BS EN 330:2014

BSI Standards Publication

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

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of EN 330:2014. It supersedes BS EN 330:1993 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/515, Wood preservation.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

ISBN 978 0 580 77206 1

ICS 71.100.50

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 November 2014.

Amendments issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 330

November 2014

ICS 71.100.50

Supersedes EN 330:1993

English Version

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

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

Holzschutzmittel - Bestimmung der relativen Wirksamkeit eines Holzschutzmittels zur Anwendung unter einem Anstrich und ohne Erdkontakt - Freilandprüfung: L-Verbindungsmethode

This European Standard was approved by CEN on 30 August 2014.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword

This document (EN 330:2014) 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 May 2015 and conflicting national standards shall be withdrawn at the latest by May 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 330:1993.

Compared to EN 330:1993 the following changes have been made:

— The scope of the standard clarifies that the effectiveness is evaluated to a reference material;

— The grading system for the assessment of decay has been modified in Table1;

— Modifications have been made to the duration (Clause 14) and validity (Clause 15) of the test;

— In Annex B information has been added that the reference wood preservatives stated in the document may only be used for research purposes in accordance with the Biocidal Products Regulations (Regulation (EU) No. 528/2012);

— An informative Annex D covering environmental, health and safety precautions has been added.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard describes a method of test for wood preservatives that are intended for use under a surface coating in timber to be exposed to the weather and out of contact with the ground (Use Class 3, EN 335).

The main objective of the test is to evaluate the relative effectiveness of the preservative applied to jointed samples of *Pinus sylvestris L* sapwood by a treatment technique relevant to its intended practical use.

Effectiveness is evaluated relative to a reference material.

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

The method does not accelerate the rate of decay (see Note), however the coating failure occurs immediately at the test start, that is even sooner than in badly designed and poorly maintained joinery exposed under the same conditions.

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

— in protecting timbers 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 location to another have to be expected. Differences in climate, especially rainfall, will 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 material and with those for untreated, control L-joints, the relative protective effectiveness of the preservative under test can be evaluated.

NOTE The coating is intended to make the technique relevant to the end use – albeit the test pieces are badly maintained and designed in order to accelerate the test.

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, exposed to the weather and out of contact with the ground. The effectiveness is evaluated relative to a reference wood preservative.

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 coated with a specified coating system. The method is applicable to products and processes used individually or in combination to prevent the development of decay in the wood.

The method is also appropriate for factory finishing systems which include wood protection and wood preservation claims.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1001-2, *Durability of wood and wood based products - Terminology - Part 2: Vocabulary*

EN 335, *Durability of wood and wood-based products - Use classes: definitions, application to solid wood and wood-based products*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1001-2 apply.

4 Principle

Jointed samples (L-joints) are treated, assembled, coated and placed out of contact with the ground and exposed to the normal environmental and ecological factors which affect coated wood so exposed in practice. The organisms 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 they have been dismantled. In addition, periodically, sets of samples are examined after dismantling and sawing along the grain of the L-joint assemblies to reveal their internal condition. These data are compared with those generated using a reference material and untreated samples to assess relative performance.

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

NOTE Inspection after sawing is necessary because application by processes such as double vacuum and superficial (surface) application does not result in complete penetration of the L-joint members. The untreated core of the samples, therefore, can show internal decay before it becomes visible on the surface 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).

5.1.2 Weatherproof end-seal

A material that prevents water entry into the test specimen and remains effective for the duration of exposure of the test specimen to the weather.

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

5.2 Reference coating

Opaque high gloss, gloss or semi-gloss solvent borne alkyd paint applied in 2 or 3 coats to give a dry film build of (50 ± 5) µm or an opaque water borne acrylic paint applied in 1 or 2 coats to give a dry film build of 110 µm -120 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 including the number of coats and the contribution each coat makes to the coating system used, e.g. primer function.

5.3 Reference preservative

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

— Hexabutyldistannoxane minimum mass fraction of 1 % (mass fraction 95 % active ingredient);

— Aliphatic neutral hydrocarbon resin mass fraction of 5 %;

— Hydrocarbon solvent mass fraction of 94 %, (distillation range 160 °C to 215 °C; aromatic content mass fraction < 17 %).

If an alternative wood preservative product is used the concentration of the product used should provide a performance equivalent to the specified concentration of the reference wood preservatives referred to in this standard. Evidence of equivalence shall be recorded in the test report.

NOTE See informative Annex B on alternative reference preservatives.

5.4 Wood test specimens

5.4.1 Wood species

Sapwood of *Pinus sylvestris* (Scots Pine, redwood) shall be used. Some heartwood is permitted in the mortise member but none in the joint area (5.4.3).

