BS EN 14081-1:2016

BSI Standards Publication

Timber structures — Strength graded structural timber with rectangular cross section

Part 1: General requirements

bsi.

National foreword

This British Standard is the UK implementation of EN 14081-1:2016. It supersedes BS EN 14081-4:2009 and BS EN 14081-1:2005+A1:2011, which are withdrawn. It partially supersedes BS 4978:2007+A1:2011, specifically Clause 7 and Table 1.

The UK committee took an active part in developing this edition of EN 14081-1. They do however disagree with what has been included in this standard for strength graded timber with only 'package marking'. National Annex NA of this document confirms the committee's position on strength graded timber marked according to Method B (package marking). It also provides guidance on the CE marking and documentation requirements set out by this standard and the Construction Products Regulation (EU) No 305/2011.

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.

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

Published by BSI Standards Limited 2016

ISBN 978 0 580 84078 4

ICS 79.040

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 31 May 2016.

Amendments/corrigenda issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 14081-1

February 2016

ICS 79.040

Supersedes EN 14081-1:2005+A1:2011, EN 14081-4:2009

English Version

Timber structures - Strength graded structural timber with rectangular cross section - Part 1: General requirements

Structures en bois - Bois de structure à section rectangulaire classé pour sa résistance - Partie 1 : Exigences générales

Holzbauwerke - Nach Festigkeit sortiertes Bauholz für tragende zwecke mit rechteckigem Querschnitt - Teil 1: Allgemeine Anforderungen

This European Standard was approved by CEN on 13 February 2016.

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

European foreword

This document (EN 14081-1:2016) has been prepared by Technical Committee CEN/TC 124 “Timber structures”, 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 August 2016, and conflicting national standards shall be withdrawn at the latest by November 2017.

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 14081-4:2009, EN 14081-1:2005+A1:2011.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Regulation n°305/2011.

For relationship with EU Regulation, see informative Annex ZA, which is an integral part of this document.

EN 14081-4:2009 will be withdrawn and replaced by 5.1.3, paragraph 2 of this document.

Compared to EN 14081-1:2005+A1:2011, the following modifications have been made:

— new Clause 6 for Assessment and Verification of Constancy of Performance linked to the CPR;

— Annex ZA has been adapted to the CPR;

— new clauses on Fire Resistance, release of dangerous substances, geometrical data and environmental issues have been added;

— marking codes for species combinations have been moved to Annex B;

— improvement of several definitions.

Other parts of the series of EN 14081 are:

— EN 14081-2, Timber structures - Strength graded structural timber with rectangular cross section - Part 2: Machine grading; additional requirements for initial type testing;

— EN 14081-3, Timber structures - Strength graded structural timber with rectangular cross section - Part 3: Machine grading; additional requirements for factory production control.

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

There are basically two methods of strength grading: visual grading and machine grading.

Machine grading is in common use in a number of countries. The countries use two basic systems, referred to as 'output control' and 'machine control'. Both systems require a visual override inspection to cater for strength-reducing characteristics that are not automatically sensed by the machine.

Output control is suitable for use where the grading machines are situated in manufacturing units grading limited sizes, species and grades in repeated production runs. This enables the system to be controlled by testing timber specimens from the daily output. These tests, together with statistical procedures, are used to monitor and adjust the machine settings to maintain the required strength properties for each strength class. With this system it is permissible for machine approval requirements to be less demanding and for machines of the same type to have non-identical performance.

Machine control was developed in Europe. Because of the large number of sizes, species and grades used it was not possible to carry out quality control tests on timber specimens drawn from production. Machine control relies, therefore, on the machines being strictly assessed and controlled, and on considerable research effort to derive the machines settings, which remain constant for all machines of the same type.

Visual grading is also in common use in a number of countries. There are many different visual strength grading standards for timber in use in Europe. These have come into existence to allow for:

— different species or groups of species;

— geographic origin;

— different dimensional requirements;

— varying requirements for different uses;

— quality of material available;

— historic influences or traditions.

Because of the diversity of existing visual grading standards in use in different countries, it is currently impossible to lay down a single standard for all Member States.

The requirements given in this European Standard on visual strength grading are therefore basic principles, which should be followed when drawing up requirements for limits for some of the characteristics.

The assignments to strength classes are based on grading reports.

When these grading reports are evaluated and approved by CEN/TC 124/WG2/TG1, they become Approved Grading Reports (AGR) which are required for assigning visual grades to EN 1912 and for machine control.

1 Scope

This European Standard specifies requirements for strength graded structural timber with rectangular cross-sections either visual or machine graded, shaped by sawing, planning or other methods and with cross-sectional dimensions complying with EN 336 (referred to as structural timber in the following clauses).

This European Standard includes provisions for test methods, Assessment and Verification of Constancy of Performance and marking of structural timber.

NOTE 1 For machine strength graded timber additional provisions for type testing (TT) are given in EN 14081–2 and for factory production control (FPC) in EN 14081–3.

NOTE 2 An acceptance procedure for verification of a lot is given in EN 14358 which may be used for a delivery of structural timber.

This European Standard identifies characteristics for which limits have to be given in visual grading standards.

This European Standard covers structural timber, untreated or treated against biological attack.

This European Standard does not cover:

— timber treated by fire retardant products to improve its fire performance;

— thermally and/or chemically modified timber;

— structural finger jointed timber.

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 338, *Structural timber — Strength classes*

EN 350-1, *Durability of wood and wood-based products — Natural durability of solid wood — Part 1: Guide to the principles of testing and classification of the natural durability of wood*

EN 350-2, *Durability of wood and wood-based products — Natural durability of solid wood — Part 2: Guide to natural durability and treatability of selected wood species of importance in Europe*

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

EN 844-7, *Round and sawn timber — Terminology — Part 7: Terms relating to anatomical structure of timber*

EN 844-9, *Round and sawn timber — Terminology — Part 9: Terms relating to features of sawn timber*

EN 844-10, *Round and sawn timber — Terminology — Part 10: Terms relating to stain and fungal attack*

EN 1310:1997, *Round and sawn timber — Method of measurement of features*

EN 1912, *Structural Timber — Strength classes — Assignment of visual grades and species*

EN 1995-1-2, *Eurocode 5: Design of timber structures — Part 1-2: General — Structural fire design*

EN 13183-2, *Moisture content of a piece of sawn timber — Part 2: Estimation by electrical resistance method*

EN 13183-3, *Moisture content of a piece of sawn timber — Part 3: Estimation by capacitance method*

EN 13238, *Reaction to fire tests for building products — Conditioning procedures and general rules for selection of substrates*

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

EN 13501-2, *Fire classification of construction products and building elements — Part 2: Classification using data from fire resistance tests, excluding ventilation services*

EN 13556, *Round and sawn timber — Nomenclature of timbers used in Europe*

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

EN 14081-2, *Timber structures — Strength graded structural timber with rectangular cross section — Part 2: Machine grading; additional requirements for initial type testing*

EN 14081-3, *Timber structures — Strength graded structural timber with rectangular cross section — Part 3: Machine grading; additional requirements for factory production control*

EN 15804, *Sustainability of construction works — Environmental product declarations — Core rules for the product category of construction products*

EN 15228:2009, *Structural timber — Structural timber preservative treated against biological attack*

EN 16485, *Round and sawn timber — Environmental Product Declarations — Product category rules for wood and wood-based products for use in construction*

EN ISO 3166-1, *Codes for the representation of names of countries and their subdivisions — Part 1: Country codes (ISO 3166-1)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
dry-graded structural timber
timber for which grading has been completed after it has been dried

3.2
grading standard
a set of grading rules contained in a National Standard or a proprietary document that is publically available

3.3
machine strength grading
process by which structural timber is sorted by a machine sensing, non-destructively, one or more properties of the timber, with any necessary visual overriding inspection, into grades or strength classes to which characteristic values of strength, stiffness and density may be allocated

3.4
package
structural timber of one grade, of one species or species combination, to be delivered to one customer

3.5
settings
values associated with the variable controls of a grading machine which determine the acceptance to each grade or strength class of structural timber graded by the machine

3.6
strength class
result of the classification of structural timber based on particular values of its mechanical properties and density

3.7
structural timber
timber with rectangular cross section strength graded either by visual means or by machine

3.8
strength-reducing characteristic
property or feature of a piece of structural timber that reduces its load bearing capacity

Note 1 to entry: Can result from natural growth of the tree (e.g. knots, slope of grain), changes in moisture content (e.g. fissures), conversion of the log (e.g. the inclusion of wane), attack from fungi, insects or mechanical damage.

3.9
timber source
identifiable geographical origin of a species or species combination from which timber is, or is intended to be, strength graded

3.10
visual strength grading
process by which structural timber is sorted, by visual inspection and assessment, into grades to which characteristic values of strength, stiffness and density can be allocated

Note 1 to entry: Electronic or mechanical instruments can be used to assist the visual grader in this process.

3.11
thickness
smaller dimension perpendicular to the longitudinal axis of a piece of timber

3.12
width
greater dimension perpendicular to the longitudinal axis of a piece of timber

4 Symbols

M machine graded structural timber

DG dry-graded structural timber

PT preservative treated structural timber

5 Requirements for structural timber

5.1 Mechanical resistance

5.1.1 General

Mechanical resistance covers modulus of elasticity, bending strength, compressive strength, tension strength, shear strength and density.

