BRITISH STANDARD

BS EN
212:2003

Wood preservatives — General guidance on sampling and preparation for analysis of wood preservatives and treated timber

The European Standard EN 212:2003 has the status of a British Standard

ICS 71.100.50

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

National foreword

This British Standard is the official English language version of EN 212:2003. It supersedes BS 5666-1:1987 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee B/515, Wood preservation, to Subcommittee B/515/2, Specifications and chemical testing of wood preservatives, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

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

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled "International Standards Correspondence Index", or by using the "Search" facility of the *BSI Electronic Catalogue* or of British Standards Online.

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

Compliance with a British Standard does not of itself confer immunity from legal obligations.

This British Standard, was published under the authority of the Standards Policy and Strategy Committee on 3 October 2003

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 18, an inside back cover and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

Amendments issued since publication

Amd. No.	Date	Comments

© BSI 3 October 2003

ISBN 0 580 42729 3

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 212

June 2003

ICS 71.100.50

Supersedes EN 212:1996

English version

Wood preservatives - General guidance on sampling and preparation for analysis of wood preservatives and treated timber

Produits de préservation du bois - Guide général d'échantillonnage et de préparation pour l'analyse des produits de préservation du bois et du bois traité

Holzschutzmittel - Allgemeine Anleitung für die Probenahme und Probenvorbereitung von Holzschutzmitteln und von behandeltem Holz für die Analyse

This European Standard was approved by CEN on 21 April 2003.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

© 2003 CEN All rights of exploitation in any form and by any means reserved worldwide for CEN national Members.

Ref. No. EN 212:2003 E

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

Contents

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

Foreword

This document (EN 212:2003) has been prepared by the 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 December 2003, and conflicting national standards shall be withdrawn at the latest by December 2003.

This document supersedes EN 212:1986.

Significant technical differences between this edition and EN 212:1986 are as follows:

a) addition of a clause "Introduction";

b) introduction of a clause "Normative references";

c) introduction of a clause "Terms and definitions";

d) taking into account the requirements of EN 351-1 and of the guidance of sampling in EN 351-2;

e) for thin section samples, use of a specific borer;

f) addition of a sampling report.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

Introduction

Sampling is a vital step in analysis and testing. Its importance is recognized in this European Standard which gives guidance on general methods for the sampling of wood preservatives and preservative-treated timber.

Such samples should be representative of the materials under examination and in a form that makes the determination of the required data possible.

No attempt has been made here to define rigidly any detailed methodology to be followed in operations in these areas because this may depend upon the nature of the preservative, the method of treatment and the particular requirements of e.g. national authorities or quality control and certification bodies.

Furthermore, the objectives of each analysis, and the demands of the individual analytical techniques, can impose their own requirements with regard to sampling and subsequent handling. Therefore, it is essential that the sampling plan for each operation should be devised in the light of the particular objective, using professional judgement based on experience.

The techniques described can be employed in a wide variety of applications ranging from laboratory research to the checking of preservatives and treated timber for arbitration purposes.

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

1 Scope

This European Standard gives guidance on the general procedures to be followed in the sampling and preparation for analysis of wood preservatives and preservative-treated timber.

This European Standard is applicable to the provision of appropriate samples for analysis which can be used to check the content of active and other ingredients in preservative formulations, and the content of active and other ingredients of wood preservatives in treated timber, either before, during or after the service life of the timber.

NOTE 1 Methods of sampling creosote and creosote-treated timber are described in EN 1014-1, 1014-2 and EN 12490. These are to be used in preference to the recommendations in this European Standard.

NOTE 2 No attempt has been made in this document to lay down detailed procedures to be adopted for control purposes at manufacturing plants where large volumes of preservatives are to be sampled. Nor does it attempt to establish procedures for checking the compliance of batches of treated timber with specifications demanding a defined level of treatment (see 6.2).

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 351-1, *Durability of wood and wood-based products – Preservative-treated solid wood – Part 1: Classification of preservative penetration and retention.*

EN 351-2, *Durability of wood and wood-based products – Preservative-treated solid wood – Part 2: Guidance on sampling for the analysis of preservative-treated wood.*

ISO 6206:1979, *Chemical products for industrial use – Sampling – Vocabulary*.

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply:

3.1
sampling unit
defined quantity of material having a boundary which may be physical, for example a container, or hypothetical, for example a particular time or time interval in the case of a stream of material

NOTE 1 A number of sampling units may be gathered together, for example in a package or box.

NOTE 2 In French, the term ”individu” is sometimes used as a synonym of ”unité d’échantillonnage”. In English, the terms ”individual”, ”unit” and ”item” are sometimes used in practice as synonyms of ”sampling unit”.

