



DEAS 324: 2023

ICS 71.100.50

DRAFT EAST AFRICAN STANDARD

**Copper/chromium/arsenic compositions for the preservation of timber —
Method for timber treatment**

EAST AFRICAN COMMUNITY

Copyright notice

This EAC document is copyright-protected by EAC. While the reproduction of this document by participants in the EAC standards development process is permitted without prior permission from EAC, neither this document nor any extract from it may be reproduced, stored or transmitted in any form for any other purpose without prior written permission from EAC.

Requests for permission to reproduce this document for the purpose of selling it should be addressed as shown below or to EAC's member body in the country of the requester:

© East African Community 2022 — All rights reserved
East African Community
P.O. Box 1096,
Arusha
Tanzania
Tel: + 255 27 2162100
Fax: + 255 27 2162190
E-mail: eac@eachq.org
Web: www.eac-quality.net

Reproduction for sales purposes may be subject to royalty payments or a licensing agreement. Violators may be prosecuted.

Contents

Page

Foreword	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Exchange of information	2
4.1 General	2
4.2 Essential items to be supplied to the treater	2
4.2.1 Commodity specification	2
4.2.2 Timber to be treated	2
4.2.3 Method of treatment	2
4.3 Items to be agreed between the treater and the customer	2
4.3.1 General	2
4.3.2 Condition of timber for treatment	2
4.3.3 Material reduced pressure for pressure sensitive	2
4.3.4 Analysis of working solution	2
4.3.5 Analysis of the treated timber	3
4.3.6 Inspection of treatment operation	3
4.3.7 Drying after treatment	3
4.3.8 Post-treatment operations	3
5 Preservative solution	3
5.1 Concentration of working solution	3
5.2 Storage temperature	3
5.3 pH value	3
5.4 Analysis of working solution	3
6 Condition and preparation of timber for treatment	3
6.1 Condition of timber before treatment	3
6.1.1 General	3
6.1.2 Freedom from decay and insect attack	4
6.1.3 Moisture content	4
6.1.4 Fabrication before treatment	4
6.2 Incising	4
7 Loading in treatment cylinder	4
7.1 Selection of timber	4
7.2 Stacking in the cylinder	4
8 Treatment schedules	5
8.1 General	5
8.2 Full cell process	5
8.2.1 Initial vacuum stage	5
8.2.2 Flooding	5
8.2.3 Pressure stage	5
8.2.4 Final vacuum stage	5
8.3 Lowry empty cell process	5
8.3.1 Flooding	5
8.3.2 Pressure stage	5
8.3.3 Final vacuum stage	5
8.4 Confirmation of treatment	6
9 Handling and drying of treated timber	6
9.1 Handling of treated timber	6

9.2	Drying of treated timber	6
Annex A (normative)	Post-treatment operations on treated timber	7
A.1	Additional preservative treatment after fabrication	7
A.2	Painting	7
A.3	Adhesive application	7
A.4	Application of metal fixing	7
Annex B (Normative)	Method for determination of concentration of working solution	9
B.1	Apparatus	9
B.2	Procedure	10
Annex C (normative)	Penetration	11
Annex D (normative)	Methods for determination of moisture content of timber before treatment	12
D.1	Oven drying method	12
D.1.1	Sample selection	12
D.1.2	Apparatus	12
D.1.3	Procedure	12
D.1.4	Calculation	12
D.2	Moisture meter method	13
D.2.1	Sampling	13
D.2.2	Apparatus	13
D.2.3	Procedure	13
Bibliography	14

Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

The Community has established an East African Standards Committee (EASC) mandated to develop and issue East African Standards (EAS). The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the public and private sector organizations in the community.

East African Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the Principles and procedures for development of East African Standards. XXXXXX.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

The committee responsible for this document is Technical Committee EASC/TC 022, *Wood, timber and their products*.

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

This **second** edition cancels and replaces the **first** edition (EAS 324:2002), which has been technically revised.

Copper/chromium/arsenic compositions for the preservation of timber — Method for timber treatment

1 Scope

This Draft East African Standard prescribes procedures for treatment of timber using water borne copper/chromium/arsenic (CCA) preservative formulations.

It does not specify details of treatment relating to specific end uses for which reference to the relevant commodity specification should be made.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EAS 24, *Glossary of terms used in timber industry*

EAS 124, *Rounding off numerical values*

EAS 325, *Wood preservatives and treated timber — Guide to sampling and preparation of wood preservative and treated timber for analysis*

EAS 326, *Wood preservation by means of copper/chromium/arsenic compositions — Specification*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EAS 24 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <http://www.iso.org/obp>

commodity specification

any document providing details of preservative treatments required for a specific end use.