Structural timber shall be either visually graded according to 5.1.2, or machine graded according to 5.1.3, and have characteristic values for the bending strength, tension strength, compression strength, shear strength, modulus of elasticity and density according to 5.1.2 or 5.1.3. Characteristic values shall be determined in accordance with EN 384.

If the structural timber is assigned to a strength class from EN 338, the characteristic values for the properties shall be those given for the strength class in EN 338.

If the grading has been carried out before processing, provided that the processing reduction is not greater than 5 mm for dimensions greater than or equal to 22 mm but less than or equal to 100 mm, or not greater than 10 mm for dimensions greater than 100 mm, the grade shall be considered not to have changed. If the reduction is greater, the structural timber shall be re-graded.

Structural timber that has previously been graded shall not be re-graded to the same or different grades unless the method of determining characteristic values has made allowances for changes to the timber population caused by the previous grading.

Since some geometrical characteristics (fissures, distortion) depend on the moisture content and affect the strength properties, marking shall consider the moisture content at the time of grading.

Moisture content shall be determined in accordance with EN 13183-2 or EN 13183-3 with an accuracy of ± 3 % moisture content (see Annex C).

Dry graded structural timber shall have at the time it is graded for fissures and distortion, a mean moisture content of 20 % or less with no individual measurement exceeding 24 %.

If the grading method restricts the structural timber to a special use, e.g. flatwise bending or compression, this shall be reflected in the marking.

5.1.2 Visual strength grading

Structural timber shall be graded visually in accordance with a grading standard which meets the requirements given in Annex A. This grading standard shall be publically available.

If the grade and species or species combination have been assigned to a strength class by EN 1912, the characteristic values for the properties shall be those given for the assigned strength class in EN 338. Assignments according to EN 384 to be included in EN 1912 should be reported and evaluated by CEN/TC 124. Accepted reports shall be documented in Approved Grading Reports (AGR).

NOTE Approved Grading Reports are intended to give basic documentation for the certification by a Notified Body of a manufacturer's factory production control (FPC) needed for the CE marking. A current list of AGRs may be obtained through CEN/TC 124 secretariat.

If there are any restrictions or additional criteria related to the strength or use of structural timber, resulting from the method of grading or species or species combination, they shall be stated in the grading standard.

5.1.3 Machine strength grading

For a grade and species (or species combination) graded by a machine control system, the settings shall be derived for the total growth area from which the structural timber will be sourced.

Grading machines shall use settings determined in accordance with EN 14081-2. Grading machines and settings used in machine control system should be evaluated by CEN/TC 124. Settings which have been accepted by CEN/TC 124 shall be documented in Approved Grading Reports (AGR).

NOTE Approved Grading Reports are intended to give basic documentation for the certification by a Notified Body of a manufacturer's factory production control (FPC) needed for the CE marking. A current list of AGRs may be obtained through CEN/TC 124 secretariat.

The visual characteristics of each piece of machine graded structural timber shall meet the requirements given in Table 1.

Table 1 — Visual override inspection requirements for machine strength graded structural timber

<table>
<tr><td colspan="2">Strength class according to EN 338 [a]</td><td>C18, D18, T11 and below</td><td>Above C18, D18, T11</td></tr>
<tr><td rowspan="3">Max. length of fissures [b]</td><td rowspan="2">Fissures not going through the thickness</td><td colspan="2">Fissures less than half the thickness may be ignored [f]</td></tr>
<tr><td>Not greater than 1,5 m or 1/2 the length of the piece, whichever is the lesser</td><td>Not greater than 1 m or 1/4 the length of the piece, whichever is the lesser</td></tr>
<tr><td>Fissures going through the thickness</td><td>Not greater than 1 m or 1/4 the length of the piece, whichever is the lesser. If at the ends, a length not greater than two times the width of the piece</td><td>Only permitted at the ends with a length not greater than the width of the piece</td></tr>
<tr><td rowspan="4">Max. warp [c] in mm over 2 m of length</td><td>Bow</td><td>20 mm</td><td>10 mm</td></tr>
<tr><td>Spring</td><td>12 mm</td><td>8 mm</td></tr>
<tr><td>Twist</td><td>2 mm/25 mm width</td><td>2 mm/25 mm width</td></tr>
<tr><td>Cup</td><td>Unrestricted</td><td>Unrestricted</td></tr>
<tr><td colspan="2">Wane</td><td colspan="2">Wane shall not be greater than one third of the full edge and/or face dimensions of the piece</td></tr>
<tr><td colspan="2">Soft rot and dote [d] (see EN 844–10)</td><td>Soft rot shall not be permitted
Dote is permitted</td><td>Soft rot shall not be permitted
Dote shall not be permitted</td></tr>
<tr><td colspan="2">Insect damage</td><td colspan="2">Active infestation shall not be permitted. Insect holes above 2 mm diameter shall not be permitted. Smaller holes shall be assessed as other defects</td></tr>
<tr><td colspan="2">Other defects [e]</td><td colspan="2">Where the reduction in strength caused by another defect is obviously less than caused by defects permitted by this table, the piece may be accepted provided the defect is of a type that will not increase after conversion and drying</td></tr>
<tr><td colspan="4">[a] For alternative strength classes, visual overrides are checked with corresponding strength value limits
[b] The length of fissures is linked with moisture content and therefore the limits given apply only at the time of grading. Permitted limits for both the depth and length of fissures refer to the sum of fissures in one plane in a piece of timber.
[c] Warp is influenced by moisture content, so the limits apply only at the time of grading. Longitudinal curvature in square section pieces may be assessed using the limits for bow.
[d] Stain is not a structural defect and is acceptable without limitation.
[e] Other defects include for example mechanical damage, top rupture, and included bark.
[f] A 0,2 mm feeler gauge is a suitable device for measuring fissure depth.</td></tr>
</table>

Where a machine does not grade completely to the ends of each piece of structural timber (as in bending type machines) the ungraded portions shall be visually inspected and assessed.

If the diameter of knots and slope of grain in the incompletely graded portions exceeds the limits given in Table 2, then the piece of structural timber shall be rejected. Knots and slope of grain shall be measured in accordance with EN 1310:1997, 4.1.2.

Table 2 — Visual override inspection requirements for incompletely machine graded portions

	Strength class according to EN 338 [a]	
	C18, D18, T11 and below	**Above C18, D18, T11**
Knot diameter on face	up to 1/2 x width of piece	up to 1/4 x width of piece
Knot diameter on edge	up to 3/4 x thickness of piece	up to 1/2 x thickness of piece
Slope of grain	1 in 6	1 in 10
[a] For alternative strength classes, visual overrides are checked with corresponding strength value limits		
NOTE 1 These limits are applicable only where the size of knots and slope of grain in the non-fully graded portion exceeds the size of similar characteristics in the fully graded portion of the same piece. NOTE 2 The knot diameter is measured perpendicular to the longitudinal axis of the piece of timber. For arris knots the above limits apply to the portion of the knot visible on the particular face or edge being considered.		

5.2 Fire resistance (charring rate)

Where required, the fire resistance performance of the structural timber whether treated against biological attack or not, shall be tested and declared according to EN 13501-2 or determined by calculation according to EN 1995-1-2. When calculating the fire resistance, the charring rate shall be evaluated on the basis of the species and characteristic density.

5.3 Reaction to fire

The class of reaction to fire performance of the structural timber (including the additional classification on smoke production and flaming droplets/particles, if any), shall be determined and declared according to EN 13501-1:

a) either without the need for further testing (CWFT), as given in Table 3 [1)], if the structural timber is proved to meet the requirements of the class also given therein;

b) or based on testing of the timber according to the standards, referred to in EN 13501-1, when the timber does not meet the requirements of Table 3 or where a higher classification than the one in a) is sought.

[1] This table is the same as given in the Decision of the Commission 2003/43/EC of 2003-01-17 (*see OJEU L13 of 2003-01-18*), as amended firstly by 2003/593/EC of 2003-08-07 (*see OJEU L201 of 2003-08-08*),

Table 3 — Structural timber considered as classified without the need for further testing (CWFT)

Product a	**Product detail**	**Minimum mean density** c (kg/m^3)	**Minimum overall thickness** (mm)	**Class** b (excluding floorings)
Structural timber	Visual and machine graded structural timber with rectangular cross-sections shaped by sawing, planing or other methods or with round cross-sections	350	22	D-s2, d0

a Applies to all species covered by the product standards.

b Class as provided for in Table 1 of the Annex to Decision 2000/147/EC.

c Conditioned according to EN 13238.

NOTE The minimum mean density is the minimum value of the mean density for which the table applies. This density may be taken from tables as in EN 338.

When tested according to EN 13823 under option b), the structural timber shall be mounted and fixed in accordance with the following:

a) the whole area of both wings in the SBI apparatus shall be covered with timber pieces mounted edge to edge (butt jointed), without jointing or bonding and orientated horizontally or vertically, supported by;

b) timber battens, minimum (40 × 40) 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).

In the case of preservative treated timber, it may be necessary to take into account additional provisions set by EN 15228.