[ISO 6206:1979]

3.2
sample
one or more sampling units taken from a larger number of sampling units, or one or more increments taken from a sampling unit

[ISO 6206:1979]

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

3.3
representative sample
sample assumed to have the same composition as the material sampled when the latter is considered as a homogeneous whole

[ISO 6206:1979]

3.4
sampling plan
planned procedure of selection, withdrawal and preparation of a sample or samples from a lot (3.6) to yield the required knowledge of the characteristic(s) from the final sample (3.9) so that a decision can be made regarding the lot

NOTE Considerations of cost, effort and delay usually determine an acceptable sampling plan.

[ISO 6206:1979]

3.5
consignment
quantity of material covered by a particular order or shipping document

[Adapted from ISO 6206:1979]

3.6
lot
total quantity of material to be sampled using a particular sampling plan. A lot can consist of a number of consignments, batches or items

[Adapted from ISO 6206:1979]

3.7
batch
definite quantity of material that can be one item or a number of items that belong together because of their manufacture or production under conditions which are presumed to be uniform

[Adapted from ISO 6206:1979]

3.8
bulk sample
collect set of samples which do not maintain their individual identity

[ISO 6206:1979]

3.9
final sample
sample obtained or prepared under the sampling plan for possible subdivision into identical portions for testing, reference or storage

[ISO 6206:1979]

4 Safety precautions

All preservatives should be considered potentially toxic both to man and to the environment and should be handled with care and in accordance with the specific recommendations for safe use agreed with National and International Authorities. The manufacturers' instructions should also be observed.

In handling solid timber after treatment, protective gloves and glasses should be worn if the timber is still wet or contains solvent. Once the timber has dried, unless preservative residues on the surface are noted, no special precautions are necessary in handling such timber, other than the normal practice of washing hands before handling food or smoking.

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

When treated timber is machined or mechanically sanded or sawn, an efficient dust extraction system should be used or, failing this, the operator should be provided with, and should wear, appropriate respiratory protection.

The organic solvents commonly used for applying preservatives are flammable and it is essential that care be exercised in handling such materials.

NOTE Attention is drawn to the need to comply with any statutory regulations that govern the use and storage of flammable liquids.

5 Guidance on sampling preservatives

5.1 General

The method of sampling chosen should ensure that the sample obtained is as representative as possible of the total consignment.

5.1.1 Suspect consignment

A consignment should be considered suspect if:

a) a container is damaged or defective;

b) there is any doubt as to the nature of the contents of a container, for example because of the presence of an old label or incorrect markings;

c) obvious and unusual variations are observed in the consignment.

Such samples should be fully reported and should not be regarded as acceptable without mutual agreement between the parties concerned.

5.1.2 Number of items in consignment

The least number of containers, e.g. drums, to be sampled from any given consignment of preservative materials, irrespective of whether the materials are solid or liquid, should be the nearest whole number to the square root of half the total number of containers in the consignment (see Table 1). The containers to be sampled should be taken at random.

Table 1 — Sampling of containers

Number of containers in consignment (x)	$\sqrt{\frac{x}{2}}$	**Number of containers to be sampled**
10	2,24	2
20	3,16	3
30	3,87	4
50	5,00	5
100	7,07	7

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

5.1.3 Choice of materials for sample container and sampling devices

It is essential in all cases that the sampling devices and the sample container and its closure be made from material which is inert to the particular preservative under investigation.

NOTE 1 Polyethylene containers should not be used for hydrocarbon solvents. Glass containers are recommended.

NOTE 2 Glass containers should not be used for fluorine and boron based preservatives. Containers of polyethylene are recommended.

5.1.4 Marking and storage of samples

All sample containers should be clearly and permanently labelled as to their contents. All samples should be stored in their containers in a cool, dark place prior to analysis.

5.2 Sampling of solid preservatives

5.2.1 Sampling device

A suitable sampling device for the purpose of sampling the preservative in a drum is a sampling spear of internal diameter approximately 30 mm and sufficiently long to reach the bottom of the drum.