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 *(Fagus sylvatica L)*. 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.

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

5.4.3 Preparation of test specimens

Use equipment capable of achieving and maintaining the condition of the timber stock at a moisture content of (12 ± 2) % mass fraction). Prepare sticks of cross-section (38 ± 1) mm x (38 ± 1) mm by sawing and planing the timber (5.4.1) with the grain parallel to the long axis and annual rings aligned parallel with one lateral face. This requirement can be relaxed for timber to be used to prepare the mortises.

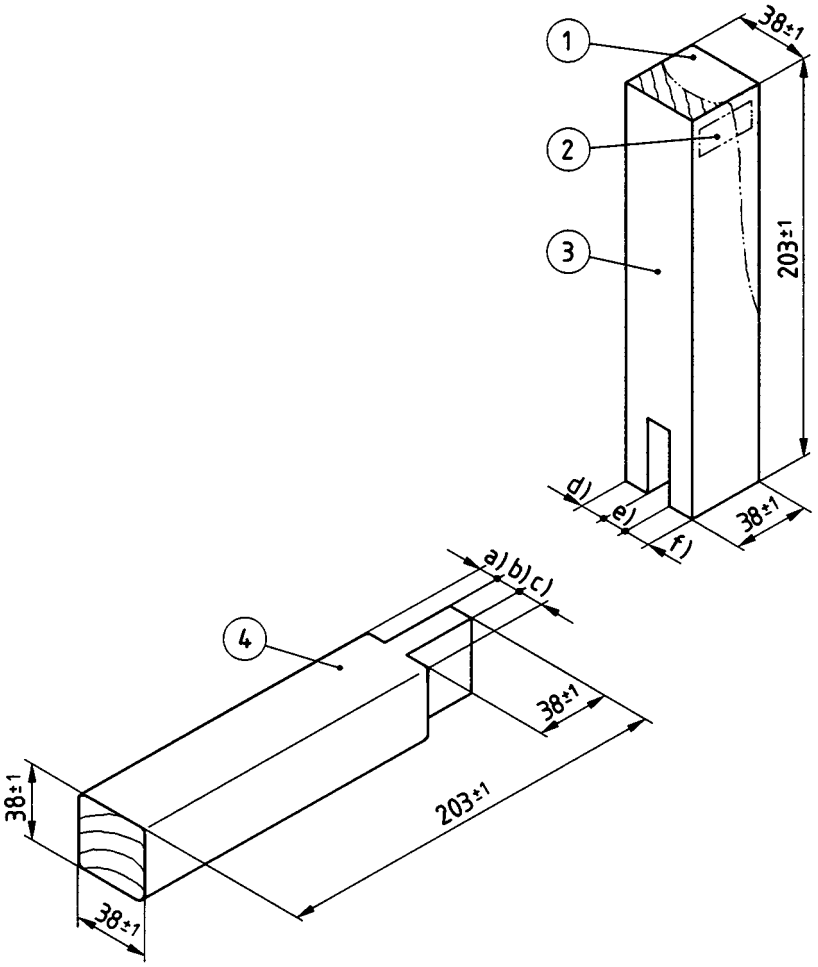
A moisture meter of the two-pronged conductivity type is suitable for assessing moisture content.

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.

Heartwood up to 20 % of the cross-section is permitted in the mortise member of sapwood specimens, except within the joint and heartwood shall not exceed 20 % at any point in the cross-section.

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-joints in the conditioning area (6.2) until required for treating.

Dimensions in millimetres



Key

1 heartwood permitted

2 label position

3 mortise member

4 tenon member (note rounding of the longitudinal edges)

Tolerances in the joint:

a) c) d) f)	13 ± 1
b) e)	12 ± 1

The two members shall provide a firm but not tight push-fit.

Figure 1 — The L-joint

5.4.4 Number of L-joints

The specimens are divided into:

a) L_1 – L-joints for non-destructive visual inspection (at least 5 years' exposure)

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

Prepare at least 10 replicate L joints for each combination of test parameters (wood species (5.4.1), test preservative, reference L- joints (Clause 9), untreated controls (Clause 10) and coating system (5.2).

b) L_2 – L-joints for destructive visual inspection

Prepare at least 10 for each combination of test parameters.

NOTE 1 This allows 5 replicates for sampling at each of two exposure periods.

NOTE 2 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, a durable identification label or tag (6.6) shall be affixed to each L-joint.

6 Apparatus and Equipment

6.1 Wood working equipment

A machine saw capable of producing a fine-sawn finish and equipment capable of producing planed timber.