5.4 Release of dangerous substances

National Regulations on dangerous substances may require verification and declaration on release /content of dangerous substances when construction products covered by this standard are placed on those markets.

NOTE 1 This only concerns treated timber.

In the absence of European harmonized test methods, verification and declaration on release/content on dangerous substances should be done taking into account national provisions in the place of use.

NOTE 2 An informative database covering European and national provisions on dangerous substances is available at the Construction website on EUROPA accessed through:

http://ec.europa.eu/enterprise/construction/cpd-ds

5.5 Biological durability

5.5.1 Structural timber without preservative treatment

The natural durability in accordance with EN 350-2 shall be declared with specific reference being made to sapwood if the producer makes no special provision for its exclusion.

For species and origins not listed in EN 350-2, the natural durability shall be assessed according to EN 350-1.

5.5.2 Structural timber with preservative treatment

If a preservative treatment is used, information in accordance with EN 15228 shall be declared.

NOTE 1 It is acceptable to use a safe relationship which has been established between the penetration and/or retention requirements and measurable features of the treatment process used as described in EN 351–1.

NOTE 2 Guidance on the relationship between treatment variables and the application of the product into particular Use Class (EN 335) may be found in national documents, which cross reference the appropriate European Standard

5.6 Geometrical data

The target sizes, in accordance with EN 336, are specified in the accompanying commercial documents.

Deviations from the target sizes shall not exceed the limits of the appropriate tolerance class declared.

6 Assessment and verification of constancy of performance –AVCP

6.1 General

The compliance of strength graded timber with the requirements of this standard and with the performances (including strength grades or strength classes) declared by the manufacturer shall be demonstrated by:

— determination of the product-type on the basis of type testing;

— factory production control by the manufacturer, including product assessment if applicable.

The manufacturer shall always retain the overall control and shall have the necessary means to take responsibility for the conformity of the product with its declared performance(s).

6.2 Type testing

6.2.1 General

All performances related to essential characteristics included in this standard (see characteristics written in bold letters in Table 4) shall be determined when the manufacturer intends to declare the respective performances unless the standard gives provisions for declaring them without performing tests (e.g. use of previously existing data, Classification Without Further Testing (CWFT) and conventionally accepted performance).

For machine strength graded timber, product-type determination shall be carried out in accordance with EN 14081-2.

Assessment previously performed in accordance with the provisions of this standard, may be taken into account provided that this was made to the same or a more rigorous test method, under the same AVCP system on the same product type, such that the results are applicable to the product type in question.

For the purposes of assessment, the manufacturer's products may be grouped into families, where it is considered that the results for one or more characteristics from any one product within the family are representative for that same characteristics for all products within that same family.

NOTE Products may be grouped in different families for different essential characteristics.

Reference to the assessment method standards (e.g. EN 384 in general, and EN 14081–2 for machine graded timber) should be made to allow the selection of a suitable representative sample.

In addition, the determination of the product-type shall be carried out for all essential characteristics included in the standard for which the manufacturer declares the performance:

— at the beginning of the production of a new or modified strength graded timber (unless a member of the same product range), or

— at the beginning of a new or modified method of production (where this may affect the stated properties); or

— they shall be repeated for the appropriate essential characteristic(s), whenever a change occurs in, the raw material, or in the method of production (subject to the definition of a family), which would affect significantly one or more of the essential characteristics.

6.2.2 Test samples, testing and compliance criteria

The number of samples of strength graded timber to be tested/ assessed shall be in accordance with Table 4.

Table 4 — Number of samples to be tested and compliance criteria for strength graded structural timber with rectangular cross section

Characteristics	Requirement	Assessment method	No. of samples	Compliance criteria
Mechanical resistance of strength graded timber expressed as modulus of elasticity, bending strength, compressive strength, tensile strength and shear strength				
Strength, stiffness and density properties of timber	Visual grading: 5.1.1 and 5.1.2	EN 384 (test)	According to EN 384	Characteristic values determined according to EN 384 shall not be less than declared values.
	Machine grading: 5.1.1 and 5.1.3	EN 14081–2 and EN 384 (test)	According to EN 14081–2	Characteristic values shall be determined in accordance with EN 14081–2.
Fire resistance (charring rate)				
Fire resistance (charring rate)	5.2	Test according to EN 13501–2, or Determine, characteristic density, and species	According to EN 13501–2 According to EN 384	EN 13501–2 According to EN 384
Reaction to fire				
Reaction to fire	5.3	Table 3 (CWFT)	–	Table 3
		or 5.3b)(test)	according to EN 13501–1	Classes according to EN 13501–1
Durability of all characteristics expressed as durability against biological attack				
Without preservative treatment	5.5.1	For species listed in EN 350–2 (assessment) For species and origins not listed in EN 350–2, assessed according to EN 350–1	–	Natural durability in accordance with EN 350–2

With preservative treatment	5.5.2	According to EN 15228 (test)	According to EN 15228	According to EN 15228
Release of dangerous substances				
Release of dangerous substances	5.4	As relevant, according to 5.4		

6.2.3 Test reports

All test reports and Approved Grading Reports (where applicable) shall be documented and retained by the manufacturer for at least 10 years after the last date of production of the strength graded timber to which they relate.

6.2.4 Shared other party results

A manufacturer may use the results of the product-type determination obtained by someone else (e.g. by another manufacturer, as a common service to manufacturers, or by a product developer), to justify his own declaration of performance regarding a product that is manufactured with raw materials, and manufacturing methods of the same kind, provided that:

— the results are known to be valid for products with the same essential characteristics relevant for the product performance;

— in addition to any information essential for confirming that the product has such same performances related to specific essential characteristics, the other party who has carried out the determination of the product-type concerned or has had it carried out, has expressly accepted[2] to transmit to the manufacturer the results and the test report to be used for the latter's product-type determination, as well as information regarding production facilities and the production control process that can be taken into account for FPC;

— the manufacturer using other party results:

  — ensures that the product has the same characteristics relevant for performance as the one that has been subjected to the determination of the product-type, and that there are no significant differences with regard to production facilities and the production control process compared to that used for the product that was subjected to the determination of the product-type; and

  — keeps available a copy of the determination of the product-type report that also contains the information needed for verifying that the product is manufactured with raw materials and manufacturing methods of the same kind.

6.3 Factory production control (FPC)

6.3.1 General

The manufacturer shall establish, document and maintain an FPC system to ensure that the products placed on the market comply with the declared performance of the essential characteristics.

[2] The formulation of such an agreement can be done by licence, contract, or any other type of written consent.

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, equipment, the production process and the product.

All the elements, requirements and provisions adopted by the manufacturer shall be documented in the form of written policies and procedures.

In case the manufacturer has used shared product-type results, the FPC shall also include the appropriate documentation as foreseen in 6.2.4.

6.3.2 Requirements

6.3.2.1 General

The manufacturer is responsible for organizing the effective implementation of the FPC system in line with the content of this product standard. Tasks and responsibilities in the production control organization shall be documented and this documentation shall be kept up-to-date.

The responsibility, authority and the relationship between personnel that manages, performs or verifies work affecting product constancy, shall be defined. This applies in particular to personnel that need to initiate actions preventing product non-constancies from occurring, actions in case of non-constancies and to identify and register product constancy problems.

The competence of the personnel performing work affecting the constancy of performance of the product shall be ensured, maintained and recorded.

Competence of the personnel involved in the grading process shall be checked at least annually. The check shall include the assessment of graded timber.

In each factory the manufacturer may delegate the action to a person having the necessary authority to:

— identify procedures to demonstrate constancy of performance of the product at appropriate stages;

— identify and record any instance of non-constancy;

— identify procedures to correct instances of non-constancy.

The manufacturer shall draw up and keep up-to-date documents defining the factory production control. The manufacturer’s documentation and procedures should be appropriate to the product and manufacturing process. The FPC system should achieve an appropriate level of confidence in the constancy of performance of the product. This involves:

a) the preparation of documented procedures and instructions relating to factory production control operations, in accordance with the requirements of the technical specification to which reference is made;

b) the implementation of these procedures and instructions;

c) the recording of these operations and their results;

d) the use of these results to correct any deviations, repair the effects of such deviations, treat any resulting instances of non-conformity and, if necessary, revise the FPC to rectify the cause of non-constancy of performance.

Where subcontracting takes place, the manufacturer shall retain the overall control of the product and ensure that he receives all the information that is necessary.

If the manufacturer has part of the product, manufactured, packed, and/or labelled by subcontracting, the FPC of the subcontractor may be taken into account, where appropriate for the product in question.

The manufacturer who subcontracts all of his activities may in no circumstances pass the above responsibilities on to a subcontractor.

NOTE Manufacturers having an FPC system, which complies with EN ISO 9001 standard and which addresses the provisions of the present European standard are considered as satisfying the FPC requirements of the Regulation (EU) No 305/2011.

6.3.2.2 Equipment

6.3.2.2.1 Testing

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

When grading structural timber in a machine controlled system, control planks shall meet the requirements given in EN 14081-3.

6.3.2.2.2 Manufacturing

All equipment used in the manufacturing process shall be regularly inspected and maintained to ensure use, wear or failure does not cause inconsistency in the manufacturing process. Inspections and maintenance shall be carried out and recorded in accordance with the manufacturer's written procedures and the records retained for the period defined in the manufacturer's FPC procedures.

