BS EN 15228:2009

Structural timber — Structural timber preservative treated against biological attack

ICS 71.100.50; 79.040

National foreword

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The UK participation in its preparation was entrusted to Technical Committee B/518, Structural timber.

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

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Structural timber - Structural timber preservative treated against biological attack

Bois de structure - Bois de structure traité avec un produit de préservation contre les attaques biologiques

Bauholz - Bauholz für tragende Zwecke mit Schutzmittelbehandlung gegen biologischen Befall

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Foreword

This document (EN 15228:2009) has been prepared by Technical Committee CEN/TC 124 “Timber structures”, the secretariat of which is held by SFS.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2009, and conflicting national standards shall be withdrawn at the latest by September 2009.

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1 Scope

This European Standard specifies general requirements for structural timber that has been treated with preservatives against biological attack.

This European Standard also specifies requirements for the evaluation of conformity and marking of preservative treated timber products when they are placed on the market.

Treatments which include a biocide are covered by this standard.

It does not provide details of which preservative treatments are necessary for a particular type of structural timber product to achieve a required service life, as regional climatic differences and prevalent biological agents would need to be taken into account for that purpose.

This European Standard does not cover any subsequent treatment which may be required for structural timber products which have been machined, bored or planed after the CE marking has been applied.

This standard does not cover the qualification of preservation products used to treat structural timber.

2 Normative references

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

EN 335-1:2006, *Durability of wood and wood-based products – Definition of use classes – Part 1: General*

EN 351-1:2007, *Durability of wood and wood-based products – Preservative-treated solid wood – Part 1: Classification of preservative penetration and retention*

EN 351-2:2007, *Durability of wood and wood-based products – Preservative-treated solid wood – Part 2: Guidance on sampling for analysis of preservative-treated wood*

EN 384, *Structural timber – Determination of characteristic values of mechanical properties and density*

EN 408, *Timber structures – Structural timber and glued laminated timber – Determination of some physical and mechanical properties*

EN 599-1:1996, *Durability of wood and wood-based products – Performance of preventive wood preservatives as determined by biological tests – Part 1: Specification according to hazard class*

EN 13501-1, *Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests*

EN 13823, *Reaction to fire tests for building products – Building products excluding floorings exposed to the thermal attack by a single burning item*

EN 14080:2005, *Timber structures - Glued laminated timber - Requirements*

EN 14081-1:2005, *Timber structures – Strength graded structural timber with rectangular cross section – Part 1: General requirements*

EN 14250:2004, *Timber structures – Product requirements for prefabricated structural members assembled with punched metal plate fasteners*

CEN/TR 14823, *Durability of wood and wood-based products – Quantitative determination of pentachlorophenol in wood – Gas chromatographic method*

prEN 15497:2008, *Finger jointed structural timber – performance requirements and minimum production requirements*

EN ISO 9001, *Quality managements systems – Requirements (ISO 9001:2008)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 335-1:2006, EN 351-1:2007, EN 351-2:2007, EN 599-1:1996, EN 14080:2005, EN 14081-1:2005, EN 14250:2004 and prEN 15497:2008 apply.

4 Requirements for structural timber products treated against biological attack

4.1 Timber

Timber to be preservative treated shall comply with EN 14081-1.

4.2 Penetration

The penetration shall be declared in terms of the penetration classes listed in EN 351-1.

4.3 Retention

The mean retention in the analytical zone (see EN 351-1) shall be equal to or greater than the preservative retention declared by the treated timber producer. This means that retention shall be declared as the retention value.

The required retention value shall be determined by the national provisions valid at the place of use of the treated timber, or be derived from the critical value for the relevant use class as defined in EN 599-1.

4.4 Reaction to fire

4.4.1 General

The reaction to fire performance shall be declared where the product is subject to reaction to fire regulatory requirements and it may also be done when the product is not subject to such regulatory requirements.

4.4.2 Products classified without further testing

Where the preservative treatment does not result, when dry, in an addition in the analytical zone of the treated timber of more than 2 % by mass of organic material, the reaction to fire classification given in the appropriate product standard for the untreated product shall apply.

4.4.3 Other products

Where the preservative treatment adds in the analytical zone more than 2 % by mass of organic material to the initial mass of the re-dried timber, the treated product shall be tested and classified in accordance with EN 13501-1.

When tested according to EN 13823 (i.e. SBI test), the specimen shall be mounted in accordance with the following procedure:

- for testing, the whole area of both wings in the SBI apparatus shall be covered with timber pieces with a minimum thickness of 22 mm, mounted edge to edge (butt jointed), without jointing or bonding and orientated horizontally or vertically;

- the pieces shall be supported by timber battens, minimum 30 mm by 30 mm, fixed to the test backing boards at 400 mm to 600 mm centres horizontally or vertically (perpendicular to the orientation of the timber pieces).