6.2 Conditioning area

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

6.3 Application equipment

Suitable equipment should be available for treating the test and reference specimens.

6.4 Balance

Laboratory balance, capable of weighing test specimens 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 / tags

Use inert, durable labels / tags and corrosion-resistant fixing pins.

6.7 Exposure site

Select a test site that produces Use Class 3 conditions according to EN 335.

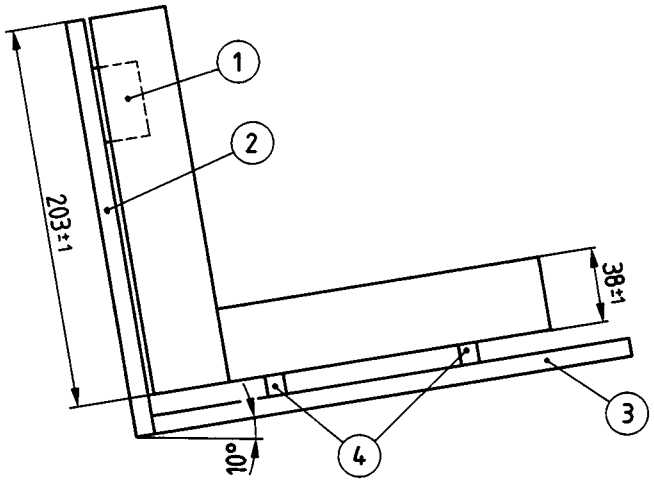
Avoid areas that are exposed to extremes of local environmental influences, especially industrial pollution.

6.8 Weathering racks

L-shaped racks facing the prevailing weather, approximately 900 mm above ground level, 500 mm above any low vegetation (short 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 non-reactive material, for example silicon spacers or *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.

Position the racks to face the prevailing weather. In most of the European area this would normally be in a southwest direction. The orientation shall be stated in the test report.

Dimensions in millimetres



Key

1 spacing piece

2 back of rack

3 rack of durable material e.g. Douglas fir plywood

4 stickers of a durable material (see 6.8)

Figure 2 — L-joint during exposure

7 Sampling

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

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

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

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

It is recommended to chemically identify the active ingredients content.

8 Treatment and handling of test L-joints

8.1 General

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

8.2 End-sealing

Remove the L-joints from the conditioning chamber and using adequate equipment to reach and maintain the (12 ± 2) % moisture content of the wood (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 sealing compound (see 5.1.1), and allow to dry.

8.3 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 treatment processes is given in informative Annex B.

NOTE 2 For development products it is preferable to test more than one retention value, ideally three; ranged around 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 1.0X, and 2.0X. A narrower range can be used if the capability of the product is sufficiently well known, for example, use a geometrical series with a factor of $\sqrt{2}$.

8.4 Retention of preservative

Weigh the L-joint members before treatment.

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 L-joint member with retentions deviating by more than 10 % from the mean for that type of member and substitute an appropriate alternative specimen (see Note 2 to 5.4.4) which falls within this range.

NOTE Although the retention for penetrating processes is calculated as kg/m^3 for the whole volume of the joint, not all penetrating processes will be designed to treat the full cross section. The supplier may wish extra joints to be included so an analysis can be made of the preservative retention to a specified penetration depth.

8.5 Post-treatment handling of the L-joints

8.5.1 Conditioning the L joint members

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

Where no instructions are provided by the preservative supplier or where L-joints treated with a reference preservative are to be conditioned the following approach shall be used:

Condition 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 racks made of a material that does not react with the preservative. Condition the L-joint members for 14 d.

8.5.2 Coating

Assemble the L-joints (5.4.3). Apply the reference coating to all lateral faces of the L-joints and allow them to dry. Do not coat the exposed end grain at the assembled joint. Where a specific coating system is required by the supplier (see 5.2), the L-joints treated with the test preservative are treated with this coating system instead of the reference coating.

If the test is to be exposed for the minimum 5-year period, it is not necessary to maintain the coating. If the test is to be exposed beyond 5 years, then the coating on the replicates for non-destructive visual inspection (L_1) should be maintained in accordance with the supplier's instructions. Following such maintenance, the joint should be separated (8.5.5) before the L-joints are returned to the racks. Details of maintenance should be included in the test report.

8.5.3 Labelling

Ensure permanent labels (6.6) are affixed to the mortise member, well away from the joint area, and positioned so that they can be read when the L-joints are in position on the weathering rack (6.8).