Manufacturer's records with regard to suitability, set-up, verification, service and maintenance of the grading machine, and the derivation and use of settings, as required in EN 14081-2 and EN 14081-3, shall be checked and monitored.

6.3.2.3 Incoming timber

The specifications of all incoming timber (including species and timber source) shall be documented, as shall the inspection scheme for ensuring their compliance.

6.3.2.4 Traceability and marking

Individual product batches or packages shall be identifiable and traceable within their production process. The manufacturer shall have written procedures ensuring that processes related to affixing traceability codes and/or markings are maintained.

6.3.2.5 Controls during manufacturing process

The manufacturer shall plan and carry out production under controlled conditions appropriate to the finished product; the control process shall be adequately documented

6.3.2.6 Product testing and evaluation

The manufacturer shall establish procedures to ensure that the stated values of the characteristics he declares are maintained.

For softwood species graded to bending strength classes with a characteristic bending strength above 30 N/mm^2 or to tension strength class with a characteristic tensile strength above 21 N/mm^2, the following product testing is required:

— during each working shift, two pieces of timber from each grade produced shall be randomly selected and tested for tensile strength or edgewise bending strength as given in EN 408 with the tension edge selected at random and the estimated weakest cross section positioned where possible within the centre third of the span. The fifth percentile value, determined by ranking, of the 100 tensile or bending strength values from 50 consecutive shifts shall meet the required tensile or bending strength;

— a strength property other than tensile strength or edgewise bending strength may be used for quality control as an alternative, provided the relation between the two properties is verified from test data.

For hardwood species, specific requirements shall be established within the factory production control.

The characteristics and controls shall be as given in Table 5.

Table 5 — Factory production control for strength graded structural timber with rectangular cross section

Characteristic	**Clause, indicating the relevant test or evaluation method**	**Acceptance criteria for tests**	**Minimum frequency of FPC checks**
Mechanical resistance of strength graded structural timber expressed as modulus of elasticity, bending strength, compressive strength, tensile strength and shear strength			
Strength, stiffness and density properties of timber	Visual grading: 5.1.1 and 5.1.2	5.1.2	Once per shift
	Machine grading: 5.1.1 and 5.1.3	According to EN 14081–3 And 5.1.3	Once per shift
Moisture content	5.1.1 for dry graded timber	5.1.1	Once per shift when grading dry timber
Geometrical data	5.6	5.6	Check each cross section at least once per shift
Fire resistance (charring rate)			
Fire resistance (charring rate)	5.2	Control of characteristic density and species (5.1.2 and 5.1.3)	Once per shift
Reaction to fire			
Reaction to fire	5.3	5.3 a) (CWFT) 5.3 b) (testing)	-Once per shift -Check on receipt that the relevant parameters of the tests are fulfilled once per shift.
Durability against biological attack			
Species or preservative treatment of timber	5.5.1 or 5.5.2	Check the species or the preservative treatment according to EN 15228:2009, 5.3	on receipt
Release of dangerous substances			
Release of dangerous substances	5.4	As relevant, according to 5.4	

The following shall be controlled and records kept for each batch of strength graded timber:

a) batch identification;

b) timber source and species;

c) grades and grading standard (for visual grading);

d) target timber sizes, tolerance class;

e) for timber that is dry-graded, range of moisture content;

f) date and working shift;

g) name(s) of graders or machine operators;

h) test results for graded softwood timber, graded to a strength class with characteristic bending strength greater than 30 N/mm^2 or a tensile strength greater than 21 N/mm^2;

In addition, the following records shall be kept for each batch of machine graded timber:

i) all machine settings used in the grading.

For visual and machine grading, the yields of each grade and reject shall be determined from at least one production lot (working shift) at least once per week and records kept.

6.3.2.7 Non-complying products

The manufacturer shall have written procedures which specify how non-complying products (e.g incorrectly graded products) shall be dealt with. Any such events shall be recorded as they occur and these records shall be kept for the period defined in the manufacturer's written procedures.

Where the product fails to satisfy the acceptance criteria, the provisions for non-complying products shall apply, the necessary corrective action(s) shall immediately be taken and the products or batches not complying shall be isolated and properly identified.

Once the fault has been corrected, the test or verification in question shall be repeated.

The results of controls and tests shall be properly recorded. The product description, date of manufacture, test method adopted, test results and acceptance criteria shall be entered in the records under the signature of the person responsible for the control/test.

With regard to any control result not meeting the requirements of this European standard, the corrective measures taken to rectify the situation (e.g. a further test carried out, modification of manufacturing process, disposal or putting right of product) shall be indicated in the records.

6.3.2.8 Corrective action

The manufacturer shall have documented procedures that instigate action to eliminate the cause of non-conformities in order to prevent recurrence.

6.3.2.9 Handling, storage and packaging

The manufacturer shall have procedures providing methods of product handling and shall provide suitable storage areas preventing damage or deterioration.

6.3.3 Product specific requirements

The FPC system shall include a product specific FPC, which identifies procedures to demonstrate compliance of the product at appropriate stages, i.e.:

a) the controls and tests to be carried out prior to and/or during manufacture according to a frequency laid down in the FPC test plan, and/or

b) the verifications and tests to be carried out on finished products according to a frequency laid down in the FPC test plan.

If the manufacturer uses only finished products, the operations under b) shall lead to an equivalent level of compliance of the product as if FPC had been carried out during the production.

If the manufacturer carries out parts of the production himself, the operations under b) may be reduced and partly replaced by operations under a). Generally, the more parts of the production that are carried out by the manufacturer, the more operations under b) may be replaced by operations under a).

In any case the operation shall lead to an equivalent level of compliance of the product as if FPC had been carried out during the production.

The operations under a) refer to the intermediate states of the product as on manufacturing machines and their adjustment, and measuring equipment etc. These controls and tests and their frequency shall be chosen based on product-type and composition, the manufacturing process and its complexity, the sensitivity of product features to variations in manufacturing parameters etc.

The manufacturer shall establish and maintain records that provide evidence that the production has been sampled and tested, where applicable. These records shall show clearly whether the production has satisfied the defined acceptance criteria and shall be available for at least three years.

6.3.4 Initial inspection of factory and of FPC

Initial inspection of factory and of FPC shall be carried out when the production process has been established and is in operation. The factory and FPC documentation shall be assessed to verify that the requirements of 6.3.2 and 6.3.3 are fulfilled.

During the inspection it shall be verified:

a) that all resources necessary for the achievement of the product performances included in this European standard are in place and correctly implemented, and

b) that the FPC-procedures in accordance with the FPC documentation are followed in practice, and

c) that the product complies with the product-type samples, for which compliance of the product performance has been verified.

If the FPC system covers more than one production line or one production process, and it is verified that the general requirements are fulfilled when assessing one production line or one production process, then the assessment of the general requirements does not need to be repeated when assessing the FPC for another production line or production process.

All assessments and their results shall be documented in the initial inspection report.

6.3.5 Continuous surveillance of FPC

Surveillance of the FPC shall be undertaken at least twice per year for machine grading and at least once per year for visual grading.

The surveillance of the FPC shall include a review of the FPC test plan(s) and production processes(s) for each product to determine if any changes have been made since the last assessment or surveillance. The significance of any changes shall be assessed.

Checks shall be made to ensure that the test plans are still correctly implemented and that the production equipment is still correctly maintained and verified at appropriate time intervals.

The records of tests and measurement made during the production process and to finished products shall be reviewed to ensure that the values obtained still correspond with those values for the samples submitted to the determination of the product-type and that the correct actions have been taken for non-compliant products.

6.3.6 Procedure for modifications

If modifications are made to the product, production process or FPC system that could affect any of the product performances declared according to this standard, then all the characteristics for which the manufacturer declares performance, which may be significantly affected by the modification, shall be subject to the determination of the product-type, as described in 6.2.1.

Where relevant, a re-assessment of the factory and of the FPC system shall be performed for those aspects, which may be significantly affected by the modification.

All assessments and their results shall be documented in a report.

7 Marking

7.1 Marking methods

Strength graded structural timber shall be marked according to one of the following two methods:

a) Method A - Individual piece marking:

Each piece of graded structural timber shall be clearly and indelibly marked to provide the information given in 7.2.

b) Method B - package marking:

Each package of graded structural timber shall be clearly and indelibly marked with a label attached to the package to provide the information given in 7.2.

In addition, for both method A and method B, the information listed in 7.3 together with those in 7.2 shall be given in accompanying commercial documentation,

Visually strength graded structural timber shall be marked according to either Method A or Method B.

NOTE 1 National regulations may exist which limit the method to be used.

Machine strength graded timber shall be marked according to Method A.

NOTE 2 For information on CE marking see ZA.3.2 and ZA.3.3.