“NOTE – Examples of such documents are East African Standard specification, a published specification or recommendation of a relevant trade association of public authority.”

4 Exchange of information

4.1 General

In order to carry out a treatment according to this East African Standard, it is necessary for the operator of the treatment process to be provided with the following supplementary information, which shall be fully documented. The information required consists of

- a) essential information to be supplied to the treater (see 4.2); and
- b) items to be agreed between the treater and the customer (see 4.3).

4.2 Essential items to be supplied to the treater

4.2.1 Commodity specification

Any commodity specification to which reference is required for information or operating detail shall be clearly identified.

4.2.2 Timber to be treated

The following information shall be stated where relevant:

- a) The timber species (see 7.1 and 8.1),
- b) whether the end use is for poles (see 6.1.3),
- c) whether incising is required (see 6.2),

if not specified in the relevant commodity specification.

4.2.3 Method of treatment

The treatment parameters shall be identified and precise schedule, shall be specified. Including pressure levels and periods for each treatment stage (see Clause 8) unless these details are given in the relevant commodity specification.

4.3 Items to be agreed between the treater and the customer

4.3.1 General

If required by agreement between the treater and the customer, the items in 4.3.2 to 4.3.8 shall be stated.

4.3.2 Condition of timber for treatment

It shall be stated whether timber showing signs of attack by sapstain and fungi pinhole borers is an acceptable constituent of the charge (see 6.1.2)

4.3.3 Material reduced pressure for pressure sensitive

It shall be stated whether a minimum hydraulic pressure of 10 bar may be used with a consequent lengthening of the standard pressure period (see 8.2.3)

4.3.4 Analysis of working solution

It shall be stated whether analysis of the working solution is required.

4.3.5 Analysis of the treated timber

It shall be stated whether analysis of the treated timber in accordance with TZS 660 is required and if so, the sampling procedure required.

4.3.6 Inspection of treatment operation

It shall be stated whether the customer is to observe the treatment operation on site (see 8.4).

4.3.7 Drying after treatment

It shall be stated whether the treated timber is to be dried to specified moisture content and, if so, the moisture content required (see 9.2).

4.3.8 Post-treatment operations

It shall be stated whether any post treatment operations are to be undertaken prior to delivery of the timber. If so the operations shall be in accordance with Annex A.

5 Preservative solution

5.1 Concentration of working solution

The working solution shall be prepared from one of the mixtures specified in EAS 326: 2002 (see clause 2) and shall be mixed thoroughly. The concentration of this working solution before use, when determined in accordance with Annex B, shall be not less than that specified in the relevant commodity specification.

5.2 Storage temperature

The solution shall be stored at normal ambient temperature except that it shall not at any time be allowed to exceed 40 °C.

5.3 pH value

The pH value of the working solution shall comply with Clause 5 of EAS 326.

5.4 Analysis of working solution

Solution strength is a function of temperate and specific gravity expressed in weight to volume". If specified (see 4.3.4) the proportions of the active ingredients shall be determined in accordance with EAS 324 on sample prepared in accordance with EAS 325.

6 Condition and preparation of timber for treatment

6.1 Condition of timber before treatment

6.1.1 General

On visual inspection, the surface of the timber shall be free from mud, dirt, inner and outer bark, sawdust and shavings. It shall also be free from paint, polish or other surface finish.

6.1.2 Freedom from decay and insect attack

On visual inspection, the timber shall be free from all signs of attack by wood-destroying fungi or insects unless it has been agreed (see 4.3.2) that timber showing signs of attack by sapstain fungi and pinhole borers is acceptable.

6.1.3 Moisture content

For all timber, unless otherwise specified in a relevant commodity specification, the average moisture content shall not exceed 25 % (m/m) on an oven dry basis. The moisture content shall be determined in accordance with one of the methods given in Annex D.

For overhead line poles, the maximum average moisture content in the charge shall be not more than 25 % (m/m) on an oven dry basis for the outer 27mm. The moisture content of any individual pole shall not exceed 28 % (m/m).

6.1.4 Fabrication before treatment

All timber shall be sawn or planed before treatment to achieve the finished cross-section at the moisture content at which the timber is to be used.

NOTE As far as possible, all crosscutting, boring, drilling or other fabrication should be carried out before treatment (see A.1).

