SLOVENSKI STANDARD
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Zaġļitna sredstva za les - Ugotavljanje preventivnega delovanja proti hiġnemu kozliļku Hylotrupes bajulus (Linnaeus) ï 1. del.: Larvicidial effect (Laboratorijska metoda)

Wood preservatives - Determination of the preventive action against Hylotrupes bajulus (Linnaeus) - Part 1: Larvicidial effect (Laboratory method)

Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber Hylotrupes bajulus (Linnaeus) - Teil 1: Larvizide Wirkung (Laboratoriumsverfahren)

Produits de préservation du bois - Détermination de l'action préventive contre Hylotrupes bajulus (Linnaeus) - Partie 1: Effet larvicide (Méthode de laboratoire)

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Wood preservatives - Determination of the preventive action against Hylotrupes bajulus (Linnaeus) - Part 1: Larvicidial effect (Laboratory method)

Produits de préservation des bois - Détermination de l'action préventive contre Hylotrupes bajulus (Linnaeus) - Partie 1: Effet larviciel (Méthode de laboratoire)

Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber Hylotrupes bajulus (Linnaeus) - Teil 1: Larvizide Wirkung (Laboratoriumsverfahren)

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (EN 46-1:2005) 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of an identical text or by endorsement, at the latest by September 2005, and conflicting national standards shall be withdrawn at the latest by September 2005.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 46:1988.

This document consist of two parts to enable preventive action of wood preservatives ,against recently hatched larvae of *Hylotrupes bajulus* , which are intended to be applied by surface treatment; Part 1 is required to determine the larvicidial effect of preservatives and Part 2 is required to determine the ovicidal action of the preservatives after egg-laying of young females.

Significant technical differences between this document and EN 46:1988 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 the assessment of the preventive action of a wood preservative, when applied as a surface treatment, against recently hatched larvae of *Hylotrupes bajulus,* whereas the method for determining the toxic values against *Hylotrupes bajulus* (EN 47) provides a means of checking whether a preservative prevents attack by these larvae and prevents their survival within totally impregnated wood.

This method makes it possible to determine whether recently hatched larvae are capable of boring through the treated surface of a susceptible wood species and of surviving in the untreated part of the test specimen. For this purpose, the procedure seeks to reproduce normal egg-laying conditions existing in cracks in wood, which provide the principal egg-laying sites. It takes account of the fact that, if larvae pass through the treated surface, they will then tunnel in the direction of the least protected regions of the wood.

This laboratory method provides one criterion by which the value of a preservative can be assessed. In making this assessment, the methods by which the preservative may be applied should be taken into account. This test is of particular interest when applied to test specimens which have been subjected to an ageing procedure. It is further recommended that results from this test should be supplemented by those from other appropriate tests and, above all, by 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 E for environmental, health and safety precautions).

1 Scope

This document specifies a method for the determination of the preventive action of a wood preservative against recently hatched larvae of *Hylotrupes bajulus* (Linnaeus) when the preservative is applied as a surface treatment to wood.

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.

The method is applicable whether or not the test specimens have been subjected to appropriate ageing procedures.

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 wood 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 surface treated 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 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 recently hatched larvae of *Hylotrupes bajulus.* The resulting attack is observed and 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

5.1.1 ***Hylotrupes bajulus*** **(Linnaeus)** larvae, within three days of hatching.

5.1.2 **Source of larvae**. Obtain the larvae from cultures reared e.g. as described in Annex B.

5.1.3 **Provision of larvae**. Collect larvae from eggs laid by different females.

5.1.4 **Choice of larvae**. Use a mixed batch of these larvae for the test. Use 10 larvae per treated test specimen or control test specimen.

5.2 Products and reagents

5.2.1 **Paraffin wax**, for fixing the glass plate and for sealing the end faces of test specimens to be treated with solutions in all cases 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 end faces of test specimens to be treated with solutions in which an organic solvent is the continuous phase.