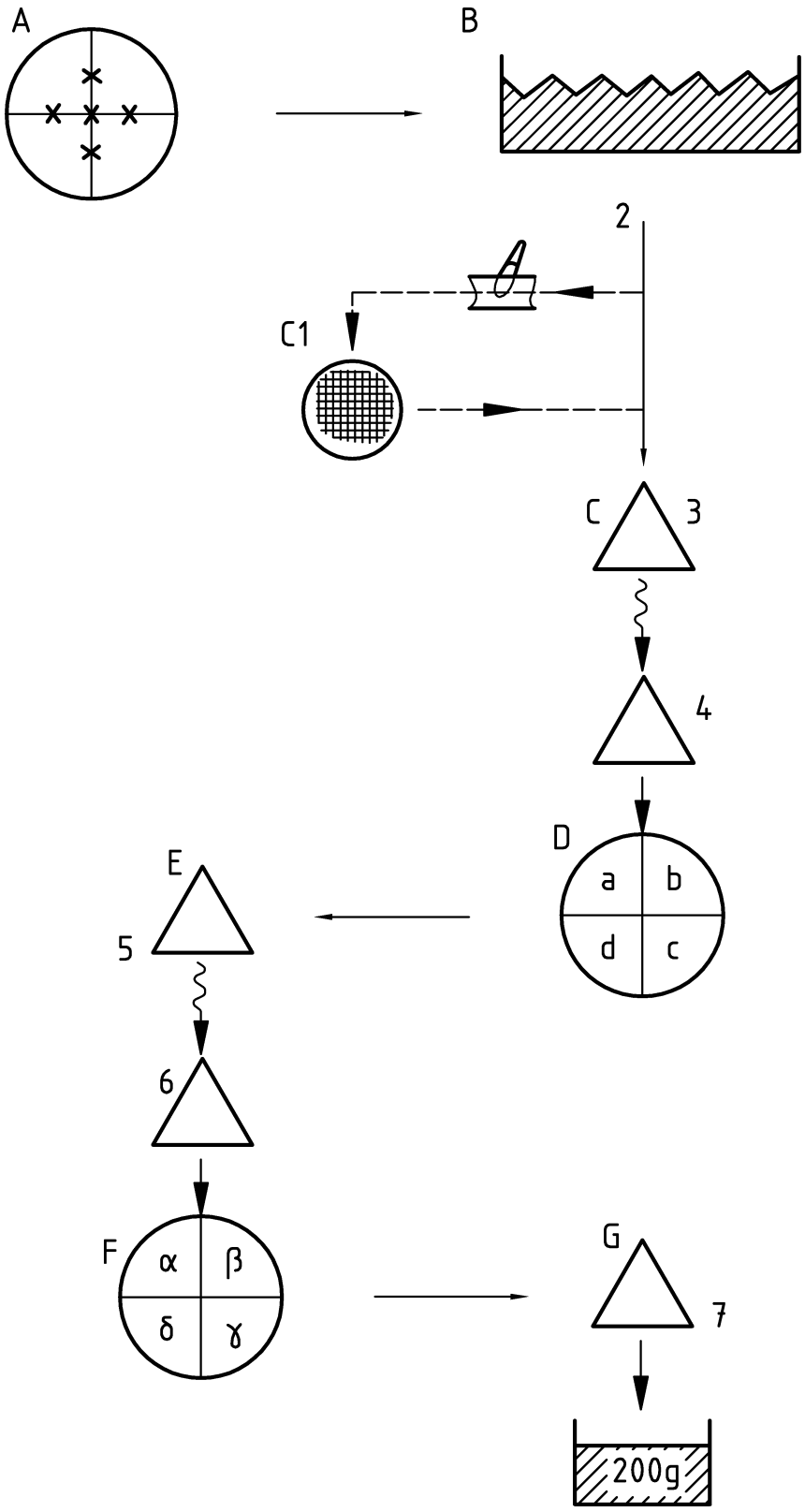
5.2.2 Procedure (see Figure 1)

Before sampling, mix the contents of the drum as thoroughly as possible. Take great care to minimize the moisture picked up by the sample during the sampling, mixing and reducing processes. Using the sampling device, take five samples, one from the centre of the drum and the other four from points on a pair of diameters at right angles to each other, which are mid-way between the centre and the side of each drum selected for testing (operation A). Ensure that the sampling spear reaches to the bottom of the drum.

Combine the five samples in a clean, dry, airtight container (operation B). If necessary, grind the whole of the bulk sample to pass a test sieve of nominal aperture size 2,00 mm, ensuring that no residue is left on the sieve.

NOTE To ascertain the homogeneity of the contents of a drum, individual spear samples can be analysed.

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013



Key

A	Drum: Top view, x (sampling points)	5	Cone 5 (a + c only)
2	Samples combined	6	Cone 8
3	Cone 1	7	+ only
4	Cone 4		

NOTE Repeat steps E to G as necessary.

Figure 1 — Sampling of a solid preservative

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

Mix the sample well (operation C_1). Transfer the entire sample to a clean dry surface and heap into a cone (operation C, cone 1). Turn over to form a new cone until the operation has been carried out three times (operation C, cone 4). Form each conical heap by depositing material on the apex of the cone so that the portions which slide down the side are distributed as evenly as possible, and that the centre of the cone is not displaced. If some of the larger aggregates of the mixture roll and scatter round the base, either push these back to the edge of the heap or break them and distribute them evenly over the heap.