8.5.4 End-sealing

Apply the weather proof end-seal (5.1.2) to the two ends of the L-joint and carry it over by 2 mm to 3 mm onto the lateral coated surfaces to provide a complete seal.

8.5.5 Separating the L-joint

When the surface coating is thoroughly dry, pull the L-joint apart to break the coating across the joint in the coated joints; and open the joint in the uncoated joints. Re-assemble the L-joint.

NOTE This operation ensures that all L-joints will start to take up water at the same time and therefore prevents variation due to the coating excluding water longer from some L-joints than from others.

9 Reference L-joints

Prepare at least 20 reference L-joints (10 L_1 + 10 L_2, see 5.4.4) of *Pinus sylvestris* sapwood as described in 5.4.3. Determine and record the volume and mass of each of the L-joints members before treatment. The method of treatment selected shall be appropriate to the preservative system under test.

The reference joint process parameters may be as follows:

Double vacuum	initial vacuum 70 kPa	3 min
	atmospheric pressure	3 min
	final vacuum 35 kPa	20 min

After treatment, weigh the L-joints members, calculate the retention of the preservative in each and select the samples for exposure as described in 8.3. Condition the treated L-joints, under the conditions given in 8.5.1, for a minimum period of 14 d. Prepare the L-joints for testing as described in 8.5.2, 8.5.3, 8.5.4 and 8.5.5.

Additional reference L-joints may be produced which have wood preservative applied by another treatment process, for example the same treatment process as that used for the test wood preservative. For some test wood preservatives alternative reference preservatives may be more appropriate (see Annex B).

10 Untreated test control L-joints

A series of at least 20 untreated control L-joints (10 L_1 + 10 L_2 see 5.4.4) of *Pinus sylvestris* sapwood shall be installed at each exposure site at the start of every experiment or group of experiments. The control test specimens shall be prepared, stored, coated and handled in the same way as treated specimens before installation.

NOTE The objective of using untreated control L-joints is to compare the rate of decay of untreated wood with that of wood treated with the preservative under test and of wood treated with the reference wood preservative. The rate of decay in the untreated control L-joints indicates the aggressiveness of biological agencies in the particular exposure site during the period of test.

11 Exposure test site

11.1 Number of test sites

The test is valid using one test site; however it may be advantageous to select more than one test site representing markedly different conditions of climate and risk of microbiological attack.

11.2 Installation of the L-joints at the test site

Place the L-joints on the weathering racks (6.8) with the tenon member resting on the horizontal stickers on the shelf of the rack and with the mortise member in contact with the back (Figure 2).

12 Inspections

12.1 L-joints for non- destructive inspection

The L-joints shall be inspected at least annually, but it is preferable to inspect them every six months.

Two scores are recorded for each L-joint inspected.

All external surfaces shall be inspected visually and the condition recorded. The inspection shall not include probing or the use of other aids to inspection that would result in damage to the coating.

Each L-joint shall then be taken apart and the condition of the surfaces within the joint inspected, and recorded, using gentle probing where necessary. Each L-joint shall be given a rating using the grading system given in Table 1.

The condition of the coating should also be recorded.

Each L-joint shall then be re-assembled and returned to its original position on the exposure rack from which it was removed.

Table 1 — Grading system for the assessment of fungal decay

Rating	Description	Definition
0	Sound	No evidence of decay
1	Slight attack	Visible signs of decay, but no significant softening or weakening of the wood
2	Moderate attack	Areas of decay (softened, weakened wood); typically not more than 3 cm^2 and to a depth of 2 mm to 3 mm.
3	Severe attack	Marked softening and weakening of the wood typical of fungal decay, typically more than 3 cm^2 affected and to a depth of 3 mm or 5 mm or more over a few cm^2
4	Failure	Very severe and extensive rot; joint member(s) often capable of being easily broken

NOTE Observations made on test specimens for non-destructive inspection will often yield a lower rating than when surfaces created by sawing are available for evaluation.

The test specimens may also be assessed for staining and discolouration and it is recommended to use the rating system contained in EN 152. The data should be recorded in a separate annex in the test report.