6.2 Incising

If incising is specified, the incisions shall be made parallel to the general direction of the grain. They shall penetrate to a depth of approximately 20 mm and be spaced 25 mm apart in rows extending across all four faces of the timber. The distance between the rows shall be 60 mm and incisions in adjacent rows shall not be in direct line but staggered at intervals of approximately 6 mm, i.e. incisions in every fourth row are in direct line.

NOTE Sawn timbers rated as resistant to preservative (e.g. East African pencil cedar), 75 mm or thicker, and intended for exterior use, may benefit from incising before treatment.

If incising is specified in the relevant commodity specification for other sawn timber, it shall be carried out as described above.

7 Loading in treatment cylinder

7.1 Selection of timber

If it is not possible to segregate timber for treatment so that a charge consists of timbers of the same species and/or resistance to penetration, the most resistant species in the charge shall be identified (see 8.1).

NOTE It is preferable to segregate the timber.

7.2 Stacking in the cylinder

7.2.1 The pieces of timber shall be stacked so that the solution will have access to all faces of the timber.

7.2.2 Sawn timber may be separated by sticks or laths at appropriate intervals.

8 Treatment schedules

8.1 General

The timber shall be treated with an aqueous solution of the preservative in accordance with either:

- a) the relevant commodity specification;
- b) the full cell vacuum and pressure process; or
- c) the lowry empty cell pressure impregnation process.

The treatment schedules shall be as specified in 8.2 or 8.3 as appropriate.

The treatment schedule for charges of mixed species or of timber of different resistance to penetration shall be that appropriate to the most resistant of the timber species present (see also Annex C and Note under 6.2).

8.2 Full cell process

8.2.1 Initial vacuum stage

Subject the timber to an initial vacuum of at least - 0.65 bar and maintain at this pressure for the period of time specified in the relevant commodity specification.

8.2.2 Flooding

On completion of the initial vacuum stage flood the cylinder with preservative solution before releasing the vacuum.

8.2.3 Pressure stage

Subject the timber and preservative in the cylinder to a minimum hydraulic pressure of 10 bar for the period of time specified in the relevant commodity specification. The pressure period begins when the pressure first reaches 10 bar.

8.2.4 Final vacuum stage

At the end of the pressure stage. Empty the cylinder of preservative solution and apply a final vacuum. Release the vacuum as soon as the gauge reading reaches a vacuum of -0.65 bar or after 15 min, whichever is sooner.

8.3 Lowry empty cell process

8.3.1 Flooding

After loading, flood the cylinder with preservative solution at atmospheric pressure.

8.3.2 Pressure stage

Subject the timber and preservative in the cylinder to the pressure and period described in 8.2.3.

8.3.3 Final vacuum stage

If a final vacuum stage is specified by the relevant commodity specification, carry out the procedure described in 8.2.4.

8.4 Confirmation of treatment

During the treatment schedule records shall be kept of the actual treatment schedule.

Detailed records of the treatment schedule shall be available to the customer on request, in addition to a certificate stating that the specification has been met and including any relevant item listed in Clause 4.

9 Handling and drying of treated timber

9.1 Handling of treated timber

Treated wood shall be held for a minimum of 48 h or until drip-dry, whichever is the longer, before dispatch or erection.

The fixation Chart gives an indication of the time versus timber temperature required for fixation to be achieved

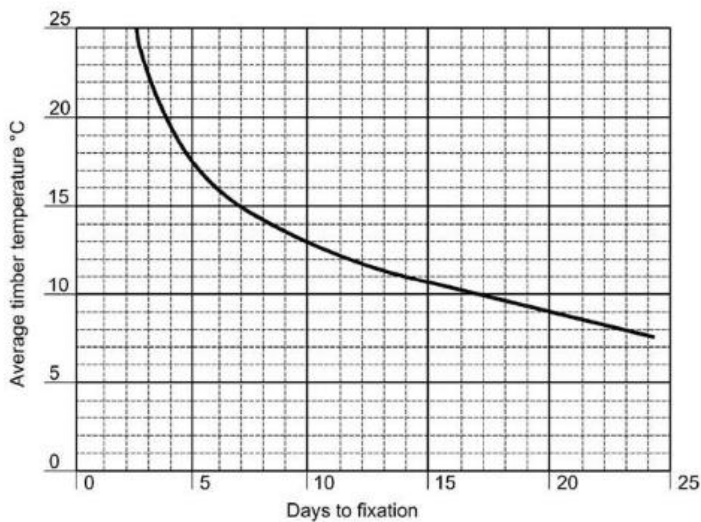


Figure – WCCA fixation chart

NOTE Fixation of the preservative may take up to 14 days and this should be taken into account before use with metal fittings (see A.4).