The results for products tested with a given preservative type and retention value in the analytical zone, shall be applicable for the same preservative type applied at a lower retention, and to timber thicknesses and densities greater than those tested.

4.5 Strength and stiffness properties

Strength and stiffness shall be assumed not to be affected in the following cases:

— treatments and preservatives listed in Annex A, or

— treatments with a penetration class not exceeding class NP2 according to EN 351-1.

In any other case (e.g. permeable species and deep treatments with class NP 3 and above and with non organic products) since the treatment might affect the strength and stiffness properties, an evaluation shall be performed according to the following principles:

— Two matched samples of 50 commercial size pieces each shall be taken. Matching shall be based on the modulus of elasticity (MOE);

— One sample shall remain untreated as the control sample. The remaining sample shall be treated with the treatment to be assessed;

— From each piece, 2 specimens shall be taken; one for a bending test according to EN 408 and, the other one for a tension perpendicular to grain according to EN 408;

— From the bending specimens, pieces to be tested for equilibrium moisture content shall be taken, according to EN 408;

— All specimens shall be tested for bending strength or tension perpendicular to grain according to EN 408 and EN 384 and the tested values reported;

— A statistical test to compare the means of both samples at a significance level of 75 % shall be performed;

NOTE see for example ISO 12491:1997, 6.4.

— In case of a statistical difference in the means of more than 10 %, the preservative treated timber shall be considered as not meeting the requirements of this European Standard.

4.6 Dangerous substances

4.6.1 Content of pentachlorophenol (PCP)

If a preservative used for the treatment contains pentachlorophenol (PCP), then the treated structural timber shall be tested according to CEN/TR 14823. If the value of 5×10^{-6} is exceeded, it shall be declared in the marking as follows, "PCP > 5×10^{-6}" .

NOTE In certain Member States preservative treated structural timber products with a PCP content of more than 5×10^{-6} are not allowed.

4.6.2 Release of other dangerous substances

Consideration shall be given to other dangerous substances.

NOTE 1 Such cases are covered by Annex ZA, Clause ZA1, of each relevant harmonized standard.

NOTE 2 Some requirements of the Directive 98/8/EC with regard to placing of biocidal products on the market may also be applicable to preservatives.

5 Evaluation of conformity

5.1 General

The compliance of preservative treated structural timber with the requirements of this European Standard shall be demonstrated by:

— initial type testing,

— factory production control, including treated timber product assessment.

For the purposes of testing, preservative treated timber products may be grouped into families, where it is considered that the results from testing any product within the family are representative for all other products within that family.

5.2 Initial type testing

5.2.1 General

The purpose of initial type testing is to obtain by direct testing, where this is relevant, declared values or classes or other appropriate information on all characteristics of the treated structural timber given in Clause 4.

Initial type testing shall be performed to show conformity with this European Standard.

Tests previously performed in accordance with the provisions of this European Standard (same product, requirements(s), test method, sampling procedure, system of attestation of conformity, etc.) shall be taken into account.

Whenever a change occurs which would change significantly one or more of the characteristics, the initial type tests shall be repeated for the appropriate characteristic(s).

5.2.2 ITT characteristics of timber treated against biological attack

a) With regard to the declared penetration class and retention value, the initial type testing shall be carried out in accordance with the direct testing requirements of EN 351-1. The samples shall be treated

with the subject preservative by a treatment process no more severe or of longer duration than that used in practice by the treated timber supplier. This initial type testing shall, for the given range of treatment parameters, provide the treated timber producer with information concerning measurable features of the treatment process (e.g. moisture content, preservative type and strength, vacuum and pressure time and intensities) necessary to meet the required penetration and retention values.

All treated samples, selected for the initial type testing, shall be sampled in accordance with EN 351-2 and analysed using the analytical methods described in relevant technical specifications. The mean analysed retention value shall be greater than or equal to the treater's declared retention value. The declared penetration class shall be achieved in at least 90 % of samples for permeable species and at least 75 % of samples for resistant species.

NOTE CEN/TC38 is in charge of developing relevant analytical methods for determination of penetration and retention of wood preservatives.

b) With regard to ITT for the reaction to fire performance, the value of organic treatment material added to the initial mass of re-dried structural timber shall be determined. According to this value the appropriate procedure (see 4.4) for establishing declared reaction to fire class shall be carried out.

c) With regard to ITT for strength and stiffness properties, where relevant, tests shall be done according to the provisions of 4.5.

d) With regard to ITT for other characteristics, where relevant, appropriate provisions of EN 14081-1 shall apply.

5.3 Factory production control

5.3.1 General

The treater shall establish, document and maintain an FPC system to ensure that the products (i.e. structural timber treated against biological attack) placed on the market conform to the stated performance characteristics. The FPC system shall consist of procedures, regular inspections and tests and/or assessments and the use of the results to control raw and other incoming materials or components, equipment, the production process and the product.