Flatten the final cone from the mixed contents of the container by repeated vertical insertions of the edge of a board, commencing about the centre and working radially round the cone, lifting the board clear of the material after each insertion. Carry out this operation so that the flattened heap is of uniform thickness and diameter and the centre coincides with the centre of the original cone (operation D).

Quarter the heap along two diameters which intersect at right angles, using a suitable divider. Shovel one pair of opposite quarters into a cone and reject the remainder (operation E). Mix the cone three times (operation E, cone 8) as described above, flatten the cone and quarter along two diameters (operation F).

Repeat these operations until a reduced sample of about 200 g remains (operation G). Enclose the test sample in an airtight container until required for analysis.

5.3 Sampling of preservatives in paste form

5.3.1 Sampling device

A suitable device is a wide-mouthed sampling can of about 500 ml capacity fitted with a long, stiff handle so that it can be submerged in the material to be sampled. It should also carry a removable lid to which a second stiff handle or cord is attached, so that when the can is immersed in the paste the lid can be removed, allowing the can to fill.

A stout, steel, rod, suitable for stirring the paste is also required.

5.3.2 Procedure

Thoroughly mix the preservative in each container before the samples are taken. Displace any settled material from the base of the container using the stirring rod. Re-close the container and homogenize the contents by mechanical agitation.

Re-open the containers and test the contents for uniformity by probing with the steel rod. Continue alternate stirring, shaking and rolling until the contents are of a homogeneous consistency.

Take three samples from each container with the sampling can, one from just below the surface of the preservative, the second at a position about halfway between the surface and the base of the container and the third from near the base. Pour the three samples from each container into a clean glass or plastic container and mix together.

NOTE Should it prove impossible to homogenize the mixture it is necessary to dissolve or disperse the whole contents of the container and take aliquot portions for analysis.

5.4 Sampling of liquid preservatives

5.4.1 Sampling device

A suitable sampling device consists of a thick-walled glass tube of about 10 mm internal diameter, cut to a length suitable for extracting the treatment solution to a depth of about two thirds of the height of the container from the top. The actual length of the tube will depend on the container to be sampled.

To ensure retention of the liquid column when the tube is withdrawn from the solution, the bottom end of the tube should be softened in a flame and the glass allowed to collapse until the opening is reduced to about 5 mm diameter.

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

5.4.2 Procedure

Before sampling, mix the contents of the container (e.g. can) as thoroughly as possible. Insert the glass tube vertically into the well-mixed liquid in the container to be sampled, and allow the liquid to reach its natural height in the glass tube. Place the thumb on the upper end of the tube to prevent escape of the liquid from the tube while it is being lifted. Lift the tube from the can and insert the end into the sample bottle. Allow the liquid to drain into the sample bottle by removing the thumb. If required, bulk the samples from the various cans, mix and remove a suitable volume for analytical purposes. Seal the sample can.

6 Guidance on sampling treated timber

6.1 General

The effectiveness of any treatment depends on the introduction of suitable quantities of preservative to a sufficient depth below the surface of the wood to protect from biological attack, and to combat existing infection. The degree of protection required varies with the severity of the environment to which the treated timber is exposed.

The penetration of preservatives into the timber is governed by three main factors:

a) the properties of the preservative;

b) the method of applying it to the timber;

c) the permeability of the timber itself; this property varies markedly with species, with direction of penetration, and, even within a single timber, regions of different permeability (e.g. heartwood/sapwood) may be present.

In practice, therefore, a wide range of preservative distribution ”profiles” is encountered within treated timber and any methods designed for the detailed examination of such materials should make provision not only for the detection and/or measurement of active components but also for the determination of their location within the timber samples or wooden members. The exact sampling technique to be employed in any particular case will depend on the factors enumerated above and, where required, should take account of the end use and location of the product.

Most general sampling schemes for preservative-treated timber are designed to allow the determination of the retention or loading of a preservative either in the timber as a whole or in a specific part of the treated component. In deciding which sampling method to select, certain factors need to be considered.

The primary requirement of any sampling system is that the samples taken should be as representative as possible of the lot of treated wood. These should be selected so as to avoid knots, splits and other growth irregularities.

It should be noted that samples consisting entirely of heartwood will contain relatively little preservative because, in general, heartwood is considerably less permeable than sapwood. Conversely, samples consisting entirely of sapwood will have a relatively high retention of preservative. Thus the proportion of sapwood and heartwood in a batch of timber should be considered if it is the intention to determine average retention of preservative within the batch.

It should be borne in mind also that preservatives enter timber most rapidly through the end grain, and relatively high loadings are obtained in these areas. The effect of end penetration on the overall loading of a piece of timber will thus depend on the length of the timber while the contribution of lateral penetration to this total will vary with the cross-sectional area of the timber. It is therefore important that the dimensions of the wood components to be sampled are taken into account when deciding the sampling procedure to be adopted.