7.2 Information on the timber (method A) or on the package (method B)

The following information shall be given, as appropriate, on the strength graded structural timber (method A) or on the package of such timber (method B):

a) name or identifying mark of the manufacturer;

NOTE Registered address of the manufacturer may also be added.

b) symbol “M”, when machine graded, (see Clause 4);

c) symbol “DG ” when dry-graded, (see Clause 4). An alternative symbol may be used provided that it relates to timber dried prior to grading in accordance with 5.1.1, so that the requirements related to dry-graded timber are fully met. In such a case, the detailed definition of this alternative symbol shall be clearly stated by the manufacturer in the documentation, accompanying the timber;

d) identification code, which identifies product from the accompanying documents;

e) performance of some of the characteristics of the timber, i.e. modulus of elasticity (mean), bending strength, tension strength, compression strength, shear strength, density. This may be declared by reference to a single strength class.

Where regulatory marking provisions require information on some or all items listed in this clause, the provisions of this clause concerning those common items are deemed to be met and the information needs not be repeated for the purpose of this clause.

7.3 Information in the documents accompanying strength graded structural timber

The following information, in addition to that specified in 7.2, shall be given in the commercial documents, accompanying all strength graded structural timber:

a) identification code relating accompanying documents to the timber or package;

b) number of this European Standard, and the year of its publication;

c) type, batch or serial number or any other element which refers to the production lot (e.g date, working shift,…);

d) description of the timber, declared as:

- generic name: strength graded structural timber;
- tolerance class of dimension;
- species code as specified:
  - in accordance with EN 13556, if single species, (see Table B.1 in Annex B); or
  - in Table B.2 in Annex B, if species combination;
  - or the botanical species if not in Tables B.1 or B.2 or EN 13556;
- code identifying the country (or countries) of origin of growth in accordance with EN ISO 3166-1;
- grade and grading standard, where visually graded;
- the reference number of the Approved Grading Report when relevant;
- specific end use of timber if relevant (see 5.1.1);

e) when performances are declared in 7.2 by a strength class either:

- by normative reference to the relevant strength class standard (for example: EN 338);
- or the list of the individual performances related to the strength class; modulus of elasticity, bending strength, compressive strength, tensile strength, shear strength and density.

f) reaction to fire, class according to EN 13501-1, either:

- as Class D-s2, d0, without the need for further testing (CWFT; or

— based on results of relevant test methods, carried out according to the standards, referred in EN 13501-1, together with mounting and fixing conditions given in 5.3b);

g) fire resistance (charring rate), declared as, characteristic density and the species;

h) release of dangerous substances, see 5.4, where relevant;

i) durability performance (i.e. resistance to biological organisms) of the timber:

— without preservative treatment (i.e. natural biological durability): declared as classification against wood destroying fungi, insects, termites and marine borers, according to EN 350-2, or

— with preservative treatment indication “PT” and additional information in accordance with EN 15228.

NOTE In some places of use, the indication PT is mandatory for each piece of timber having received a preservative treatment.

Where regulatory marking provisions require information on some or all items listed in this clause, the provisions of this clause concerning those common items are deemed to be met and the information needs not be repeated for the purpose of this clause.

8 Environmental issues

Manufacturers may draft Environmental product declarations for their products used in construction complying with EN 15942.

When drafting such an Environmental product declaration, EN 16485 shall be used in conjunction with EN 15804. This European standard provides general product category rules (PCR) for Type III environmental declarations for wood and wood-based products for use in construction and related construction and in-service processes.

To quantify the amount of atmospheric carbon dioxide of the wood and wood-based product, based on the biogenic carbon content of wood, the calculation method described in EN 16449 should be used.

Annex A
(normative)

Requirements for strength reducing characteristics for visual grading standards

A.1 Limitations for strength-reducing characteristics

A.1.1 Knots

The grading standard shall specify the method of measurement of knots.

NOTE Methods of measurement of knots are given in EN 1310.

Maximum dimensions of knots or knot holes shall be specified in one of the following ways:

a) in relation to the width and or thickness of timber on the basis of linear values;

b) in relation to the cross-sectional area of timber on the basis of cross-sectional values;

c) in relation to absolute values for a given range of timber sizes.

Different limitations on knot sizes can be specified for different portions of the piece, e.g. a margin area with different knot limitations from the rest of the piece may be included.

In certain sizes, knot groupings affect the timber strength and shall be taken into account.

A.1.2 Slope of grain

The grading standard shall have a definition of slope of grain in accordance with EN 844-9 and refer to EN 1310 for its method of measurement, and shall give limitations on the slope of grain for each grade specified.

NOTE For the limitations on the slope of grain, values in the following increments are preferred: 1:4, 1:6, 1:8 and 1:10.

Local fibre deviations around knots or other defects shall be disregarded in measuring slope of grain.

A.1.3 Density and rate of growth

For softwoods and temperate hardwoods, the grading standard shall contain a requirement for either density or rate of growth.

If density is specified, it shall be linked to a stated moisture content.

NOTE 1 The preferred moisture content for this purpose is 20 %.

Where the density is given at the moisture content other than 20 %, correction factors shall be available for correction to 20 %.

NOTE 2 EN 384 gives a method of density correction.

If rate of growth is specified, the standard shall include limits for rate of growth and its method of measurement.

NOTE 3 For limits for rate of growth, the values in the following increments of ring width are preferred: 15 mm, 10 mm, 8 mm, 6 mm, 4 mm and 3 mm.

A.1.4 Fissures

Fissures shall be measured in accordance with EN 1310.

Where fissures have a significant effect on strength, e.g. shear strength of a beam, they shall be limited according to Table A.1. Otherwise they may be disregarded.

Table A.1 — Maximum total of length of fissures in a piece of timber [a]

Type	**Max. permitted length corresponding to the levels of strength classes**	
	C18, D18, T11 [b] and below	**above C18, D18, T11 [b]**
Fissures not going through the thickness	Fissures with depth less than half the thickness of the piece may be ignored	
	Not greater than 1,5 m or 1/2 the length of the piece, whichever is the lesser	Not greater than 1 m or 1/4 the length of the piece, whichever is the lesser
Fissures going through the thickness	Not greater than 1 m or 1/4 the length of the piece, whichever is the lesser. If at the ends, length not greater than twice the width of the piece	Only permitted at the ends with a length not greater than the width of the piece
NOTE The length of fissures is linked with moisture content and therefore the limits given above are only applicable at the time of grading.		
[a] Permitted limits for both the depth and length of fissures refer to the cumulative sum of fissures in one plane in a piece of timber. [b] According to EN 338. For alternative strength classes, fissures are checked with corresponding strength value limits.		

A.2 Limitations for geometrical characteristics

A.2.1 Wane

Criteria for the wane limitations with references to the width, thickness and length of the piece and its method of measurement shall be given.

The maximum wane permitted shall not reduce the edge and face dimensions to less than 2/3 of the basic dimensions of the piece.

Wane should be restricted for general building reasons. Wane can be particularly undesirable when nail plates or connectors are used or there is transverse compression.

A.2.2 Warp

The limitations of maximum permitted values of warp for bow, spring and twist shall be given.

Maximum warp shall be no greater than as given in Table A.2. The requirements given in Table A.2 are applicable to dry-graded timber.

Bow and spring shall be measured in accordance with EN 1310.

Twist shall be measured in accordance with EN 1310.

Even if warp of timber does not directly influence strength, it is strongly recommended that timber for building purposes should be subject to some restrictions in this respect.

NOTE 1 Warp is linked with moisture content of timber and can therefore change with time.

NOTE 2 Warp is often linked to the dimensions of timber.

Table A.2 — Maximum warp (in mm) over 2 m of length [a]

Type	**Max. permissible warp corresponding to strength classes**	
	C18, D18, T11 [b] and below	**above C18,D18,C11 [b]**
Bow	20	10
Spring	12	8
Twist	2 mm / 25 mm width	2 mm / 25 mm width
Cup	No restrictions	No restrictions

[a] For warp of other lengths the requirements shall be adjusted *pro-rata*.

[b] According to EN 338. For alternative strength classes, warp is checked with corresponding strength value limits.

A.3 Limitations for biological characteristics

Grading standards shall include requirements that limit fungal and insect damage to timber and which prohibit timber under live insect attack. Soft rot shall not be allowed in any grade, and dote shall only be permitted in grades to a level of EN 338 strength class C18/D18/T11 and below. For alternative strength classes, dote is checked with corresponding strength value limits.

Grading standards shall conform to EN 844-10 for definitions of terms relating to stain and fungal attack.

A.4 Other characteristics

A.4.1 Reaction wood

Grading standards for softwood species shall take account of compression wood. Standards dealing with hardwood species shall take account of tension wood. Grading standards shall conform to EN 844-7 for definitions of these terms.

A.4.2 Other criteria

Other grade characteristics and strength affecting criteria, e.g. mechanical damage, inbark, covered damage to the stem and top rupture, shall be restricted in line with the requirements given in this annex for other strength reducing characteristics that have a similar effect on the strength of timber.

Annex B
(normative)

Marking codes for species

B.1 Marking codes for single species

EN 13556 assigns a four-letter code to each of the species listed in that standard.

Table B.1 gives the codes for a selection of species that occur in EN 1912 classified as single species or in Approved Grading Reports.

Species that are only listed as part of a species combination are given in Table B.2.