CAUTION! Skin contact with timber still wet after treatment should be avoided. If it is necessary to handle treated timber while wet, it is essential that protective gloves be worn.

9.2 Drying of treated timber

If it is specified that the treated timber shall be dried to a specific moisture content (see 4.3.7) the moisture content shall be determined by the method described in EAS 325.

Annex A (normative)

Post-treatment operations on treated timber

A.1 Additional preservative treatment after fabrication

Liberalily treat the exposed surfaces or bolt holes of timbers that are cross-cut, notched or drilled for bolts after any pressure impregnation treatment, by brushing, spraying or dipping with a preservation formulation recommended by the preservative manufacturer, unless otherwise specified in the relevant commodity specification.

NOTE 1 The treater may undertake post-treatment operations by agreement (see 4.3.8), or by the user of the treated timber.

NOTE 2 It should be born in mind that this remedial treatment would not replace the full preservative protection of the impregnation process.

A.2 Painting

Allow to dry to a suitable moisture content as specified for any treated timber that is to be stained, painted or varnished. Brush the surface of the dried timber to remove any dirt or excess preservative salts.

NOTE 1 Provided that the timber has been dried to a moisture content less than 25 % (m/m) any normal painting system may be used.

NOTE 2 Paint does not key satisfactorily into wet timber whether treated or untreated.

A.3 Adhesive application

A.3.1 Before application of the adhesive lightly sand the treated timber or brush it with a wire brush to remove excess preservative salts. Follow the adhesive manufacturer instructions concerning the moisture content.

NOTE For internal dry conditions phenol-formaldehyde, casein or urea-formaldehyde resin adhesives are recommended.

A.3.2 For external and damp conditions, resorcinol or phenol-formaldehyde types are recommended.

NOTE Materials containing formaldehyde can release formaldehyde gas or vapor into the air. Formaldehyde is classified as a probable human carcinogen under conditions of unusually high or prolonged exposure. Therefore, it is important to insert a note of precautions. All necessary safety precautions should be taken when using adhesives.

A.4 Application of metal fixing

Certain types of metal fixing will be liable to corrode if the wood in which they are embedded becomes wet. The presence of CCA preservatives in these conditions will increase the risk of corrosion. Where there is a risk that the moisture content of the timber will exceed 20% (m/m), choose the metal fixings so that the effects of corrosion are minimized taking the following into account:

- a) Do not fix fittings to the timber until 14 days after treatment or until the moisture content has fallen below 20 % (m/m).
- b) If the timber is likely to become wet and a long service life is required, use fittings of austenitic stainless steel (excluding free machining grades), or copper or silicon bronze in preference to other types of fittings.
- c) Take into account the likelihood of corrosion against intended service life of the component in selecting such fittings.

NOTE If only occasional dampness is expected, coated low carbon steel (e.g. sherardized, galvanized or cadmium plated) fittings may be used. Better performance will be obtained from fittings with thicker coatings.

- d) Use fittings of unprotected low carbon steel, iron and aluminium only on timber, the moisture content of which is expected to remain below 20 % (m/m) for most of its service life and then only in indoor or well protected environments. Do not use aluminium alloys containing copper.
- e) Do not use sheet aluminium roof coverings or claddings in direct contact with CCA treated timber.

NOTE These materials may be used if a bitumen emulsion, bitumen barrier paper or felt of other suitable water repellent barrier is placed between the timber and the aluminium sheeting.

Annex B (Normative)