When determining retentions from lateral or end-grain surfaces, it is necessary to appreciate the depth to which the preservative is likely to have penetrated. Pressure impregnation of a permeable timber will result in a relatively deep, even distribution of preservative within the wood while, at the other extreme, dipping or brushing an impermeable species will provide only a shallow, less uniform distribution which is confined to the outermost layers of the wood.

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

When sampling timber *in situ* (i.e. while in service) it is essential to ensure that no structural weakening or loss of integrity arises as a result of this process, so sampling may have to be limited on this account. In difficult circumstances, the advice of an experienced structural specialist should be sought before commencing operations.

In many situations, samples have to be taken from preservative-treated timber that has been subjected to further processing such as gluing or painting, or which has otherwise been contaminated on the surface. In such cases, care has to be taken to avoid interference in the subsequent analysis by excluding such extraneous material from the sample.

6.2 Sampling procedures

6.2.1 Sampling for the determination of penetration and retention as required by EN 351-1

The basis on which preservative treatments for timber are to be specified in European product Standards is presented in EN 351-1. This standard establishes a classification to be used in specifying the level of treatment to be achieved by the treatment process. The classification refers to the penetration of the preservative and its retention within a defined zone of the treated timber.

EN 351-2 should be referred to in this context. It provides guidance on the sampling of treated timber in order specifically to check the compliance of a batch of treated timber with a specification written in accordance with EN 351-1. It makes recommendations on the number of treated units in a batch that should be sampled and the methods to be used in obtaining analytical samples from those units. However, it gives no guidance on the conversion of the sample to a form suitable for the analysis nor on the methods of analysis that should be used.

6.2.2 Sampling for the determination of average cross-sectional retention

A complete cross-section, about 5 mm thick and of uniform thickness, of the timber should be cut, if possible, at least 300 mm from the end. In all cases, and especially in shorter billets, it is essential to take into account the effects of any penetration through the end grain.

6.2.3 Sampling for the determination of lateral retention

A sample of the required lateral depth should be cut at least 300 mm from the end or where penetration from the end grain will have no effect. If profiles of penetration at different depths are required, it is necessary to eliminate edge effects; for example, if radial penetration profiles are required, zones contaminated by tangential penetration should be avoided (see Figure 2). Depending on the purpose of the test, it can be desirable for the sample to consist of sapwood only or of heartwood only; if both are present, it may be necessary to distinguish between them before selecting analytical samples from the block.

6.2.4 Sampling for the determination of end-grain retention

A sample of the required length from the end should be cut. Remove the outer 5 mm of the lateral surfaces. It is desirable to divide the remaining sample into heartwood and sapwood portions for separate analysis.

6.2.5 Sampling for the determination of core retention

A complete cross-section of uniform thickness, about 5 mm thick, should be cut from the timber at least 300 mm from the end or where penetration from the end grain will have no effect. The one-ninth core sample, as illustrated in Figure 3, should be cut from this section.

6.2.6 Preparation of thin section samples

Preservatives in treated wood are usually not evenly distributed, and it is often required to determine preservative loading over very small areas. To do this, sections of up to 0,2 mm in thickness of air dry specimens should be cut on a microtome. The specimens may be sawn from the bulk of the treated wood, or borings taken with a test borer consisting of a hollow auger and extractor, e.g. a Mattson borer (see Figure 4). It is also possible to cut sections with a wood plane, but this method is not so accurate.

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

Samples may also be taken using a Forstner auger bit (Figure 5), which produces thin shavings and results in a smooth sided, flat-bottomed hole of well defined area. If incremental borings are taken it is possible to examine the distribution of preservative with respect to depth, though this method is not as accurate as that using a microtome because of the possibility of compressing the wood during sampling.

To obtain a representative sample, it is necessary to include both early and late wood in the thin sections taken for analysis. This is because concentration gradients of preservative can occur across the annual rings. Sections taken from the radial and transverse faces of the sample will contain both early and late wood but sections cut from the tangential face may contain only one or the other. To make up a representative sample from the tangential face, thin sections should be cut over several annual rings, provided there is sufficient depth of preservative penetration to allow this.

NOTE In order to avoid loss of sample, it is necessary for the preparation of thin section samples (6.2.6) and for wood dust sampling (6.2.7) to be carried out in a draught-free environment; appropriate precautions should be taken to protect the operator (see clause 4).