12.2 L-joints for destructive inspection

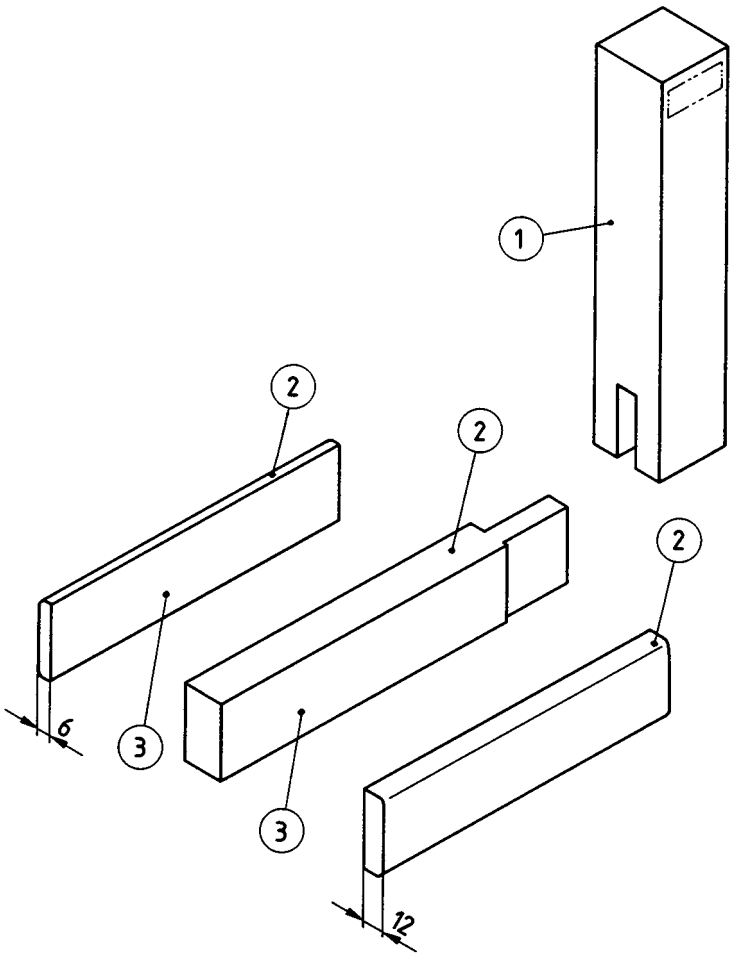
All destructive L-joints for the 1st or 2nd period should be assessed at the same time whether they are untreated, test or reference joints.

The L-joints for destructive inspection shall be removed from the exposure racks in sets after three years and after five years or when the notional median rating (V^n) for the untreated control replicates for non-destructive inspection (L1) is equal to or greater than 3,0.

The L-joints for destructive inspection shall be inspected at the time of their removal from the exposure rack. Initially, inspect and rate the L-joints in the same way as those for non-destructive inspection. In addition, each tenon member shall be cut up as shown in Figure 3, using the sawing equipment (6.1). The faces created by sawing shall then be inspected and given a rating using the grading system given in Table 1.

NOTE In situations where the decay of the test L-joints proceeds slowly then it may be appropriate to delay the destructive inspections. Alternatively, the decay may proceed very quickly in which case the destructive inspections can be made over a shorter period.

Dimensions in millimetres



Key

1 mortise member

2 tenon member

3 saw cut

Figure 3 — Method of conversion of an L-joint for visual assessment

13 Evaluation

13.1 General

The effectiveness of the test preservative in the L-joints is assessed on the basis of comparison with the reference preservative taking into account, after each inspection, the assessments of decay development for the non-destructively inspected specimens and, where appropriate, from the specimens inspected destructively.

13.2 Assessment of decay

The grading system shown in Table 1 shall be used to assess the extent of attack of the L-joints. Observations shall be made on all of the external surfaces and on surfaces exposed by dismantling the joint (13.1). Where

L-joints are inspected destructively, observations shall be made additionally on the surfaces revealed by sawing (12.2).

The individual ratings are tabulated for inclusion in the test report to enable median and mean values to be calculated.

The median rating (V^n) shall be calculated for each set of replicates for non-destructive inspection following each assessment. Median ratings shall be calculated for each set of replicates inspected destructively; separate median values shall be calculated for the ratings given, following inspection of the external surfaces and those visible within the joint (V^e) and following sawing to reveal the internal condition (V^i). These can be used as interim values to compare the relative performance of treatments before all the specimens have failed.

When all the specimens in a set for non-destructive inspection have failed, (rating 4), the median life (in years) of the L-joints in that set shall be calculated, as well as the mean together with the standard deviation.

14 Duration of the test

The test continues until either 5 years' exposure has taken place or until all non-destructive specimens have failed (rating 4), whichever is the longer.

15 Validity of the test

The results shall be accepted as valid provided that the median rating (V^n) for the untreated control replicates for non-destructive inspection is equal to or greater than 3,0.