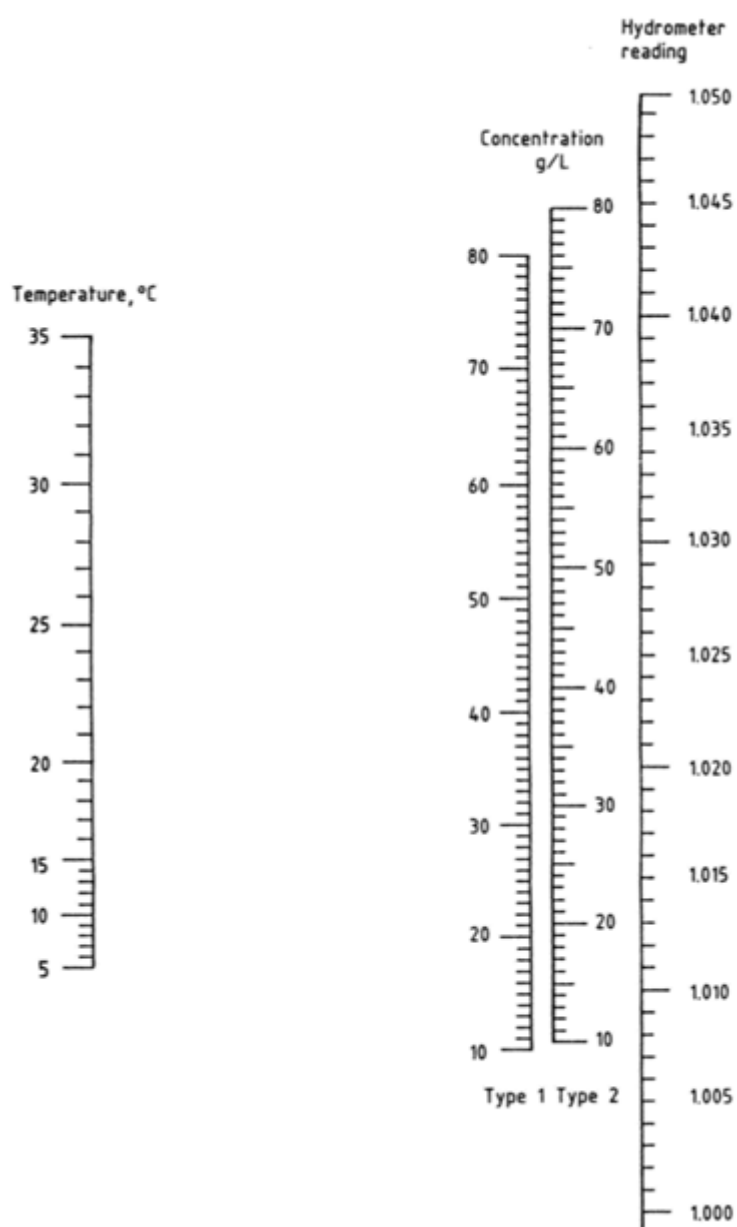
Method for determination of concentration of working solution

B.1 Apparatus

B.1.1 Hydrometer, suitable for the uses and graduated for medium surface tension calibrated relative to water at a temperature of 15.5 °C.

B.1.2 Glass cylinder, of nominal capacity 500 mL preferably ungraduated.

B.1.3 Thermometer, total immersion type and suitable for measuring up to 40 °C.



B.2 Procedure

B.2.1 Obtain a representative 500 mL sample of the working solution.

B.2.2 Transfer the solution to the glass cylinder (B.1.2) and place it on a level surface.

B.2.3 Insert the thermometer (B.1.3) into the solution, wait until the temperature has reached equilibrium with its surroundings and remains constant for 1 min and record the temperature before removing the thermometer.

B.2.3 Place the clean, dry hydrometer (B.1.1) in the solution and when the hydrometer has settled to a constant level, record the height of the solution level against the graduated scale on the stem of the hydrometer, with the eye directly in line with the surface of the solution to the nearest 0.005.

B.2.4 Using a hydrometer calibration, chart the accuracy which has been verified by analysis (see Figure B.1). Place a straight edged ruler across the temperature and hydrometer reading scales at the points recorded for the solution sample.

B.2.5 The concentration of the solution (in g/L) of the preservative type under test is read at the point of intersection on the concentration scale.

