



SLOVENSKI STANDARD SIST EN 330:2004

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Wood preservatives - Field test method for determining the relative protective effectiveness of a wood preservative for use under a coating and exposed out of ground contact: L-joint method

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Holzschutzmittel - Freilandversuch zur Bestimmung der relativen Wirksamkeit eines Holzschutzmittels zur Anwendung unter einem Anstrich und ohne Erdkontakt: L-Verbindungs-Methode

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Produits de préservation du bois - Essais de champ pour déterminer l'efficacité protectrice d'un produit de préservation du bois pour emploi sous un revêtement et hors de contact avec le sol: méthode avec un assemblage en L

Ta slovenski standard je istoveten z: EN 330:1993

ICS:

71.100.50 S{ ã æ Á Á æ ä Á • æ Wood-protecting chemicals

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EUROPEAN STANDARD

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English version

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determining the relative protective effectiveness
of a wood preservative for use under a coating
and exposed out of ground contact: L-joint
method**

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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.

The European Standards exist 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.

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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

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Foreword

This European Standard was drawn up by the Technical Committee CEN/TC 38 "Durability of wood and wood-based products" of which the secretariat 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of an identical text or by endorsement, at least by October 1993, and conflicting national standards shall be withdrawn at the latest by October 1993.

This European Standard has been approved by CEN, and in accordance with the Common CEN/CENELEC Rules, the following countries are bound to implement this European Standard: Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden and United Kingdom.

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INTRODUCTION

This European Standard describes a method of test for wood preservatives that are intended for use in timber to be exposed out of contact with the ground but with a paint or similar surface coating.

The main objective of the method is to evaluate the relative effectiveness of the preservative, applied to jointed samples of Scots pine sapwood by a treatment method relevant to its intended practical use. Effectiveness is evaluated relative to a reference preservative treatment.

The method is concerned with protection against attack by the complete sequence of micro-organisms occurring under natural conditions, including eventually those basidiomycete fungi that cause decay. It takes into account also the effects of weathering (light, rain and heat) on the effectiveness of the preservative under the paint.

The method may be used, after modification, for other purposes including evaluating the effectiveness of a test preservative:

- in timber of a different wood species;
- under different types of coating.

Since the L-joints are exposed to natural outdoor conditions during the test period, variations in test conditions from one area to another have to be expected. Differences in climate, especially rainfall, will inevitably influence the general rate of development of decay fungi. However, by comparing the results obtained for the test preservative with those obtained with the reference preservative and with those for untreated control L-joints, the relative protective effectiveness of the preservative under test can be evaluated.

NOTE: The procedures described in this standard are intended to be carried out by suitably trained and/or supervised specialists. Appropriate safety precautions should be observed throughout the use of the standard.

1 SCOPE

This European Standard specifies a method for determining the relative protective effectiveness against fungal decay of a wood preservative applied to wood, in combination with a subsequent surface coating, and exposed out of contact with the ground.

The method is applicable to the testing of commercial or experimental preservatives applied to non-durable timbers by methods appropriate to commercial practice and subsequently overcoated with a specified coating system. The method is applicable to products and processes used individually or in combination to prevent the development of the decay in the wood.

2 NORMATIVE REFERENCE

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the

NOTE: Two coats of an epoxy-resin/pitch compound have been found to be suitable.

5.2 Reference coating

A medium-build, opaque, gloss or semi-gloss, solvent-borne, alkyd-based paint applied in two or three coats to give a dry film build of (50 ± 5) μm when measured by method 4A (microscope method) of ISO 2808.

If a particular coating system is specified, by the supplier of the test preservative, to be an integral part of the protection system, this shall be used in conjunction with the test preservative, instead of the reference coating. Details of the coating system used shall be given in the test report.

5.3 Reference preservative

Containing hexabutyldistannoxane (bis(tri-n-butyltin)oxide) as the active ingredient and with the following formulation:

Hexabutyldistannoxane (minimum 95 % $\underline{\text{m}}/\underline{\text{m}}$ active ingredient)	1 % $\underline{\text{m}}/\underline{\text{m}}$
Aliphatic neutral hydrocarbon resin	5 % $\underline{\text{m}}/\underline{\text{m}}$
Hydrocarbon solvent (distillation range 160°C to 215°C; aromatic content <17 % $\underline{\text{m}}/\underline{\text{m}}$)	94 % $\underline{\text{m}}/\underline{\text{m}}$

The hexabutyldistannoxane shall be in the form known as "stabilized" containing either 0,1 % $\underline{\text{m}}/\underline{\text{m}}$ 2-hydroxypropanoic acid or 1 % $\underline{\text{m}}/\underline{\text{m}}$ mercaptoethanoic acid.