Table B.1 — Marking codes for single species (classified in EN 13556)

Species standard name	Botanical species	Code
Ekki	*Lophira alata*	LOAL
Balau	*Shorea* spp. (section Shorea)	SHBL
Douglas fir	*Pseudotsuga menziesii*	PSMN
Silver fir	*Abies alba*	ABAL
Greenheart	*Ocotea rodiaei*	OCRD
Radiata pine	*Pinus radiata*	PNRD
Iroko	*Milicia excelsa* *Milicia regia*	MIXX
Jarrah	*Eucalyptus marginata*	EUMR
Kapur	*Dryobalanops* spp.	DRXX
Karri	*Eucalyptus diversicolor*	EUDV
Kempas	*Koompassia malaccensis*	KOML
Keruing	*Dipterocarpus* spp.	DPXX
European larch	*Larix decidua*	LADC
Maritime pine	*Pinus pinaster*	PNPN
Merbau	*Intsia bijuga* *Intsia palembanica*	INXX
Opepe	*Nauclea diderrichii*	NADD
Parana pine	*Araucaria angustifolia*	ARAN
Scots pine ("Redwood")	*Pinus sylvestris*	PNSY
Austrian Pine	*Pinus nigra subsp. nigra*	PNNN
Corsican Pine	*Pinus nigra subsp. laricio,*	PNNL
Black pine	*Pinus nigra subsp. nigra* *Pinus nigra.subsp laricio*	PNNG
Poplar	*Populus* spp.	POER

Sitka spruce	*Picea sitchensis*	PCST
Norway spruce	*Picea abies*	PCAB
Teak	*Tectona grandis*	TEGR
Western red cedar	*Thuja plicata*	THPL
Southern blue gum	*Eucalyptus globulus*	EUDL
European beech	*Fagus sylvatica*	FASY
European oak	*Quercus petraea* *Quercus robur*	QCXE
American white oak	*Quercus alba*	QCXA
American red oak	*Quercus rubra*	QCXR
American ash	*Fraxinus americana*	FXXX
European ash	*Fraxinus excelsior*	FXEX

B.2 Marking codes for species combination

Table B.2 — Marking codes for species combinations

Species commercial name	**Botanical species**	**Species code**
British pine	*Pinus nigra* *Pinus sylvestris*	WPNN
British spruce	*Picea abies* *Picea sitchensis*	WPCS
Caribbean pitch pine	*Pinus caribaea* *Pinus oocarpa*	WPNC
Douglas fir-larch	*Larix occidentalis* *Pseudotsuga menziesii*	WPSM
Hem-fir	*Abies amabilis* *Abies concolour* *Abies grandis* *Abies magnifica* *Abies procera* *Tsuga heterophylla*	WABA
Larch	*Larix decidua* *Larix x eurolepsis* *Larix kaempferi*	WLAD
Pines	*Pinus nigra* *Pinus pinaster* *Pinus sylvestris*	WPNP
Redwood and whitewood	*Abies alba* *Picea abies* *Pinus sylvestris*	WPPA

S-P-F	*Abies balsamea* *Abies lasiocarpa* *Picea engelmannii* *Picea glauca* *Picea mariana* *Picea rubens* *Pinus banksiana* *Pinus contorta* *Pinus ponderosa*	WPCE
Southern pine	*Pinus echinata* *Pinus elliottii* *Pinus palustris* *Pinus taeda*	WPNE
Spruce and fir Whitewood	*Abies alba* *Picea abies*	WPCA
Western white woods	*Abies balsamea* *Abies lasiocarpa* *Picea engelmannii* *Pinus contorta* *Pinus lambertiana* *Pinus monticola* *Pinus ponderosa* *Tsuga mertensiana*	WABB

Annex C
(normative)

Measurement of moisture content

C.1 General

Moisture meters shall be able to measure the moisture content of timber with an accuracy of ± 3 % moisture content (for at least 95 % of the measurements).

It is assumed that the accuracy of a moisture meter according to EN 13183-2 or −3 is checked by the manufacturer of the equipment.

In addition the constancy of the moisture meter shall be checked

— with a set of at least three resistances from 1 MOhm to 100 GOhm for moisture meters according to EN 13183-2; or

— with calibration panels provided by the manufacturer of the moisture meter for moisture meters according to EN 13183-3.

C.2 Measurement of moisture content of timber during production

The accuracy of the moisture meter shall be checked for each combination of species and preservative treatment (if relevant) with timber pieces having representative cross sections and with moisture contents covering the likely range of moisture contents during production, but at least a range of 8 % moisture content difference.

If the measurement is done by an electrical resistance moisture meter the electrodes have to be driven into one face of the timber at a distance of at least 0,3 times the width from the edge and at least 0,3 m from either end of the timber so that the tips of the electrodes penetrate into a depth of 0,3 times the thickness of the timber, with a maximum of 40 mm. Lower penetration depths are allowed if correlation is checked within Factory Production Control.

If the measurement is done by an in-line capacitance moisture meter the mean value of the measured data are to be used.

Annex ZA
(informative)

Clauses of this European Standard addressing the provisions of the EU Construction Products Regulation

ZA.1 Scope and relevant characteristics

This European Standard has been prepared under Mandate M/112 "Structural timber products and ancillaries" given to CEN by the European Commission and the European Free Trade Association.

If this European standard is cited in the Official Journal of the European Union (OJEU), the clauses of this standard, shown in this annex, are considered to meet the provisions of the relevant mandate, under the Regulation (EU) No. 305/2011.

This annex deals with the CE marking of the strength graded structural timber with rectangular cross section intended for the uses indicated in Table ZA.1 and shows the relevant clauses applicable.

This annex has the same scope as in Clause 1 of this standard related to the aspects covered by the mandate and is defined by Table(s) ZA.1.

Table ZA.1 — Relevant clauses for strength graded structural timber with rectangular cross section

Construction product: Strength graded structural timber with rectangular cross section[a] **Intended uses:** In buildings and bridges			
Essential characteristics	**Clauses in this European Standard related to essential characteristics**	**Regulatory classes**	**Notes**
Mechanical resistance covering modulus of elasticity, bending strength, compressive strength, tensile strength and shear strength[b] as:			
Properties of visual graded timber	5.1.1 and 5.1.2	-	Declared as strength class or individual values
Properties of machine graded timber	5.1.1 and 5.1.3	-	
Fire resistance (charring rate)[c]	5.2		Declared as species and characteristic density
Reaction to fire[d]	5.3	A1 to F	Declared as D-s2, d0 according to Table 3 or Tested and classified acc. to EN 13501-1
Durability of all characteristics (i.e. resistance to biological organisms)			
Timber without preservative treatment	5.5.1	-	Declared as durability class(es) according to EN 350-2
Timber with preservative treatment	5.5.2	-	Declared according to EN 15228:
Release of dangerous substances[e]	5.4	-	As relevant in accordance with 5.5[e]

[a] For strength graded timber preservative treated to improve the durability or not, but not treated to improve the fire performances.

[b] The declared information enables the designer to calculate the mechanical resistance for the specific end use situation of the product (columns, beams, etc)

[c] The declared information enables the designer to calculate the fire resistance according to EN 1995-1-2 for the specific end-use situation of the product (columns, beams, etc).

[d] The performance of these characteristics may be affected by the preservative treatment against biological attack of timber.

[e] To be included in the declaration only if there is a dangerous substance regulated in the place of destination of the product. Consequently, the NPD option is not applicable.

The declaration of the product performance related to certain essential characteristics is not required in those Member States (MS) where there are no regulatory requirements on these essential characteristics for the intended use of the product.

In this case, manufacturers placing their products on the market of these MS are not obliged to determine nor declare the performance of their products with regard to these essential characteristics and the option “No performance determined” (NPD) in the information accompanying the CE marking and in the declaration of performance (see ZA.3) may be used for those essential characteristics.

ZA.2 Procedure for Assessment and Verification of the Constancy of Performance (AVCP) of strength graded structural timber with rectangular cross section

ZA.2.1 System(s) of AVCP

The AVCP system(s) of strength graded structural timber with rectangular cross section indicated in Table ZA.1, established by EC Decision(s) 97/176/EC of 1997-02-17 (*see OJEU L73 of 1997-03-14*), as amended by 2001/596/EC of 2001-01-08 (*see OJEU L209 of 2001-08-02) amended by regulation EU N°568/2014 of 2014-02-18 (see OJEU L 157/76 of 2014-05-27)* is shown in Table ZA.2 for the indicated intended use(s) and relevant level(s) or class(es) of performance.

Table ZA.2 — System(s) of AVCP

Product	Intended use(s)	Level(s) or class(es) of performance	AVCP system(s)
Solid structural timber products	Bridges, and buildings	(A1, A2, B, C), D, E (A1 to E)***, F	2+
System 2+: See Regulation (EU) No. 305/2011 (CPR) Annex V, 1.3 and regulation (EU) N° 568/2014 including certification of the factory production control by a notified production control certification body on the basis of initial inspection of the manufacturing plant and of factory production control as well as of continuous surveillance, assessment and evaluation of factory production control.			
*** Products/materials that do not require to be tested for reaction to fire (e.g. products/materials of Class A1 according to Commission Decision 96/603/EC).			

The AVCP of the strength graded structural timber with rectangular cross section in Table ZA.1 shall be according to the AVCP procedures indicated in Table ZA.3 resulting from application of the clauses of this or other European Standard indicated therein. The content of tasks of the notified body shall be limited to those essential characteristics as provided for, if any, in Annex III of the relevant mandate and to those that the manufacturer intends to declare.