16 Test report

The test report shall include:

a) the number of this European Standard;

b) the specific and unique name or code of the wood preservative tested, with an indication of whether or not the composition has been declared;

c) the solvent or diluent used (if any);

d) the wood species used and the density of the wood selected;

e) the number of replicates for both non-destructive and destructive inspection;

f) the concentration(s) tested;

g) the method and the date of treatment;

h) the method and duration of drying;

i) the mean retention of preservative in kilograms per cubic metre or grams per square metre as appropriate, (tenon and mortise reported pieces separately);

j) the reference preservative with concentration, retention, method and date of the treatment application, method and duration of post treatment conditioning;

k) the reference coating system, any other coatings applied and details of any maintenance procedures carried out;

l) the location and characteristics of the exposure site;

m) the date of installation of the specimens;

n) the date of each inspection;

o) the grading system used for inspection;

p) the duration of the exposure period;

q) the median rating (V^n);

r) the median ratings (V^e and V^i) for the controls, reference and test L-joints inspected destructively;

s) the name of the institute responsible for the report and the date of issue;

t) the name(s) and signature(s) of the person(s) in charge;

u) the name and address of the sponsor of the test;

v) any deviations from the standard and any special factors that may have influenced the results, such as the condition of the coating;

w) the following note: “The interpretation and practical conclusions that can be drawn from a test report demand a specialized knowledge of the subject of wood preservation and for these reasons this test report cannot of itself constitute an approval certificate”;

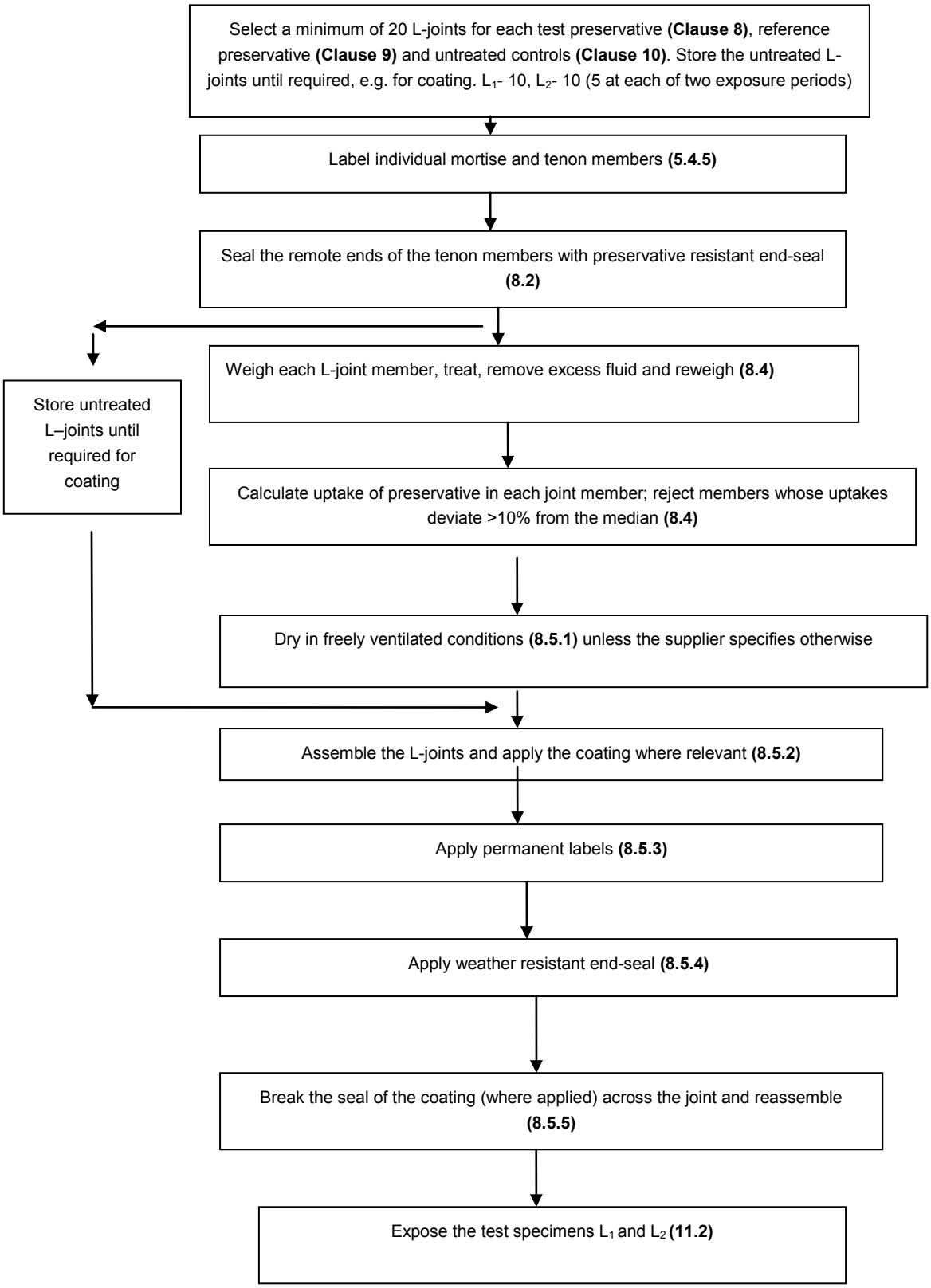
x) information on service life (when all joints have failed) is required;