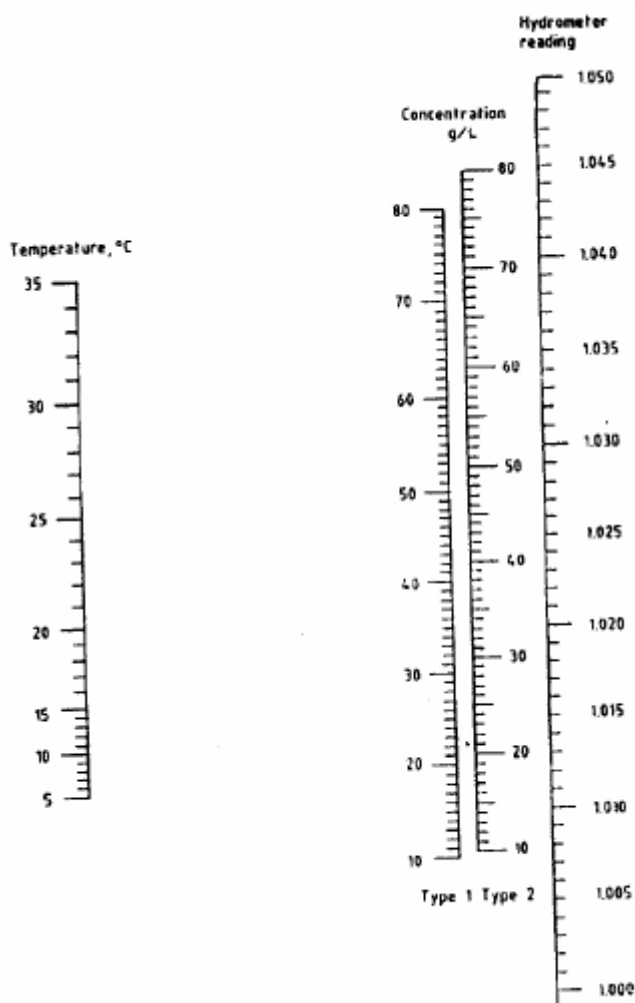


Figure B.1 — Hydrometer reading: Concentration calibration chart for working solutions of type 1 and type 2 CCA preservatives

Annex C

(normative)

Penetration

C.1 The effectiveness of any preservative treatment depends not only on the amount of preservative taken up by the timber, but also on the depth of penetration achieved during the treatment process. However, in all cases, sapwood defined as permeable should be completely penetrated.

C.2 If it is a requirement of the relevant commodity specification to determine the degree of penetration, this shall be carried out in accordance with the respective commodity specification.

Annex D (normative)

Methods for determination of moisture content of timber before treatment

D.1 Oven drying method

D.1.1 Sample selection

D.1.1.1 Cut a sample consisting of a full cross section not less than 300 mm from one end and 13 mm to 19 mm thick.

D.1.1.2 Alternatively, if it is not possible to cut the timber, take borings totalling not less than 8 g, not less than 230 mm from one end. Using a test borer consisting of a hollow auger and extractor bore from the sapwood face to the centre of the section. For timbers having a smallest dimension of 150 mm or over, take borings to a depth of 25 mm or the full depth of the sapwood if this exceeds 25 mm.

D.1.1.3 Put the sample into a stoppered weighing bottle or other airtight container immediately after extraction if it cannot be weighed at once.

D.1.2 Apparatus

Ordinary laboratory apparatus together with electrically-heated drying oven, suitable for the uses

D.1.3 Procedure

D.1.3.1 Weigh the sample as soon as possible after cutting or extraction, m_1 and place it in the oven (D.1.2) which has been already adjusted to a temperature of $103\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$. Remove the sample periodically, cool it in a desiccator and reweigh it (m_2).

D.1.3.2 Dry the sample to constant mass such that the loss in mass for a drying interval of 6 h does not exceed 0.1 %.

D.1.4 Calculation

Calculate the moisture content (w) as a percentage of the dry mass according to the following equation:

$$w = \frac{m_1 - m_2}{m_2} \times 100\%$$

where

m_1 is the mass in grams of the sample when wet;

m_2 is the mass in grams after drying.

D.2 Moisture meter method

D.2.1 Sampling

Take components to be measured from random positions in the charge.

NOTE The number of heartwood and sapwood faces to be sampled should reflect the relative proportions of these types of wood in the charge as a whole.

D.2.2 Apparatus

Moisture meter, electrical resistance type, provided with insulated electrodes and calibrated for the species of wood to be measured. It shall be capable of making an individual measurement with an error of not more than 2 % (m/m) for moisture contents between 7 % and 29 % (m/m).

D.2.3 Procedure

D.2.3.1 If the total number of components in the charge is n , take moisture readings on at least $\sqrt{n/2}$ separate components. Measure the moisture content in the middle of each face.

D.2.3.2 Drive the electrodes into the wood to a depth appropriate to the type of wood as given in Table 1, so that the line between the tips of the electrodes is in the direction of or perpendicular to the grain, in accordance with the instructions for the type of meter used.

D.2.3.3 Make at least three measurements in each measuring area 10mm to 15 mm apart to avoid any accidental error due to electrodes penetrating an inner invisible defect in the wood.

D.2.3.4 The moisture content is given by the mean of the averages of the three measurements on each face.

Bibliography

EAS 324:2002, *Copper/chromium/arsenic compositions for the preservation of timber — Method for timber treatment*