6.2.7 Sampling to produce wood dust

Samples can be cut as solid sections and then converted to dust (for example by pulverising the dry sample in a beater or hammer mill) or they can be produced directly by sawing (see note following 6.2.7). Since the preservative, by virtue of its original location within the timber, may well be concentrated in dust particles of a particular size it is important that no fraction be rejected before analysis. The sample should be homogenized before taking aliquot portions, for example by grinding until all the sample passes a test sieve of nominal aperture size of 0,5 0,1 mm, and then mixing well.

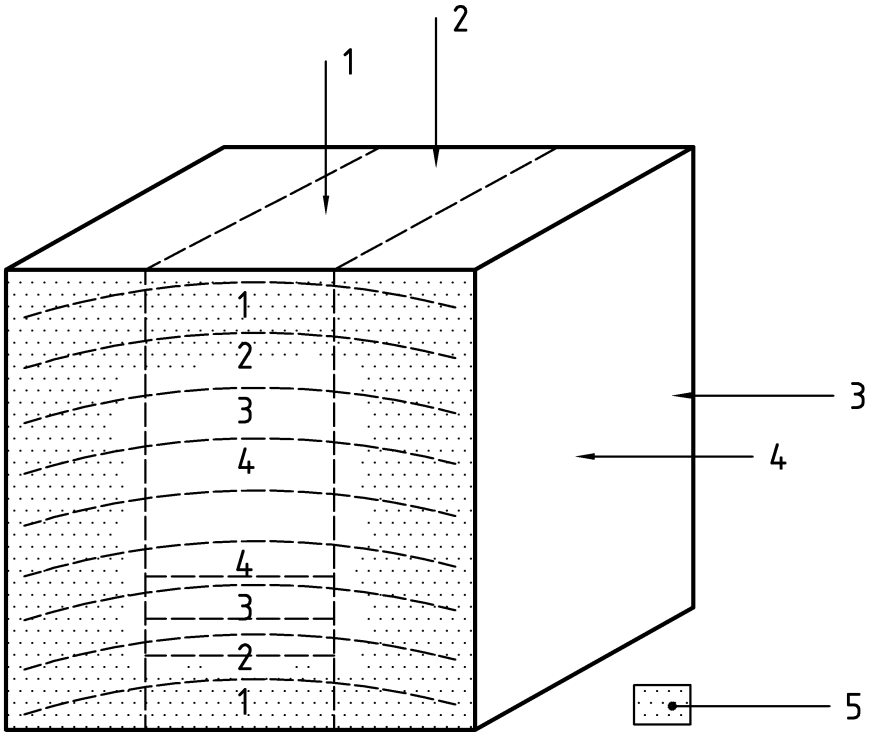
Care should be taken to minimize the risk of evaporative losses or degradation of organic preservatives due to generation of excessive heat in the conversion process.

The fastest method of sampling is to make a clean uniform saw-cut through the cross-section of a prepared specimen and collect the sawdust produced for analysis. During sawing it is important that the saw-blade is held rigidly so that sideways motion of the blade is virtually eliminated. An unrepresentative sample is obtained if there is any variation in the width of the saw-cut through the specimen.

To ensure a uniform cut, modify a mitre machine to allow easy sawdust collection by fitting it with a shallow V shaped bed containing a simple gripping device over which the saw is supported on four rods (see Figure 6). Fit the machine with a medium cut blade with 4 or 5 points per centimetre.

Saw the specimen through, whilst it is held firmly mounted on the saw bench, and collect the sample by brushing the wood dust into a tared beaker for weighing.

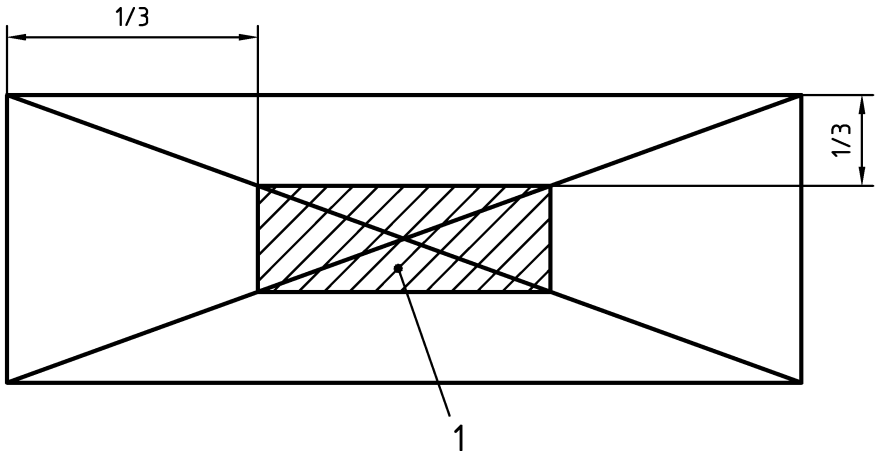
Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013