y) an example of a test report is shown in Annex C.

All individual joint grades are required to be documented in an appendix to the report.

Annex A
(informative)

Flow chart for the preparation and exposure of L-joints for test



Annex B
(informative)

Information on treatment processes, reference and alternative preservatives and materials

B.1 Model treatment methods

B.1.1 General

The following treatment methods are given for guidance and should be regarded as providing model treatment parameters; the double vacuum and dip processes are those used for the reference preservative (1 % mass fraction hexabutyldistannoxane). The full-cell process would be a suitable method for the application of both alternative reference preservatives (B.2).

B.1.2 Double vacuum process

—	Initial vacuum	70 kPa	for 3 min;
—	atmospheric pressure		for 3 min;
—	final vacuum	35 kPa	for 20min.

B.1.3 Dip (immersion) process

—	Total immersion	for 3 min.

B.1.4 Full-cell process

—	Initial vacuum	20 kPa	for 30 min;
—	pressure	1.35 MPa	for 60 min.

It should be noted that there may be difficulties with grain raising, splitting and warping with high uptakes of water based preservatives. This can result in the test specimens requiring extended drying to ensure the components of the joint fit together.

B.2 Alternative reference preservatives

B.2.1 General

Historically the reference preservative for this test has been 1 % mass fraction hexabutyldistannoxane. As a result of the implementation of the Biocidal Products Directive 98/8/EC wood preservative products containing this substance can no longer be placed on the market. It is still permitted however to use the substance for research purposes.

It may be more appropriate to compare its performance with an alternative preservative.

B.2.2 Alternative reference preservative 1

$CuSO_4 \cdot 5H_2O$ mass fraction 35 %;

$K_2Cr_2O_7$ mass fraction 45 %;

$As_2O_5 \cdot 2H_2O$ mass fraction 20 %.

The chemical purity of the individual components should be at least a mass fraction of 98 %.

NOTE A dry salt retention approximating to 5,3 kg/m^3, when applied by a full-cell process (B.1.4), would be applicable to out of ground contact use.

As a result of the implementation of the Biocidal Products Directive 98/8/EC wood preservative products containing arsenic can no longer be placed on the market. It is still permitted to use the substance for research purposes.

B.2.3 Alternative reference preservative 2

$CuSO_4 \cdot 5H_2O$ mass fraction 50 %;

$K_2Cr_2O_7$ mass fraction 48 %;

CrO_3 mass fraction 2 %.

The chemical purity of the individual components should be at least 98 % mass fraction.

NOTE A dry salt retention approximating to 9,0 kg/m^3, when applied by a full-cell process (B.1.4), would be applicable to out-of-ground contact use.

As a result of the implementation of the Biocidal Products Directive 98/8/EC there are restrictions in the use of chromium- containing wood preservatives.

Annex C
(informative)

Example of a Test Report

Table C.1

Number of European Standard	EN 330:2014
Test Product including code if known	Product A, an organic solvent, joinery preservative
Product Composition (if declared)	Preservative containing 5 % active ingredient X in hydrocarbon solvent distilling between 153 °C and 193 °C
Diluent / Solvent	None
Wood species / density	Scots pine sapwood (*Pinus sylvestris)*; 550 kg/m^3
Number of replicates	10 for non-destructive inspection 5 for each destructive inspection
Concentration(s)	Preservative used undiluted
Method of treatment Date of treatment	Double vacuum (as per Annex B method); year / month / day Dip (as per Annex B method); year / month / day
Mean retention of preservative	Double Vacuum Tenons 57,0 kg/m^3 Double Vacuum Mortises 62,9 kg/m^3 Dip Tenons 275 g/m^2 Dip Mortises 285 g/m^2
Reference preservative and method of treatment	1 % mass fraction hexabutyldistannoxane (TBTO) Double vacuum (as per Annex B method)
Mean retention of reference preservative	Double vacuum Tenons 49,9 kg/m^3 Double vacuum Mortises 54,5 kg/m^3
Method and duration of post treatment conditioning	Air-dried horizontally on stickers for 4 weeks
Reference coating system	XYZ wood primer (white), XYZ undercoat, XYZ liquid gloss topcoat (white) applied to treated and untreated samples
Test exposure site	At AB Laboratories; on the edge of open country; trees of both hardwood and softwood species not nearer than 300m
Date of Installation in test racks	year / month / day
Sampling and assessment dates	T1 (1 year) non-destructive assessment only T2 (2 year) non-destructive assessment only T3 (3 year) both destructive and non-destructive T4 (4 year) non-destructive assessment only T5 (5 year) both destructive and non-destructive
Visual observations on fungal degradation	See Table C.2
Deviations from the standard	None

