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Wood preservatives - Determination of preventive action against Reticulitermes species (European termites) (Laboratory method)

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Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber Reticulitermes-Arten (Europäische Termiten) (Laboratoriumsverfahren)

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Produits de préservation du bois - Détermination de l'action préventive contre les especes Reticulitermes (termites européens) (Méthode de laboratoire)

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ICS:

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

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EUROPEAN STANDARD
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EUROPÄISCHE NORM

EN 118

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ICS 71.100.50

Supersedes EN 118:1990

English version

**Wood preservatives - Determination of preventive action against
Reticulitermes species (European termites) (Laboratory method)**

Produits de préservation des bois - Détermination de
l'action préventive contre les espèces de Reticulitermes
(termites européens) (Méthode de laboratoire)

Holzschutzmittel - Bestimmung der vorbeugenden Wirkung
gegenüber Reticulitermes-Arten (europäische Termiten)
(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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Foreword

This document (EN 118:2005) 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 September 2005, and conflicting national standards shall be withdrawn at the latest by September 2005.

This document supersedes EN 118:1990.

Significant technical differences between this document and EN 118:1990 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 assessment of the effectiveness of a wood preservative, when applied as a surface treatment, against the *Reticulitermes* species of European termites.

This laboratory method provides one criterion by which the value of a product can be assessed. 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 C for environmental, health and safety precautions).

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1 Scope

This document specifies a method for the determination of the preventive action of a wood preservative against the *Reticulitermes* species of European termites ¹⁾ 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 ingredients,
- 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 can be used in conjunction with an ageing procedure, for example EN 73 or EN 84.

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

Surface treatment of test specimens of a susceptible wood species with the preservative or, if a concentrate is being used, with known dilutions of the preservative.

1) This method can be applied not only to different species of *Reticulitermes*, but also to other species of the family Rhinotermitidae, where necessary adapting the temperature and humidity conditions and the assessment of attack to the specific behaviour of the species concerned.

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Exposure of these test specimens to specified colonies of European *Reticulitermes*²⁾ species and assessment of the attack suffered after exposure under fixed conditions and over a fixed period.

Comparison of these results with those obtained from untreated and solvent or diluent-treated control test specimens.

5 Test materials**5.1 Biological material**

Workers, soldiers and nymphs of an identified termite species of *Reticulitermes*.

NOTE 1 The termite species and the locality of origin should be stated in the test report and their identification should be proved.

NOTE 2 The termites should be obtained from colonies reared as described in Annex B.

5.2 Products and reagents

5.2.1 Substrate for establishing the colonies. A choice of:

5.2.1.1 Fine white quartz sand consisting of grains of crystallized silica, very pure (99,5 % silica), and free from any organic substances³⁾.

5.2.1.2 An hydrated, laminar, aluminium-iron-magnesium silicate exfoliated to give particles of 1 mm to 3 mm with an apparent density of 80 kg/ m³ to 90 kg/ m³. Particles of less than 1 mm shall be eliminated by sieving prior to use, to ensure the absence of free water and prevent any significant agglomeration of the particles.

5.2.2 Adhesive which cannot be attacked by the termites and is non-toxic, for securing the tubes. This adhesive shall also not react with the preservative applied to the wood.

5.2.3 Sealant

5.2.3.1 Paraffin wax, setting point of 52 °C to 54 °C, for sealing the relevant surfaces of test specimens to be treated with solutions in which water is the continuous phase.

5.2.3.2 Gelatine, for sealing the relevant surfaces of test specimens to be treated with solutions in which an organic solvent is the continuous phase.

5.2.3.3 Inert adhesive, for sealing the relevant surfaces of test specimens to be treated with other solutions in which e.g. an emulsion solvent is the continuous phase.

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

5.2.5 Solvent or diluent. A suitable volatile liquid that will dissolve or dilute the preservative but does not leave a residue in the wood which would have a toxic effect on the insect at the end of the conditioning period.

2) In providing biological validation of individual species, it is essential that the locality of origin of each test termite species is given. The description of the locality should at least include the district name.

3) In France, Fontainebleau sand, of which more than 97 % of the particles are between 75 µm and 300 µm in size, meets these requirements.

5.3 Apparatus

5.3.1 Culturing chamber, with air circulation, controlled at (26 ± 2) °C and a minimum relative humidity of (70 ± 5) %.

5.3.2 Conditioning chamber, well ventilated, controlled at (20 ± 2) °C and relative humidity (65 ± 5) %⁴⁾.

5.3.3 Laboratory work area, well ventilated, where treatment of the test specimens is carried out⁵⁾.

5.3.4 Testing chamber, protected from light, ventilated and controlled at (26 ± 2) °C and at a minimum relative humidity of (70 ± 5) %.