Key

1 Radial penetration
2 Tangential face
3 Radial face
4 Tangential penetration
5 Impregnated area

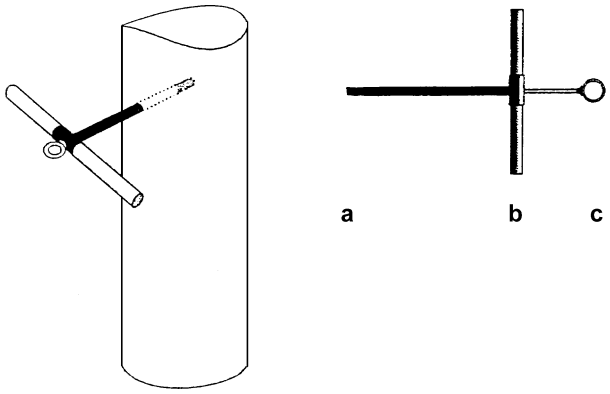
Figure 2 — Example of a sampling technique for the study of radial penetration



Key

1 Core section

Figure 3 —Cross-section of timber component showing determination of 1/9 core section to determine core retention



NOTE Clip the borer (a) into the handle (b). Press the end of the borer to the wood at the chosen position and penetrate the wood to the required depth by turning the handle. Insert the tool with the serrated edge (c) to its full length down the centre of the borer. Make a 1/2 turn of the borer in the reverse direction to break the core. Then remove the core boring by slowly pulling the tool (c) from the borer using the unclipped handle. Finally remove the borer from the wood.

Figure 4 — A Mattson borer

Figure 5 — A Forstner auger bit

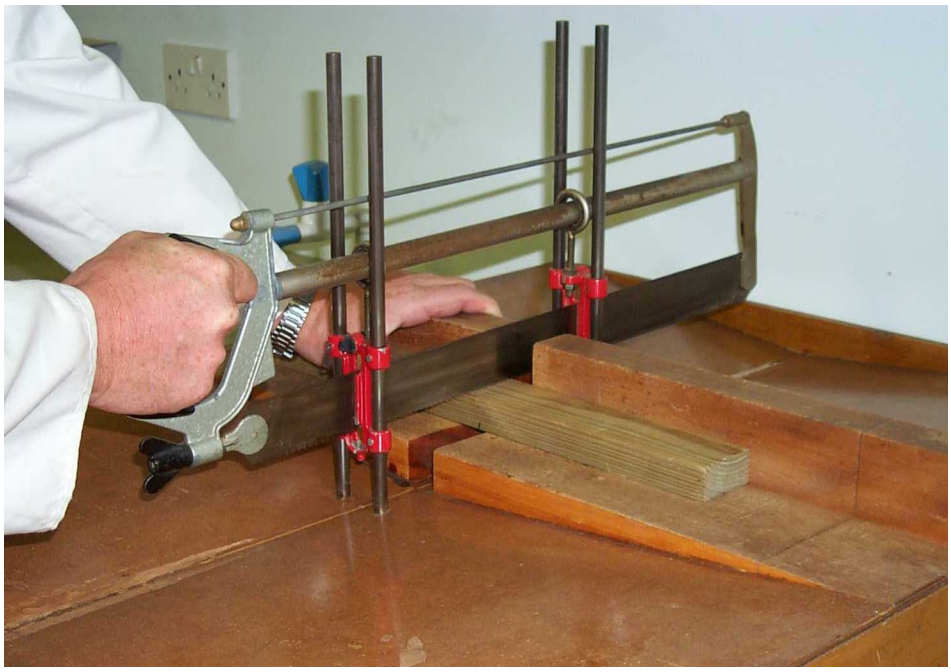


Figure 6 — Modified mitre machine for the preparation of a sawdust sample

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

7 Method for the determination of moisture content of preservative-treated timber

7.1 Selection of sample

If the average moisture content of a piece of treated timber is required, cut a sample consisting of a full cross-section 10 mm to 20 mm thick, not less than 300 mm from either end. Alternatively, if it is not possible to cut the timber, take borings totalling not less than 8 g, not less than 300 mm from either end. Using a test borer consisting of a hollow auger and extractor e.g. a Mattson borer (see Figure 4), bore from the sapwood face to the centre of the section or to the specified depth.

NOTE The depth to be utilised, especially for members of large cross-section, should be specified in the relevant commodity specification.

If the information is required on the moisture content of the analytical samples, matched material or sample aliquots should be employed, but not the samples to be used for chemical analysis.

If the sample cannot be weighed at once put it into a stoppered weighing bottle or other air-tight container immediately after it has been prepared (see 5.1.3).