An FPC system conforming with the requirements of EN ISO 9001, and made specific to the requirements of this European Standard and EN 14081-1, where relevant, is considered to satisfy the above requirements.

The results of inspections, tests or assessments requiring action shall be recorded, as shall any action taken.

The action to be taken when control values or criteria are not met shall be recorded.

For the control of penetration and retention requirements, two test systems are available (see EN 351-1:2007, 7.2), direct testing or indirect testing. If results of the indirect testing are used, the correlation with the results of direct testing according with EN 351-1:2007, 7.2, shall be established. A relevant control frequency shall be defined.

Minimum bases for the factory production control shall be as described in the following subclauses.

5.3.2 Equipment

All weighing, measuring and testing equipment shall be calibrated and regularly inspected according to documented procedures, frequencies and criteria.

5.3.3 Control of raw materials and preservatives

5.3.3.1 Raw materials

The conformity of the wood species shall be controlled and recorded by batch.

Type of surface (planed or rough) shall be controlled and recorded by batch.

The timber to be preservative treated shall have a moisture content in line with the characterisation made during the ITT. If no information exists as to the moisture content of the wood, then the average moisture, taken on 3 % of the wood specimens from a batch with a minimum of 3 specimens, shall be controlled. The specimens shall be taken randomly in order to be representative.

5.3.3.2 Preservatives

The updated technical information and safety data sheet on preservatives used shall be held. Recommendations from the supplier of the preservative(s) shall be followed.

The references of the preservatives shall be checked and recorded.

5.3.4 Treatment solution preparation

This Clause shall only be applied for preservatives that are supplied not ready for use.

The quality control of the treater procedures shall assure a control of the water and preservative quantities in order to achieve the dilution rate objective.

For each mixing the water and preservative quantities shall be recorded.

Chemical analyses of representative samples carried out under the responsibility of the preservative supplier may be accepted as a control of the strength of the treatment solution. According to the results of the chemical analyses, corrective actions shall be taken by the treatment plant. The procedure shall be described in a specific document.

No mixing of preservatives shall be permitted.

5.3.5 Process control

The process conditions, established during the initial type testing, shall be followed. They shall be controlled and recorded at least once per shift for each specific treatment operation.

Treated timber shall not be released until it is safe to be used in construction.

NOTE Fixation time depends on temperature.

6 Marking

On each treated structural timber product or on the accompanying documents, the following information shall be given:

— method of treatment with wood preservative;

— preservative: specification complying with national provisions valid at the place of use of the treated timber (see Note);

— penetration class (see Note);

— retention value including units (see Note);

— charge number and year of treatment;

— target biological agents (see Note);

— identification of the treater.

NOTE Guidance on the relationship between these variables and the application of the product into a particular Use Class is given in national documents valid at the place of use of the treated timber, which cross reference the appropriate European Standards.

Annex A
(normative)

Preservative treatment not affecting strength and stiffness properties of treated timber

A.1 General

It shall be assumed that the following wood preservative types (see A.2) shall be regarded as not causing any change of strength and stiffness of treated structural timber products providing they are used in retentions specified in national documents for use classes 1 to 5 according to EN 335-1.

It shall be assumed that the following wood preservatives applied with processes, which do not utilize temperatures in excess of 80 °C, (110 °C for Creosotes), including post-treatment drying, and/or physical incising, shall be regarded as not causing any change in structural performance.

NOTE See 4.5.

A.2 Preservatives types

a) Water-based amine and soluble copper (II) based formulations containing optionally a borate and an additional organic component in the form of:

   — Azoles;

   — Quaternary ammonium compounds:

      - Benzyl-C12-16-alkyldimethyl ammonium chloride,
      - Didecyldimethylammonium chloride,
      - Didecylpolyoxethylammonium borate,
      - Didecylpolyoxethylammonium propionate,
      - Trimethylalkylammonium chloride;

   — Copper(II)-Bis-(N-cyclohexyldiazeniumdioxy) (copper-HDO).

b) Water-based copper-chromium-based formulations containing optionally borate or phosphate;

c) Water-based quaternary ammonium formulations containing optionally IPBC, borates, azoles, fenpropimorph and organic insecticides;

d) Water-based azole formulations containing optionally IPBC, borates, fenpropimorph and an organic insecticide;

e) Water-based N-Didecyl-N-dipolyethoxyammonium borate didecylpolyoxethylammonium borate formulations containing optionally an organic insecticide;

f) Water-based borate formulations;

g) Water-based borate and guanylurea phosphate formulations;

h) Solvent-based formulations;

i) Creosote.

Bibliography

[1] ISO 12491:1997, *Statistical methods for quality control of building materials and components*

[2] *Council Directive 98/8/EC, Placing of biocidal products on the market*

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