5.3.5 Ordinary laboratory equipment for application by brushing or by pipette of a liquid preservative product and including an analytical balance capable of weighing to an accuracy of 0,01 g.

5.3.6 Protective gloves

5.3.7 Instruments adapted for termite manipulation (aspirator, forceps).

5.3.8 Glass tubes open at both ends, one end being ground:

— interior diameter: 25 mm;

— length: 110 mm.

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6 Sampling

The sample of preservative shall be representative of the product to be tested. Samples should 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).

NOTE Additional tests can be made with other timber 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.

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

⁴⁾ The conditioning of test specimens after treatment is permissible in the laboratory work area (5.3.3) provided that this meets the conditions specified for the conditioning chamber (5.3.2).

⁵⁾ It is essential to follow proper safety measures for handling flammable or toxic material. It is essential that operators avoid excessive exposure to solvents or their vapours.

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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 with a fine-sawn finish and having a cross-section of $(50 \pm 0,5)$ mm x $(10 \pm 0,5)$ mm 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 have a contact angle of $(45 \pm 15)^\circ$ mm 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 $(50 \pm 0,5)$ 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 specimen after reaching equilibrium in the conditioning chamber (5.3.2) shall be $(50 \pm 0,5)$ mm x $(50 \pm 0,5)$ mm x $(10 \pm 0,5)$ mm.

The surface area of the face to be treated is theoretically 25 cm² but an allowance shall be made for any encroachment of the sealing compound on to this face.

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

7.5 Number and distribution of test specimens

The test specimens shall be divided as follows:

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- a) treated test specimens: these are the treated test specimens which are subject to attack by *Reticulitermes*; use at least 6 treated test specimens;
- b) untreated control test specimens for checking the virulence of the termites taken for the test: these untreated test specimens are subjected to attack by *Reticulitermes*; for each series of tests use at least three control test specimens;
- c) control test specimens treated with the product free of active ingredients are subjected to attack by *Reticulitermes*; they are three in number.

7.6 Inserts

The inserts are discs of untreated Scots Pine sapwood, $(1 \pm 0,2)$ mm thick and having a diameter about 1 mm to 2 mm less than the interior diameter of the tubes (5.3.8), so that they fit snugly into the tubes after moistening.

8 Procedure**8.1 Preparation of the test specimens****8.1.1 Conditioning of test specimens prior to sealing**

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

8.1.2 Sealing of the transverse and the narrower longitudinal faces

Seal the transverse and the narrower longitudinal faces using the sealer (5.2.3).

8.1.3 Treatment of test specimens

8.1.3.1 Preparation of treatment solutions.

8.1.3.1.1 Solid preservatives

- Water-soluble preservatives: dissolve the preservative in water (5.2.4) to the required concentration;
- non-water-soluble preservatives: dissolve the preservative in an appropriate solvent (5.2.5) to the required concentration.

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, dilute the preservative with the diluent to the required working concentration, using the procedure specified by the supplier.

All treatment solutions shall be freshly prepared.

8.1.3.2 Treatment

In the laboratory work area (5.3.3) apply the calculated volume or mass of the treatment solution (8.1.3.1) as uniformly as possible over one of the large faces of the block either by brush application or from a pipette moved transversely across the surface. Check by weighing that the correct quantity of preservative has been applied.

NOTE If the required quantity cannot be applied in one application, the treatment solution can be applied in successive applications at appropriately close intervals so as to avoid solidification of any substances which could hinder the penetration of the subsequent applications.

Calculate the mass and volume of preservative retained per unit area of wood surface.

8.1.4 Drying and conditioning of the test specimens after treatment

After treatment, condition the test specimens for at least four weeks in the conditioning chamber (5.3.2).

Arrange the specimens on their large untreated faces, resting on glass rods, not touching each other.

8.2 Exposure of the test specimens to the insects

8.2.1 Collecting and selecting the termites

Pick up the insects individually using the instrument (5.3.7). Make up groups of 250 workers, rejecting those insects which are moulting (indicated by the dull white colour of the abdomen) also those which appear to be wounded or remain motionless. To each group made up in this way add a number of soldiers corresponding to the proportion found in the colony from which the workers were taken; add a corresponding proportion of nymphs (1 % to 5 %).

The number of colonies to be prepared as indicated above is equal to the number of test specimens to be subjected to attack by the termites. If the required number of termites is more than that in a single culture, the control series and test series shall contain the same number of groups from each colony. Termites from different colonies shall not be mixed in a single group.

8.2.2 Securing the tubes (see Figure 1)

Attach with adhesive (5.2.2) the ground glass end of one tube (5.3.8) at the centre of the treated surface of each treated test specimen and at the centre of one of the large surfaces of each virulence control test specimen.

Introduce into each tube an insert (7.6) and place it on the surface of the test specimen.