7.2 Apparatus

Ordinary laboratory apparatus together with the following:

7.2.1 Electrical heated drying oven capable of maintaining a temperature of (103 2) °C.

7.2.2 Desiccator containing an efficient desiccant (e.g. silica gel).

7.2.3 Analytical balance.

7.3 Procedure

Weigh the sample as soon as possible after preparation, and place it in an oven which has already been adjusted to a temperature of (103 2) °C. Periodically remove the sample from the oven, allow it to cool in a desiccator and reweigh. Repeat the drying, cooling and weighing at suitable intervals until any further loss in mass is at a rate not exceeding 0,1 g per 24 h. For samples in excess of 20 g dry mass the loss between two successive weighings should not differ by more than 0,5 % per 24 h.

NOTE 1 Some loss of preservatives by volatilisation or degradation can occur during this process and this can lead to somewhat higher values for moisture content. This should be acknowledged when reporting the results. If the timbers have a high content of volatile substances that are non-miscible with water, such as can arise with creosote treatment, it can be preferable to use a Dean and Stark distillation method (e.g. EN 12490 or ISO 3733) for the determination of moisture content.

NOTE 2 It is advisable for the drying oven to be in a fume cupboard to avoid exposure of personnel to any fumes.

7.4 Calculation

The moisture content, W_m , as a percentage of the dry mass, is given by the following equation :

$$W_m = \frac{100(m - m_1)}{m_1}$$

where

m is the mass of sample when wet in grams ;

m_1 is the mass of sample after drying in grams.

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

8 General considerations in converting samples for analysis

Samples for analysis isolated by the methods outlined in clauses 5 and 6 may be converted, by a variety of techniques, into a form suitable for further processing. Subsequent operations include preparation of the wood surface, conversion to sawdust, chemical digestion, extraction, etc. The precise procedures to be followed depend on the requirements of the analytical methods. However, it is essential that the sample to be analysed is homogenous, especially where sub-sampling will take place.

It is essential that losses of preservative by evaporation are avoided. Drying under ambient conditions is therefore recommended and moisture content determinations should not normally be carried out on the samples selected for further analysis. In addition, migration of aqueous or organic solvents during the drying process can well cause redistribution of the active components within solid wood samples and it is necessary to use a freeze-drying technique in distribution studies.

9 Sampling report

A sampling report should be written containing all essential information pertaining to the product sampled and the manner in which the sample was prepared. It should contain at least the following particulars:

a) number and date of this European Standard and, in particular, to those clauses which have been followed;

b) unambiguous sample identification marks such as name and number of the label on the sample container;

c) date, and duration of sampling;

d) nature of sample (see clause 3);

e) approximate size of consignment;

f) number of portions taken in the consignment, equipment used, (for example spear) approximate mass of sample before size reduction, method of reduction, (for example coning and quartering procedure);

g) comments on abnormalities such as unusual weather conditions or obvious contamination;

h) any operation not included in this European Standard to which reference is made, or regarded as optional.

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

Bibliography

[1] ISO 3733, *Petroleum products and bituminous materials – Determination of water – Distillation method.*

[2] EN 1014-1, *Wood preservatives – Creosote and creosoted timber – Methods of sampling and analysis – Part 1: Procedure for sampling creosote.*

[3] EN 1014-2, *Wood preservatives – Creosote and creosoted timber – Methods of sampling and analysis – Part 2: Procedure for obtaining a sample of creosote from creosoted timber for subsequent analysis.*

[4] EN 12490, *Durability of wood-based products – Preservative-treated solid wood – Determination of the penetration and retention of creosote in treated wood.*

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

blank

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: +44 (0)20 8996 9000. Fax: +44 (0)20 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: +44 (0)20 8996 9001. Fax: +44 (0)20 8996 7001. Email: orders@bsi-global.com. Standards are also available from the BSI website at http://www.bsi-global.com.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: +44 (0)20 8996 7111. Fax: +44 (0)20 8996 7048. Email: info@bsi-global.com.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: +44 (0)20 8996 7002. Fax: +44 (0)20 8996 7001. Email: membership@bsi-global.com.

Information regarding online access to British Standards via British Standards Online can be found at http://www.bsi-global.com/bsonline.

Further information about BSI is available on the BSI website at http://www.bsi-global.com.

Copyright

Copyright subsists in all BSI publications. BSI also holds the copyright, in the UK, of the publications of the international standardization bodies. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI.

This does not preclude the free use, in the course of implementing the standard, of necessary details such as symbols, and size, type or grade designations. If these details are to be used for any other purpose than implementation then the prior written permission of BSI must be obtained.

Details and advice can be obtained from the Copyright & Licensing Manager. Tel: +44 (0)20 8996 7070. Fax: +44 (0)20 8996 7553. Email: copyright@bsi-global.com.

BSI
389 Chiswick High Road
London
W4 4AL