



SLOVENSKI STANDARD

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Wood preservatives - Determination of the toxic values against larvae of Hylotrupes
bajulus (Linnaeus) - (Laboratory method)

Holzschutzmittel - Bestimmung der Grenze der Wirksamkeit gegenüber Larven von
Hylotrupes bajulus (Linnaeus) - (Laboratoriumsverfahren)

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Produits de préservation du bois - Détermination du seuil d'efficacité contre les larves
d'Hylotrupes bajulus (Linnaeus) - (Méthode de laboratoire)

Ta slovenski standard je istoveten z: EN 47:2005

ICS:

71.100.50 S^ { ä ää Á áä æ ä Ä • æ Wood-protecting chemicals

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 47

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ICS 71.100.50

Supersedes EN 47:1988

English version

**Wood preservatives - Determination of the toxic values against
larvae of *Hylotrupes bajulus* (Linnaeus) - (Laboratory method)**

Produits de préservation des bois - Détermination des
valeurs toxiques contre les larves d'*Hylotrupes bajulus*
(Linnaeus) - (Méthode de laboratoire)

Holzschutzmittel - Bestimmung der Grenze der
Wirksamkeit gegenüber Larven von *Hylotrupes bajulus*
(Linnaeus) - (Laborverfahren)

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

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of 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.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 47:2005) 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 47:1988.

Significant technical differences between this document and EN 47:1988 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.

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Introduction

This document describes a laboratory method of testing which gives a basis for the general assessment of the effectiveness of a wood preservative against *Hylotrupes bajulus* by determination and comparison with different classes of larvae, of the concentration at which the product prevents their survival in totally impregnated wood of a susceptible species.

In this respect it differs from the method specified in EN 46-1 which is intended to determine whether a preservative applied to the surface is capable of preventing infestation of wood by these larvae.

This laboratory method provides a 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. 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 very low concentration 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).

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1 Scope

This document specifies a method for the determination of the toxic values of a wood preservative against the larvae of *Hylotrupes bajulus* (Linnaeus), introduced into wood 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.

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)*

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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

Impregnation of several sets of test specimens of susceptible wood species with a series of concentrations of the preservative.

Introduction of *Hylotrupes bajulus* larvae of a given category into these test specimens and determination of their survival rate at fixed intervals of time.

Comparison of the results with those obtained with untreated and solvent or diluent-treated control test specimens. Derivation of the toxic values of the product under test for the category of larvae in question.

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5 Test materials

5.1 Biological material

5.1.1 *Hylotrupes bajulus* (Linnaeus) larvae

- Category 1 (obligatory test): larvae within a maximum of 3 days of hatching.
- Category 2 (optional additional test): larvae with masses in the range 50 mg to 150 mg.

5.1.2 Source of larvae

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

NOTE Otherwise larvae in Category 2 can be taken from naturally infested wood, in which case they should be transferred into sapwood of pine and stored for at least 4 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

Collect larvae in Category 1 from eggs laid by different females.

Carefully cut out the larvae in Category 2 from the culture blocks and keep them separated from one another for 2 days to 3 days in the culturing chamber (5.3.1) to check that they are healthy.

5.1.4 Choice of larvae in Category 2

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Use only healthy larvae in the test.

NOTE A healthy larva can be recognized 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. 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.

5.1.5 Number of larvae

The number of larvae per treated and control test specimen shall be six of Category 1 or one of Category 2.

Sort the larvae retained in Category 2 mentioned above.

Do not use larvae weighing more than 150 mg as they may pupate and therefore interfere with the test.

For a single test, use a mixed batch of larvae of Category 1 and for Category 2, as far as possible, use larvae of similar masses. The number of larvae necessary is given in Table 1.

Table 1 – Number of larvae and test specimens

Type of test specimen	Concentrations of preservatives Mass fraction	Larvae in Category 1		Larvae in Category 2			
		Number of test specimens	Number of larvae	Without radiography		With radiography ^a	
				Number of test specimens	Number of larvae	Number of test specimens	Number of larvae
Treated test specimens	1	5	30	10	10	7	7
—	2	5	30	10	10	7	7
—	3	5	30	10	10	7	7
—	4	5	30	10	10	7	7
—	5	5	30	10	10	7	7
etc.							
Untreated control test specimens	0	5	30	10	10	7	7
Solvent or diluent control test specimens (including water)	0	5	30	10	10	7	7
Total for 5 concentrations		35	210	70	70	49	49
^a The use of radiography is only recommended in the case of tests with larvae in Category 2.							

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5.2 Products and reagents

5.2.1 Xylene, technical grade, mixed isomers.

5.2.2 Water, complying with grade 3 of EN ISO 3696.

5.2.3 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.

5.2.4 Cellulose or absorbent cotton wool and filter paper

5.3 Apparatus

5.3.1 Culturing chamber, with air circulation, and controlled at $(28 \pm 2) ^\circ\text{C}$ and at relative humidity $(85 \pm 5) \%$.

5.3.2 Conditioning chamber, well ventilated and controlled at $(20 \pm 2) ^\circ\text{C}$ and at relative humidity $(65 \pm 5) \%$.

NOTE The conditioning of test specimens can 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.

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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 $(22 \pm 2) ^\circ\text{C}$ and at a relative humidity of $(70 \pm 5) \%$.

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 Vacuum vessel(s), fitted with stopcocks, capable of receiving the treatment vessels (5.3.5).

5.3.9 Vacuum pump, fitted with a pressure gauge and capable of maintaining a pressure of 700 Pa^1 .

5.3.10 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.

5.3.11 Drill and twist drills, approximately 3,0 mm to 4,5 mm in diameter, and a fine awl. In all cases, the number of bits shall be sufficient to drill holes to the size of the larvae available; in the case of larvae of Category 1, use a steel awl.

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 following ranges:

- voltages: 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) $100 \text{ Pa} = 1 \text{ mbar}$.

7 Test specimens

7.1 Species of wood

The reference species is Scots pine (*Pinus sylvestris* Linnaeus)².

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.

NOTE 2 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 $(25 \pm 0,5)$ mm \times $(15 \pm 0,5)$ 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 greater than 10° to the faces of the test specimens. Make transverse cuts, neatly to give sharp edges and a fine-sawn finish to the end-grain surfaces, to give test specimens $(50 \pm 0,5)$ mm long.

The 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 $(50 \pm 0,5)$ mm \times $(25 \pm 0,5)$ mm \times $(15 \pm 0,5)$ 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 cm³.

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

7.5 Number of test specimens

The number of test specimens required is given in Table 1.

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.

2) 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 document has been demonstrated in all aspects (development of larvae, resistance to impregnation, etc.).