The interpretation and practical conclusions that can be drawn from a test report demand a specialized knowledge of wood preservation and, for this reason this report of itself cannot constitute an approval certificate.

Tested for:	Chemical Company A
	(Address)
Tested by:	A B Laboratories Ltd.
	(Address)
Test supervised by:	Name of person
	(Signature)
	Name of person
	(Signature)
Date of Report:	Year / Month / Day

Table C.2 — Visual observations – median fungal attack rating

Treatment	Type of sample and number of replicates	Exposure period - years				
		1	2	3	4	5
Untreated	Non-destructive (10) - V^n	0	1	2	2	3
1 % mass fraction TBTO (double vacuum)[a]	Destructive (5) - V^e	na	na	1	na	2
	- V^i	na	na	3	na	3
	Non-destructive (10) - V^n	0	0	1	1	1
	Destructive (5) - V^e	na	na	1	na	1
	- V^i	na	na	1	na	1
Product A (dip) Product A (double vacuum)	Non-destructive (10) - V^n	0	0	1	1	1
	Destructive (5) - V^e	na	na	1	na	1
	- V^i	na	na	1	na	1
	Non-destructive (10) - V^n	0	0	0	0	1
	Destructive (5)- V^e	na	na	0	na	1
	- V^i	na	na	0	na	1

na Not assessed.

[a] Reference preservative.

The test report should include an annex containing all of the individual assessments made during the course of the test.

Annex D
(informative)

Environmental, health and safety precautions within chemical / biological laboratory

When preparing this standard, consideration was given to the minimization of environmental impacts caused by the use of the methods of analysis.

It is the users' responsibility to use safe and proper techniques in handling materials in the methods of analysis specified in this standard.

The following list is not exhaustive but this standard may be used as a guide to the use of safe and proper techniques. They should:

— investigate if European Directives, transposed European legislation and national laws, regulations and administrative provisions apply;

— consult manufacturers/suppliers for specific details such as material safety data sheets and other recommendations;

— use safety equipment and wear protective clothing, usually goggles and coats, appropriate for the test product and the test chemicals, in all laboratory areas, to ensure the safety of the operator;

— be careful with flammable materials and substances that are toxic and/or human carcinogens and generally take care during transportation, decanting, diluting and dealing with spillages;

— use a fume cupboard during preparation of organic solvent solutions;

— store, handle and dispose of chemicals in a safe and environmentally satisfactory manner; including chemicals for laboratory tests, test specimens, unused solvents and reagents for disposal.

Bibliography

[1] EN 212, *Wood preservatives — General guidance on sampling and preparation for analysis of wood preservatives and treated timber*

[2] EN 152, *Wood preservatives — Determination of the protective effectiveness of a preservative treatment against blue stain in wood in service — Laboratory method*

[3] EN 252, *Field test method for determining the relative protective effectiveness of a wood preservative in ground contact*

[4] European Parliament and Council Directive 98/8/EC concerning the placing of biocidal products on the market. OJ L series 123/1

[5] Biocidal Products Regulations (Regulation (EU) No 528/2012) concerning the making available on the market and use of biocidal products

[6] ISO 2808:2007, *Paints and varnishes — Determination of film thickness*

This page deliberately left blank

This page deliberately left blank

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards -based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email bsmusales@bsigroup.com.

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Copyright

Useful Contacts:

Customer Services
Tel: +44 845 086 9001
Email (orders): orders@bsigroup.com
Email (enquiries): cservices@bsigroup.com

Subscriptions
Tel: +44 845 086 9001
Email: subscriptions@bsigroup.com

Knowledge Centre
Tel: +44 20 8996 7004
Email: knowledgecentre@bsigroup.com

Copyright & Licensing
Tel: +44 20 8996 7070
Email: copyright@bsigroup.com

bsi.

...making excellence a habit.™