SLOVENSKI STANDARD

SIST–TS ENV 1390:2004

januar 2004

(istoveten ENV 1390:1994)

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

ICS 71.100.50

Referenčna številka
SIST–TS ENV 1390:2004(en)

EUROPEAN PRESTANDARD **ENV 1390**

PRÉNORME EUROPÉENNE

EUROPÄISCHE VORNORM December 1994

ICS 71.100.50

Descriptors: Wood, Wood preservatives, pesticides, insecticides, pest control, laboratory tests, determination hylotrupes, curative treatment

English version

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

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

Holzschutzmittel - Bestimmung der bekampfenden Wirkung gegenüber Larven von Hylotrupes bajulus (Linnaeus) - Laboratoriumsverfahren

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart,36 B-1050 Brussels

Ref. No. ENV 1390:1994 E

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Foreword

This European Prestandard was drawn up by the WG 6 "*Hylotrupes*" of CEN/TC 38 "Durability of wood and wood-based products", the secretariat of which is held by AFNOR.

The method is new and has been developed to assess the eradicant action of wood preservatives against *Hylotrupes bajulus* in order to replace EN 22 : 1974 in future.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to announce this European Prestandard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

Introduction

This European Prestandard describes a laboratory method of test which gives a basis for the assessment of the eradicant action of a wood preservative 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 insect tunnels have not been exposed by cutting away. 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 European Prestandard.

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 European Prestandard specifies a method for the determination of the eradicant action of a surface application of a 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 from concentrates ; or
- organic water-dispersible formulations, as supplied or as prepared in the laboratory from concentrates ; or
- water-soluble products, for example, salts.

An ageing procedure cannot be combined with this method.

2 Normative references

This European Prestandard 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 Prestandard 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

3 Definitions

For the purposes of this prestandard, 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

Insertion of larvae of *Hylotrupes bajulus* into the test specimens.

After a period of time to allow the larvae to establish themselves in the test specimens, treatment of the test specimens by brush or pipette with the test product.

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

5 Test materials and apparatus

5.1 Biological material

Larvae of *Hylotrupes bajulus* (Linnaeus)

NOTE : A culturing technique which experience has shown to be suitable, is described in Annex B. Larvae may also be taken from naturally infested wood in which case they should be transferred into pine sapwood blocks and be stored for at least 4 weeks under the culturing conditions specified in Annex B before use. Larvae which do not feed normally during this period should not be used.

5.1.1 Provision of larvae

Carefully split or crumble infested blocks to extract larvae.

Keep the larvae separately from one another in glass receptacles for 2 or 3 days in the culturing chamber (5.3.1) then examine them and reject any which are damaged, unhealthy or which have recently moulted or are in a pre-pupal stage.

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

5.1.2 Choice of larvae

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

- 51 mg to 100 mg ;
- 101 mg to 150 mg.

NOTE : Larvae of more than 150 mg in weight are unsuitable as they may pupate during the course of the test.

5.2 Products and reagents

5.2.1 Paraffin wax, for sealing the relevant surfaces of test 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 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 Water, complying with grade 3 of ISO 3696.

5.3 Apparatus

5.3.1 Culturing chamber, with air circulation, controlled at between 26 °C and 29 °C with a tolerance of ± 1 °C and at a relative humidity (85 ± 5) %.

5.3.2 Ventilated fume cupboard, in which the test specimens are treated, with an input air temperature at (20 ± 5) °C and a maximum air speed, measured at the input opening with the sash in the 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 (22 ± 1) °C and at a relative humidity (75 ± 5) %.

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

5.3.5 Pipettes of type specified in ISO 835 Part 1, Class B : graduated pipette with no waiting time. Capacity 5 ml with an accuracy of ± 0,05 ml.

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

5.3.7 Ordinary laboratory equipment, including :

- a balance capable of weighing to an accuracy of 1mg.

5.3.8 A rectangular cover with sides, constructed of glass, or plastics, or plywood, of height not less than 200 mm and with an open face of sufficient size to cover all the treated specimens from a single test. (See Figure 1)

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.

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 Scots pine (*Pinus sylvestris* Linnaeus).

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

7.2 Quality of wood

The wood shall be free from cracks, stain, decay, insect damage or other defects. The wood shall not have been water-stored, floated, chemically treated or steamed and shall have been reduced to a moisture content of (12 ± 2) % (*m/m*) by air drying.

NOTE 1 : Moisture content may be assessed in accordance with ISO 3130. In addition a moisture meter of the two-pronged electrical conductivity type is also suitable.

NOTE 2 : When kiln drying is required to dry timber, temperatures below 60 °C should be used.

The wood shall be exclusively sapwood containing little resin and having a growth rate of between 2,5 annual rings per 10 mm and 8 annual rings per 10 mm. The proportion of late wood in the annual rings shall not exceed 30 % of the whole.

NOTE 3 : Wood that has been stored for more than 5 years may have reduced nutritional quality and could reduce survival of larvae in test specimens.

7.3 Provision of the test specimens

By re-sawing all faces of the dried wood, prepare sapwood strips of 100 mm x 25 mm cross section and with the wide longitudinal faces oriented tangentially In addition the annual rings shall make an angle of not more than 35° to the tangential faces of the strips (see Figure 2). Cut the test specimens from these strips.

The specimens required for a test (see 7.5) shall be taken from at least two lots, each lot corresponding to a different tree or to two sapwood strips taken from diametrically opposed positions in the same sawlog. The specimens from the two lots shall be combined and the test specimens taken at random from them.

7.4 Dimensions of the test specimens

The dimensions of each test specimen measured at (12 ± 2) % (*m/m*) moisture content shall be :

(150 ± 2) mm x (100 ± 2) mm x (25 ± 1) mm.

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

7.5 Number of test specimens

Use :

a) for each preservative, each concentration and each method of treatment :10 treated specimens ;

b) for a single test of each preservative : 2 untreated control 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 25 mm x 100 mm face of each test block, positioning the holes as shown in Figure 2. 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.