NOTE As the use of fire retardants is excluded from the scope, all products covered by this European standard are assigned to AVPC system 2+. Therefore no provisions for AVPC system 1 are given in the later subsections of this annex.

Table ZA.3 — Assignment of AVCP tasks for strength graded structural timber with rectangular cross section under system 2+

Tasks		Content of the task	AVCP clauses to apply
Tasks for the manufacturer	Factory production control (FPC)	Parameters related to essential characteristics of Table ZA.1 relevant for the intended use which are declared	6.1, 6.3
	Assessment of the performance of the construction product on the basis of testing (including sampling), calculation, tabulated values or descriptive documentation of that product	Parameters related to essential characteristics of Table ZA.1 relevant for the intended use which are declared	6.1, 6.2
	Testing of samples taken at the manufacturing plant by the manufacturer in accordance with the prescribed test plan	Essential characteristics of Table ZA.1 relevant for the intended use which are declared	6.1, 6.3.2.6
Tasks for the notified production control certification body	Initial inspection of the manufacturing plant and of FPC	Parameters related to all essential characteristics of Table ZA.1, relevant for the intended use which are declared, Documentation of the FPC.	6.1, 6.3.4
	Continuous surveillance, assessment and evaluation of FPC	Parameters related to essential characteristics of Table ZA.1, relevant for the intended use which are declared, namely bending strength, compressive strength, tensile strength and, reaction to fire. Documentation of the FPC.	6.1, 6.3.5

ZA.2.2 Declaration of performance (DoP)

ZA.2.2.1 General

The manufacturer draws up the DoP and affixes the CE marking on the basis of the different AVCP systems set out in Annex V of the Regulation (EU) No 305/2011:

— the determination of the product-type on the basis of type testing (including sampling), type calculation, tabulated values or descriptive documentation of the product;

— the factory production control and the testing of samples taken at the factory according to the prescribed test plan, carried out by the manufacturer; and;

— the certificate of conformity of the factory production control, issued by the notified production control certification body on the basis of:

  — initial inspection of the manufacturing plant and of factory production control and;

— continuous surveillance, assessment and evaluation of factory production control.

ZA.2.2.2 Content

The model of the DoP is provided in Annex III of the Regulation (EU) No 305/2011 amended by delegated regulation n°574/2014 of 21 February 2014. According to this Regulation, the DoP shall contain, in particular, the following information:

— the unique identification code of the product-type for which the declaration of performance has been drawn up;

— the intended use or uses for the construction product, in accordance with the applicable harmonized technical specification;

— the name, the registered trade name or registered trade mark and the contact address of the manufacturer;

— the name and the contact address of the authorized representative, if relevant;

— the number of the applicable AVCP system or systems of the construction product, as set out in Annex V of the CPR;

— the reference number of the harmonized standard and its date of issue and the identification number of the notified body;

— the list of essential characteristics, as determined in the harmonized technical specification for the declared intended use or uses;

— for each essential characteristic, the declared performance, by level or class, or in a description, in relation to this characteristic or, for characteristics for which no performance is declared, the letters “NPD” (No Performance Determined).This point may be filled up with the use of a table which brings forward the links between the harmonized technical specifications and the systems of assessment and verification of constancy of performance applied respectively to each essential characteristic of the product, as well as the performance in relation to each essential characteristic;

— If relevant, appropriate Technical Documentation and/or Specific Technical Documentation has been used, in accordance with Articles 36 to 38 of Regulation (EU) No 305/2011, in order to indicate the requirements with which the product complies. In such a case, under this point the declaration of performance shall indicate:

  (a) the reference number of the Specific and/or Appropriate Technical Documentation used, and

  (b) the requirements with which the product complies.

Regarding the supply of the DoP, article 7 of the Regulation (EU) No 305/2011 applies.

The information referred to in Article 31 or, as the case may be, in Article 33 of Regulation (EC) No 1907/2006, (REACH) shall be provided together with the DoP.

ZA.2.2.3 Example of DoP

The model of the DoP is provided in delegated Regulation (EU) No 574/2014.

ZA.3 CE marking and labelling

ZA.3.1 General

The CE marking symbol shall be in accordance with the general principles set out in Article 30 of Regulation (EC) No 765/2008 and shall be affixed visibly, legibly and indelibly:

— to the strength graded structural timber with rectangular cross section, or

— to a label attached to it.

Where this is not possible or not warranted on account of the nature of the product, it shall be affixed:

— to the packaging, or

— to the accompanying documents.

The CE marking shall be affixed before the construction product is placed on the market. It may be followed by a pictogram or any other mark notably indicating a special risk or use.

The CE marking regime under this European standard distinguishes between:

— CE marking which is given in commercial documents;

— Marking which is placed on each piece of graded structural timber or on a label attached to the package.

ZA.3.2 CE marking

The CE-marking symbol, together with the following information, all representing the CE marking, shall be given in the commercial documents, accompanying either the graded structural timber (see Method A in 7.1 a), or the package of such timber (see Method B in 7.1 b):

NOTE 1 One accompanying document may contain information on more than one package provided that all relevant information with regard to the corresponding CE-markings, applicable to all such packages, is given.

a) identification number of the notified production control certification body;

b) name and the registered address of the manufacturer, or the identifying mark allowing identification of the name and address of the manufacturer easily and without ambiguity;

c) the last two digits of the year in which it was first affixed;

NOTE 2 The above is the year in which the CE marking was first applied by the manufacturer.

d) the reference number of the declaration of performance;

e) the number of this European Standard, and the year of its publication);

f) the unique identification code of the product type;

g) the intended use of strength graded structural timber as laid down in the harmonized technical specification applied;

h) description of the timber, with the following information:

   — species code as specified:

— in accordance with EN 13556, if single species, (see Table B1) or;

— in Table B2, if species combination;

— or the botanical species if not in Tables B1 or B2 or EN 13556.

— code identifying the country (or countries) of origin of growth in accordance with EN ISO 3166-1

— grade and grading standard, where visually graded;

— symbol “M”, when machine graded;

— symbol “DG”” when dry-graded ; An alternative symbol may be used provided that it relates to timber dried prior to grading in accordance with 5.1.1, so that the requirements related to dry-graded timber are fully met. In such a case, the detailed definition of this alternative symbol shall be clearly stated by the manufacturer in the documentation, accompanying the timber.

— specific end use of timber if relevant;

i) type, batch or serial number or any other element which refers to the production lot (e.g date, working shift,…);

j) performances on all those relevant essential characteristics of the structural timber listed in Table ZA.1, which are to be declared and, where relevant, expressed as “Pass” for the pass/fail requirements (where necessary), or “NPD” for those characteristics, where this is relevant, for the following:

1) mechanical resistance covering modulus of elasticity (mean), bending strength, tension strength, compression strength, shear strength, density. This may be declared by reference to a single strength class;

2) when performances are declared by a strength class:

— normative reference to the relevant strength class standard (for example EN 338);

— or the list of the individual performances related to the strength class: modulus of elasticity, bending strength, compressive strength, tensile strength, shear strength and density.

3) reaction to fire, class according to EN 13501-1, either:

— as Class D-s2, d0, without the need for further testing (CWFT), or

— based on results of relevant test methods, carried out according to the standards, referred in EN 13501-1, together with mounting and fixing conditions given in 5.3b);

4) fire resistance, declared as characteristic density via the strength class and the species or species combination;

5) release of dangerous substances, see 5.4, where relevant;

k) durability performance (i.e. resistance to biological organisms) of the timber:

— without preservative treatment (i.e. natural biological durability): declared as classification against wood destroying fungi, insects, termites and marine borers, according to EN 350-2, or

— with preservative treatment indication “PT” and additional information in accordance with EN 15228:.

NOTE 3 In some countries, the indication PT is mandatory for each piece of timber having received a preservative treatment.

Figure ZA.1 gives an example of the CE marking given in the documents, accompanying in this case untreated machine dry graded structural timber (see Method A in 7.1 a).

CE 4321	*CE marking, consisting of the “CE”-symbol* *Identification number of the notified production control certification body*
AnyCo Ltd **16** 001CPR2013–0714	*Name and the registered address of the manufacturer, or identifying mark.* *Last two digits of the year in which the marking was first affixed* *Reference number of the DoP*
EN 14081–1:2016 Xxxx/ C24/ M / DG / PCAB/ Strength graded structural timber intended to be used in buildings and bridges	*No. of European Standard applied, as referenced in OJEU* *Unique identification code of the product-type* *Description of timber* *Intended use of the product as laid down in the European standard applied*

Mechanical resistance and fire resistance, as	
Species	PCAB
Strength class	C 24
Reaction to fire	D-s2, d0
Biological Durability, as:	
- wood destroying fungi - insects - termites - marine borers	Class 4 SH SH S

Level or class of the performance declared

Figure ZA.1 — Example of the CE marking for an untreated machine strength dry graded structural timber under AVCP 2+

Figure ZA.2 gives an example of the CE marking given in the documents, accompanying in this case treated visual graded structural timber either individual piece marked (see Method A in 7.1 a), or the package of such timber (see Method B in 7.1b).