5.4 Wood specimens

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5.4.1 Wood species: For every test, sapwood of Pinus sylvestris (Linnaeus) (Scots pine, redwood) shall be used. Some heartwood is permitted in the mortise member (see 5.4.3).

NOTE: Optionally, other wood species may be chosen that are in use or proposed for exterior use. They should include a hardwood if the preservative is expected to be used in hardwoods, for example beech. Specimens should be cut exclusively from sapwood or heartwood.

5.4.2 Quality of wood: Use sound, straight-grained wood without knots. Material of a resinous appearance shall be avoided.

Use wood with between 2,5 annual growth rings per 10 mm and 8 annual growth rings per 10 mm in the case of Scots pine sapwood. The proportion of latewood in the annual rings shall not exceed 30 % of the whole for Scots pine sapwood.

The wood shall not have been floated, stored in water or heated above 60 °C or treated with chemical agents.

NOTE: If additional wood species are used, the density and the number of annual rings for each species should be mentioned in the report.

5.4.3 Preparation of test specimens: Condition the timber stock to (14 ± 2) % $\underline{\text{m}}/\underline{\text{m}}$ moisture content. Prepare sticks of (38 ± 1) mm x (38 ± 1) mm cross-section by sawing and planing from the timber (5.4.1) with the grain parallel to

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 Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

ISO 2808: 1974 Paints and varnishes - Determination of film thickness.

3 DEFINITIONS

For the purposes of this standard, the following definitions apply:

3.1 representative sample: A sample having its physical or chemical characteristics identical with the volumetric average characteristics of the total volume being sampled.

3.2 supplier: The sponsor of the test.

4 PRINCIPLE

Jointed samples (L-joints) are treated, assembled, coated and placed out of doors, out of contact with the ground and exposed to the normal environmental and ecological factors which affect coated wood so exposed in practice. The fungi that colonize such units invade in their natural sequence of moulds, blue stain fungi, soft rot fungi and basidiomycetes. Colonization by basidiomycetes, as shown by the presence of visible decay is assessed at least annually by visual inspection of the L-joints after being disassembled. In addition, periodically, sets of samples are examined after sawing to reveal their internal condition. These data are compared with those generated using a reference preservative and untreated samples to assess relative performance.

NOTE 1: It is recommended that the replicates for non-destructive inspection continue to be exposed beyond the minimum 5 year period, preferably until failure..

NOTE 2: Inspection after sawing is necessary because application by processes such as dipping or double vacuum treatment does not result in the complete penetration of the L-joint members. The untreated core of the samples, therefore, may show visible decay before it becomes visible on surfaces within the joint.

5 MATERIALS

5.1 End-seal compounds

5.1.1 Preservative resistant end-seal: A material resistant to the penetration of the reference and test preservative solutions (or separate materials for each).

NOTE: Polyvinyl acetate (PVAc) glues have been found to be suitable for most organic solvent formulations.

5.1.2 Weatherproof end-seal: A material which prevents water entry and remains effective during long term exposure to the weather.

the long axis and annual rings aligned parallel with one lateral face.

NOTE 1: A moisture meter of the two-pronged electrical conductivity type is suitable for assessing moisture content.

The L-joint is prepared as two members (Figure 1) both (203 ± 1) mm long. The tenon members shall be cut from the most accurately prepared and orientated sticks and the mortise members from the remaining material. The joint region shall be free from any minor defects.

NOTE 2: Heartwood up to 50 % of the cross-section is permitted in the mortise member of sapwood specimens, except within the joint itself.

Machine the joints to the dimensions given in Figure 1, with a tolerance such that the two members provide a firm but not tight push-fit. Align the tenons and the mortises at 90° to the annual rings (Figure 1). Round the longitudinal edges of the tenon members exposed during the test to a radius of 2 mm (Figure 1). Store the L-joint members in the conditioning chamber (6.2) until required for treating.

5.4.4 Number of L-joints

The specimens are divided into:

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- L₁ - L-joints for non-destructive visual inspection (at least 5 years exposure);

NOTE 1: To obtain the maximum information from the test, specimens should be retained on the rack and inspected annually until failure.

Prepare at least 10 for each combination of test parameters (wood species (5.4.1), test preservative (8.2), reference preservative (clause 9), untreated control (clause 10) and coating system (5.2)).