5.2.3 **Water**, complying with grade 3 of EN ISO 3696.

5.2.4 **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.

5.3 Apparatus

5.3.1 **Culturing chamber**, with air circulation, and controlled at (28 ± 2) °C and at a relative humidity of (70 ± 5) %.

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

NOTE The conditioning of test specimens may be carried out in the laboratory work area (see 5.3.3) provided that this has the conditions specified for the conditioning chamber (see 5.3.2).

5.3.3 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.

5.3.4 Testing chamber, ventilated and air conditioned, controlled at (22 ± 2) °C and at a relative humidity of (70 ± 5) %.

5.3.5 Treatment vessels, 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.

5.3.6 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.

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

5.3.8 Glass plates, 48 mm long and 25 mm wide, intended to provide a lateral slit on the test specimens.

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

5.3.10 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.

7 Test specimens

7.1 Species of wood

The reference species is Scots pine (*Pinus sylvestris* Linnaeus)[1)].

NOTE Additional tests may be carried out using other species 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 wood shall not have been stored for more than five years.

NOTE 1 Wood that has been kiln dried at temperatures below 60 °C may be used.

The wood shall be exclusively sapwood containing little resin and having between 2,5 annual rings per 10 mm and eight annual rings per 10 mm. The proportion of latewood in the annual rings shall not exceed 30 % of the whole.

1) In southern European countries the pine species most frequently infested by *Hylotrupes bajulus* may be used as an alternative, provided that the suitability of the species for use in the tests specified in this document has been demonstrated in all aspects (development of larvae, resistance to impregnation etc.).

NOTE 2 It is recommended to use test specimens of similar growth rate within a single test.

7.3 Provision of test specimens[2)]

Prepare planed strips having a cross-section of (25 ± 0,5) mm × (15 ± 0,5) mm removing a minimum of 2 mm from any faces exposed during drying. The longitudinal faces shall be parallel to the direction of the grain. The annual rings shall have a contact angle of (45 ± 15)° to the broad faces. 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.

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

7.5 Number of test specimens

Use:

a) six treated test specimens (two from each lot) (see 7.4) for each preservative, each concentration and each duration of treatment;

b) three untreated control test specimens (one from each lot) (see 7.4) for a complete test of any given preservative;

c) c) three control test specimens treated with the solvent or the diluent (5.2.4 or 5.2.5) (one from each lot) (see 7.4) if a solvent or diluent (including water) is used.

When dipping is to be used (8.1.3.2) 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 the test specimens prior to sealing

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

2) For special tests, test specimens may be obtained according to a given series. As a result, it may be preferable to take test specimens from pretreated strips.

8.1.2 Sealing of the transverse faces

Seal the transverse faces as follows:

8.1.2.1 For tests with solutions in which water is the continuous phase, apply three coats of the paraffin wax (5.2.1) at about 90 °C so that the first coat adheres closely to the wood and the successive coatings bond to one another. Condition the sealed test specimens in the conditioning chamber (5.3.2) for at least one day.

8.1.2.2 For tests with preservative solutions in which the continuous phase is an organic solvent that dissolves paraffin wax, use the gelatine (5.2.2): apply the first coat as an aqueous solution of 200 g/l at 40 °C, then after a minimum of 8 h of drying, apply two further coats of an aqueous solution of 300 g/l at 50 °C. Condition the sealed test specimens in the conditioning chamber (5.3.2) for at least one day.

8.1.3 Treatment of the test specimens[3)]

8.1.3.1 Preparation of the treatment solutions

8.1.3.1.1 Solid preservatives

— Water-soluble preservatives:

dissolve the preservative in the water (5.2.3) to the required concentration, or in a series of concentrations if toxic values are to be determined.

— Non-water-soluble preservatives:

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

All treatment solutions shall be freshly prepared.

8.1.3.1.2 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.

8.1.3.1.3 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.

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3) Apply, if necessary, treatment by pipette (see Annex D).