CE 4321	*CE marking, consisting of the "CE"-symbol* *Identification number of the notified production control certification body*
AnyCo Ltd **16** 002CPR2013-0714	*Name and the registered address of the manufacturer, or identifying mark* *Last two digits of the year in which the marking was first affixed* *Reference number of the DoP.*
EN 14081-1:2016 Xxxx C 24/ WPCA/ Strength graded structural timber intended to be used in buildings and bridges	*No. of European Standard applied, as referenced in OJEU* *Unique identification code of the product-type* *Description of the timber* *Intended use of the product as laid down in the European standard applied*
Mechanical resistance and fire resistance, as	*Level or class of the performance declared*

Species	WPCA
Strength class	C 24 graded acc. to (NF B 52-001-1) ST-II
Reaction to fire	**D-s2, d0**
Biological Durability "PT" as**:**	
type of treatment and preservative - penetration class - retention value - target biological agents	Product XY NP1 100 g/m^2 Fungi

Figure ZA.2 — Example of the CE marking for a treated visual strength graded structural timber under AVCP 2+

ZA.3.3 Marking on the product or on a label attached to the package

In addition to the CE marking and the information given in accordance with ZA.3.2, the CE-marking symbol and the information followed below, shall be given clearly and indelibly either on each piece of strength graded structural timber (see Method A in 7.1 a) or on a label attached to the package of such timber (see Method B in 7.1 b):

a) identification number of the notified production control certification body;

b) name or the identifying mark of the manufacturer;

c) information on the timber:

— level or class of the performance declared;

— symbol “M”, when machine graded;

— symbol “DG”, when dry-graded. An alternative symbol may be used provided that it relates to timber dried prior to grading in accordance with 5.1.1, so that the requirements related to dry-graded timber are fully met. In such a case, definition of this alternative symbol shall be clearly stated by the manufacturer in the documentation, accompanying the timber;

— symbol “PT” where the timber has been treated against biological attack and for places of use where this indication is mandatory for each piece of timber;

d) reference to the DoP.

Figure ZA.3 gives an example, in this case for untreated machine graded structural timber, of the marking either placed on each piece of a graded structural timber (see Method A in 7.1 a) or on a label attached to the package of such timber (see Method B in 7.1 b).

CE 4321	*CE marking consisting of the “CE” symbol* *Identification number of the notified production control certification body*
AnyCo Ltd	*Name or identifying mark of the manufacturer*
C24/ M / DG /PCAB / 002CPR2013–0714	*Description of the timber* *Reference to DoP,*

Figure ZA.3 — Example of marking on the product or on a label attached to the package

Bibliography

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

[2] EN 336, *Structural timber — Sizes, permitted deviations*

[3] EN 14358, *Timber structures — Calculation and verification of characteristic values*

[4] EN 15942, *Sustainability of construction works — Environmental product declarations — Communication format business-to-business*

[5] EN 16449, *Wood and wood-based products — Calculation of the biogenic carbon content of wood and conversion to carbon dioxide*

[6] EN ISO 9001, *Quality management systems — Requirements (ISO 9001)*

National Annex NA
(informative)

Grade Stamp Marking and Documentation in respect of UK requirements

NA.1 Introduction

This national annex confirms the UK position with regard to strength-graded timber with only 'package marking'.

In addition, it provides guidance on the CE marking and documentation requirements set out by this standard and the Construction Products Regulation (EU) No 305/2011.

NA.2 Partial factor (NA TO BS EN 1995-1-1:2004+A2:2012)

Notwithstanding the marking and documentation requirements summarised in this annex, the UK National Annex to EN 1995-1-1 applies a specific partial factor to strength graded timber supplied in accordance with the 'package marking' clauses in Method B of EN 14081-1. Application of this partial factor reduces significantly the design strength of the timber.

An exception for when timber with only 'package marking' is exempt from applying the partial factor is covered in NA.3.1.

NA.3 Guidance on Clause 7

NA.3.1 Marking Methods (See EN 14081-1, 7.1)

In the UK it is a requirement that strength-graded structural timber be marked according to Method A (individual piece marking). The marking on the timber is customarily known as the 'grade stamp'. The grade stamp must be stamped clearly and indelibly at least once on a face or edge and at least 600mm from the end of the piece. It may also be applied to an end but, if so, this mark must be in addition to the face or edge mark and not instead of it. Grade stamped timber not meeting this requirement is regarded as being package marked, owing to the possibility of the grade stamp being removed or hidden early during construction. Therefore, it will be subject to the strength reduction identified in NA.2.

The only exception to the application of the partial factor for package marked timber is when the grade stamp is omitted for aesthetic reasons. Specifically, where visually strength-graded structural timber is *requested* to be supplied without grade stamps, *solely for aesthetic reasons*, then the timber may be marked according to Method B (package marking). This is permitted *only* where a customer requests it for a single structure with the timbers exposed on completion.

Machine strength-graded timber, in accordance with Clause 7.1, must always be marked according to Method A.

NA.3.2 Information on the timber (Method A) or on the package (Method B)
(See EN 14081-1, 7.2)

In the UK, the following information is included in the strength-graded structural timber marking:

— Manufacturer name/logo
— Declaration of Performance (DoP) reference/number
— Strength Class
— "DG" or alternative marking when the timber has been Dry-Graded
— "M" when the timber has been Machine Graded

Additionally:

— CE 'symbol'

Further information may also be provided on the grade stamp, so long as it does not conflict with the other items that are required to be present.

Examples of other information that may be provided in the stamp are:

— the number or logo of the Notified Body
— the visual grade of the timber and the grading rule/standard
— the wood species or species combination by code or botanical name.

NOTE 1 Some countries require preservative treated timber to be marked with the letters "PT". This is not a requirement in the UK.

NA.4 Documentation required for compliance

NA.4.1 CE Marking

To be in compliance with the Construction Products Regulation (CPR), the CE marking *must* accompany every delivery to every customer. The CE marking must be affixed to the product, preferably directly on the product or on a label fixed to it. Where this is not possible, it may be affixed to the packaging or to the accompanying commercial documents. The CE marking must also be followed by the items listed in Article 9.2 of the CPR.

The DoP reference, required with the CE marking, is also included within the grade stamp, providing the 'identification code, which identifies the product from the accompanying documents' listed in Clause 7.2 of EN 14081-1.

However, the information required to be included in the grade stamp falls short of that required for the CE marking. Consequently, in addition to grade stamping (and also when the timber is only 'package marked'), the CE marking for strength-graded structural timber must be affixed to the accompanying commercial documents. The CE marking documentation must accompany the timber to its final recipient.

CE marking and other information provided with accompanying documentation has to enable unambiguous identification of grade and species of each piece of timber in the consignment together with details of the manufacturer of each and the declaration of performance number relating to each piece.

Where a consignment includes strength-graded structural timber with individual piece marking from more than one manufacturer the distributor must affix, to the accompanying documents, CE marking as appropriate from each manufacturer.

NOTE 2 With reference to Article 9.2 of the CPR, and the year in which the CE marking was *first* affixed. The date will not change until the product changes necessitating the raising of a new DoP with revised declared values of any of the listed essential characteristics. The date does not change annually.

NA.4.2 Declaration of Performance (DoP)

The only product information to be included in the DoP is identified in Table ZA.1 of EN 14081-1. Further information that the manufacturer must provide for all DoPs is identified in the CPR, specifically Annex V.

Clause 7.3 of EN 14081-1 gives a list of information augmenting that which is required to be provided in the DoP which, since it may not be part of the DoP, must be included with the customary accompanying commercial documentation supplied to customers. The DoP should be made freely available by the manufacturer (for example via a website) and must be supplied in paper form if requested by the recipient. The DoP is not required to accompany each consignment.

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.

Copyright in BSI publications

All the content in BSI publications, including British Standards, is the property of and copyrighted by BSI or some person or entity that owns copyright in the information used (such as the international standardization bodies) and has formally licensed such information to BSI for commercial publication and use.

Save for the provisions below, you may not transfer, share or disseminate any portion of the standard to any other person. You may not adapt, distribute, commercially exploit, or publicly display the standard or any portion thereof in any manner whatsoever without BSI's prior written consent.

Storing and using standards

Standards purchased in soft copy format:

- A British Standard purchased in soft copy format is licensed to a sole named user for personal or internal company use only.
- The standard may be stored on more than 1 device provided that it is accessible by the sole named user only and that only 1 copy is accessed at any one time.
- A single paper copy may be printed for personal or internal company use only.

Standards purchased in hard copy format:

- A British Standard purchased in hard copy format is for personal or internal company use only.
- It may not be further reproduced – in any format – to create an additional copy. This includes scanning of the document.

If you need more than 1 copy of the document, or if you wish to share the document on an internal network, you can save money by choosing a subscription product (see 'Subscriptions').

Reproducing extracts

For permission to reproduce content from BSI publications contact the BSI Copyright & Licensing 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 subscriptions@bsigroup.com.

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.

Useful Contacts

Customer Services
Tel: +44 345 086 9001
Email (orders): orders@bsigroup.com
Email (enquiries): cservices@bsigroup.com

Subscriptions
Tel: +44 345 086 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 Group Headquarters

389 Chiswick High Road London W4 4AL UK

bsi.