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Zaġļ itna sredstva za les - Ugotavljanje uļ inkovitosti zatiranja liļ ink hiġnega kozliļ ka Hylotrupes bajulus (Linnaeus) - Laboratorijska metoda

Wood preservatives - Determination of the eradicant action against Hylotrupes bajulus (Linnaeus) larvae - Laboratory method

Holzschutzmittel - Bestimmung der bekämpfeden Wirkung gegenüber Larven von Hylotrupes bajulus (Linnaeus) - Laboratoriumsverfharen

Produits de préservation du bois - Détermination de l'action curative contre les larves d'Hylotrupes bajulus (Linnaeus) - Méthode de laboratoire

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Wood preservatives - Determination of the eradicant action against Hylotrupes bajulus (Linnaeus) larvae - Laboratory method

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Foreword

This document (EN 1390:2006) has been prepared by Technical Committee CEN/TC 38 “Durability of wood and derived materials”, 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of an identical text or by endorsement, at the latest by December 2006, and conflicting national standards shall be withdrawn at the latest by December 2006.

This document supersedes ENV 1390:1994.

Significant technical differences between this standard and ENV 1390:1994 are as follows:

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

b) separation of the method according to the expected test periods for fast and slow acting preservatives and for deferred acting preservatives respectively;

c) admission of the terms given in EN 1001-1and the definitions of EN 1001-2;

d) 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, Romania, 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 eradicant action of fast and slow acting wood preservatives and of deferred acting wood preservatives against *Hylotrupes bajulus*. It allows determination of the lethal effect of a surface application of a preservative product on a population of large larvae previously introduced into the test specimens.

The method simulates conditions in practice where a beam is treated, which is only slightly attacked and where cutting away has not exposed insect tunnels. This represents a severe test of the product.

In some particular instances, for example where the preservative is to be used on timbers of large dimensions, laminated beams, blockboard, plywood and other panel products, other test methods can be used to obtain complementary information on the effectiveness of the eradicant action of a product. Such methods lie outside the scope of this document.

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 that 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 C for environmental, health and safety precautions).

1 Scope

This document specifies a method for the determination of the eradicant action of a surface application of a fast and a slow acting wood preservative product or a deferred acting wood preservative product on timber infested with larvae of *Hylotrupes bajulus* (Linnaeus).

This method is applicable to:

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 products, for example, salts.

NOTE An ageing procedure cannot be combined with this method.

2 Normative references

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)

ISO 835-1:1981, *Laboratory glassware - Graduated pipettes - Part 1: General requirements*

3 Terms and definitions

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

3.1
representative sample
sample with physical and/or chemical characteristics identical to the volumetric average characteristics of the total volume being sampled

[EN 1001-2:2005, **4.71**]

3.2
supplier
sponsor of the test (person or company providing the sample of wood preservative to be tested)

[Adapted from EN 1001-2:2005, **4.83**]

4 Principle

Insertion of larvae of *Hylotrupes bajulus* into test specimens. After a period of time to allow the larvae to establish themselves in the test specimens, treatment of these test specimens by brushing or pipetting of the test preservative product.

After the time necessary for the preservative to act effectively, assessment of the mortality of the larvae compared with that of larvae in untreated control test specimens.

5 Test materials

5.1 Biological material

5.1.1 *Hylotrupes bajulus* (Linnaeus) larvae

5.1.2 Source of larvae.

The larvae shall preferably be obtained from cultures reared according to the method described in Annex B.

NOTE Larvae can also be taken from naturally infested wood, in which case they should be transferred into sapwood of pine and stored for at least four weeks under the rearing conditions specified in Annex B.

Do not use the larvae in the test if they have not fed normally during this storage period.

5.1.3 Provision of larvae

Carefully split or crumble infested blocks to extract larvae.

Keep the larvae separate from one another in glass receptacles for two or three days in the culturing chamber (5.3.1) to check they are healthy.

5.1.4 Choice of larvae

Use only healthy larvae in the test.

NOTE 1 A healthy larva can be recognized by ivory-white colour, its firm consistency and rounded appearance, and by the absence of wounds or bites, which show up as dark marks. Healthy larvae react to the touch by vigorous movement and attempts to bite.

Reject any larvae, which are shrunken or aged which have recently moulted, or which are in a pre-pupal stage.

Weigh each larva and place it in a glass receptacle marking the receptacle with the weight of the larva. Make up two groups with the weight ranges:

- 51 mg to 100 mg and

-101 mg to 150 mg.

NOTE 2 Larvae with a mass larger than 150 mg in mass are unsuitable as they can pupate during the course of the test.

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 suitable.

5.2.2 Gelatine, for sealing the relevant surfaces of 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, controlled at (28 ± 2) °C and at a relative humidity of (70 ± 5) %.

5.3.2 Ventilated fume cupboard, in which the specimens are treated with an input air temperature of (20 ± 5) °C and a maximum air speed, measured at the input opening with the sash in the approximate operating position, of 0,5 m/s.

