ensures the required complete impregnation of test specimens by the test solutions.