- L₂ - L-joints for destructive visual inspection (up to 5 years exposure);

Prepare at least 10 for each combination of test parameters.

NOTE 2: This allows 5 replicates for sampling at each of two exposure periods.

NOTE 3: It is normally necessary to treat a higher number of replicates so that the required number can be selected after treatment (see 8.3) and the inclusion of specimens achieving abnormally high or low retention of preservative avoided.

5.4.5 Labelling of L-joints

Individual members of L-joints shall be assigned unique identification numbers in such a way that these numbers are retained through all preparation operations. After application of coatings an identification label or tag (6.6)

of suitably inert and long-lasting material shall be affixed to each L-joint.

6 APPARATUS

6.1 Sawing equipment: A sawing machine capable of producing a fine-sawn finish.

6.2 Conditioning chamber: Well ventilated, controlled at (20 ± 2) °C and (65 ± 5) % relative humidity.

6.3 Preservative treatment plant: Equipment suitable for carrying out vacuum, vacuum-pressure or immersion treatment of specimens.

6.4 Balance: Capable of weighing to the nearest 0,1 g.

6.5 Safety equipment and protective clothing: Appropriate for the test product and the reference preservative, to ensure the safety of the operator.

6.6 Labels: Inert, long-lasting labels and corrosion resistant fixing pins.

6.7 Exposure site: An open area free from tall vegetation (see 6.8) and extremes of local environmental influences especially industrial pollution.

6.8 Weathering racks: L-shaped racks facing the prevailing weather¹⁾, approximately 900 mm above ground level, 500 mm above any low vegetation (grass is acceptable), sloping back at 10 ° and made of durable materials. The racks shall be provided with slots or holes to prevent the collection of water in the angle of the rack. The racks shall be provided with stickers of a durable unreactive material (for example *Pinus sylvestris* heartwood) cross-section minimum 5 mm x 5 mm, maximum 10 mm x 10 mm, to separate the tenon member of the L-joint from the rack, and with spacing pieces affixed to the back, to separate the L-joints and to maintain their orientation. The cross-section of a suitable exposure rack is shown in Figure 2.

6.9 Ordinary laboratory equipment.

7 SAMPLING

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

If a particular coating system is specified by the preservative supplier as an integral part of the protection system, it shall be representative of that to be tested.

Samples shall be stored and handled in accordance with any written requirements from the supplier.

NOTE: For the sampling of preservatives from bulk supplies, the procedures given in EN 212 should be used.

1) In most of the European area this would normally be south-west.

8 TREATMENT AND HANDLING OF TEST L-JOINTS

NOTE: The sequence of operations involved in the preparation and exposure of the L-joints is summarized in Annex A.

8.1 End-sealing

Remove the L-joints from the conditioning chamber (see 5.4.3). Seal the end of the tenon members (but not the mortise members) remote from the joint with the preservative resistant end-seal (5.1.1); allow to dry.

8.2 Treating process

Determine and record the volume of each of the L-joint members and the mass, to the nearest 0,1 g.

Apply the test preservative to the test L-joints using the process specified by the supplier of the preservative/protection system.

NOTE 1: A range of model processes is given in Annex B.

NOTE 2: For development products it is preferable to test at more than one retention, ideally three, ranged about that thought to be appropriate for use out of ground contact. The concentration or retention (x) may be achieved by varying the concentration of active ingredient(s) in the formulation. Alternatively, the parameters of the treatment process can be altered. A suitable range of retentions could be 0,5x, 1x and 2x. A narrower range can be used if the capability of the product is sufficiently well known, for example, a geometrical series with a factor of $\sqrt{2}$.

8.3 Retention of preservative

After treatment, the excess of solution on the surface of the L-joint members shall be allowed to drip off or be removed with a cloth. Reweigh each member immediately and record the mass after treatment, to the nearest 0,1 g. Calculate the uptake of preservative solution for each member and express it in kilograms of preservative per cubic metre of wood for penetrating processes and in grams of preservative per square metre of wood for superficial application methods.

Reject any member with retentions deviating by more than 10 % from the median for that type of member and substitute an appropriate alternative (see Note 3 to 5.4.4) which falls within this range.

8.4 Post-treatment handling of the L-joints

8.4.1 Conditioning: Dry the treated L-joint members in a well-ventilated covered area protected from rain and frost. Ensure free ventilation by storing members horizontally on supporting rods of a material that does not react with the preservative, for example, glass for organic products.

Dry the L-joints treated with the test preservative in accordance with the supplier's instructions for its use.