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

5.3.3 Testing chamber, ventilated and controlled at (21 ± 2) °C and at a relative humidity of (75 ± 5) %.

5.3.4 Drill and twist drills, with 3 mm, 4 mm and 5 mm diameters.

5.3.5 Pipettes as specified in ISO 835-1:1981, Class B - graduated pipette with no waiting time, with a capacity 5 ml and an accuracy of ± 0,05 ml.

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

5.3.7 Ordinary laboratory equipment, including a balance capable of weighing to an accuracy of 1 mg.

5.3.8 Rectangular cover with sides, constructed either of glass, plastics, plywood and of a height not less than 200 mm and with an open face of sufficient size to cover all the treated specimens from a single test.

5.3.9 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.

5.3.10 Protective gloves

6 Sampling

The sample of preservative shall represent 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.

1) In southern European countries the species of pine 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 standard has been demonstrated in all aspects (development of larvae, resistance to impregnation, etc.).

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.

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

7.3 Provision of test specimens

Prepare planed strips having a cross-section of (100 ± 2) mm x (25 ± 2) mm removing a minimum of 2 mm from any surface 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 35 °), (see Figure 1). Make transverse cuts neatly to give sharp edges and a fine-sawn finish to the end-grain surfaces, to make test specimens (150 ± 2) 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 100 test specimens.

7.4 Dimensions of test specimens

The test specimen at (12 ± 2) % (m/m) moisture content shall be (150 ± 2) mm x (100 ± 2) mm x (25 ± 1) mm.

NOTE A moisture meter of the two-pronged electrical conductivity type is suitable for assessing moisture content.

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

7.5 Number of test specimens

7.5.1 For fast and slow acting wood preservatives, test duration 12 weeks or 24 weeks

Use:

a) for each wood preservative, each concentration and each method of treatment -10 treated test specimens;

b) for a single test of each wood preservative - two untreated control test specimens.

7.5.2 For deferred acting wood preservatives, test duration 52 weeks

Use:

a) for each wood preservative, each concentration and each method of treatment- 20 treated test specimens;

b) for a single test of each wood preservative -four untreated control test specimens.

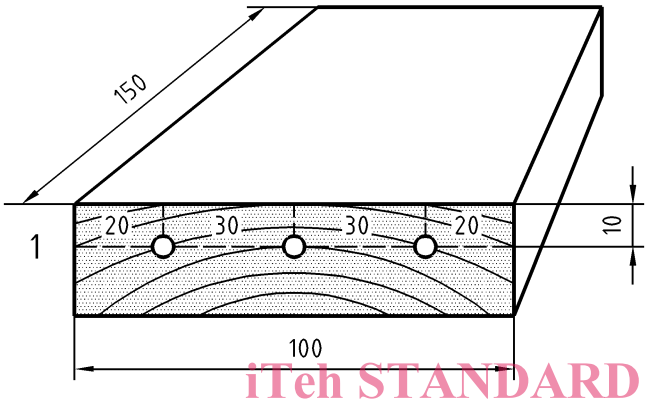
8 Procedure

8.1 Preparation of the test specimens

Using the drill (5.3.4), drill vertically three holes, 30 mm deep, into each cross section of each test specimen, positioning the holes as shown in Figure 1. For each hole choose the twist drill diameter so as to provide a hole size which will accommodate the size of larva selected (8.2).

Place the test specimens in the testing chamber (5.3.3) for one week.

Dimensions in millimetres



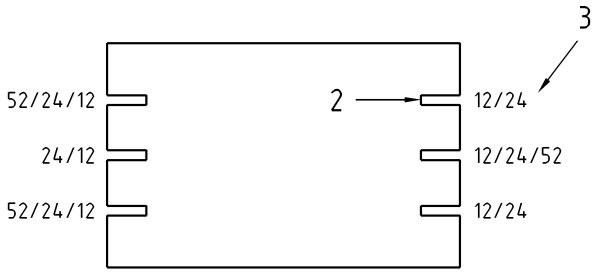


Figure 1a: frontal perspective view **Figure 1b: horizontal section**

Key

1 plan of section in Fig. 1b

2 insertion hole for larva

3 estimated test duration

Figure 1: Example of a test specimen

8.2 Insertion of larvae into the test specimens

For fast and slow acting wood preservatives, allocate three larvae from the 51 mg to 100 mg mass range and three larvae from the 101 mg to 150 mg mass range to each test specimen. Carefully insert the larvae (5.1) head first into the appropriately sized holes.

For deferred acting wood preservatives, allocate one larva from the 51 mg to 100 mg mass range and two larvae from the 101 mg to 150 mg mass range to each test specimen (or vice versa). Carefully insert the larvae (5.1) head first into the appropriately sized holes. Insert one larva from one mass range into the middle hole at one end of the test specimen and two larvae from the other mass range into outer holes of the other end of the test specimen.

Seal the insertion holes with plugs of cotton wool. Incubate the test specimens for one week in the testing chamber (5.3.3), then remove the cotton wool plugs and determine whether each larva has bored, replacing larvae, which have not bored. If any larvae are replaced then incubate all test specimens for a further week in the testing chamber (5.3.3).

8.3 Sealing of the surfaces not to be treated

Seal the 100 mm x 150 mm pith face and the two cross sections.