



BSI Standards Publication

Structural timber — Determination of characteristic values of mechanical properties and density

National foreword

This British Standard is the UK implementation of EN 384:2010. It supersedes BS EN 384:2004 which is withdrawn.

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

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

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ISBN 978 0 580 58145 8

ICS 79.040

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 July 2010

Amendments issued since publication

Date	Text affected
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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 384

April 2010

ICS 79.040

Supersedes EN 384:2004

English Version

Structural timber - Determination of characteristic values of mechanical properties and density

Structures en bois - Détermination des valeurs
caractéristiques des propriétés mécaniques et de la masse
volumique

Bauholz für tragende Zwecke - Bestimmung
charakteristischer Werte für mechanische Eigenschaften
und Rohdichte

This European Standard was approved by CEN on 4 March 2010.

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Foreword

This document (EN 384:2010) has been prepared by Technical Committee CEN/TC 124 “Timber structures”, the secretariat of which is held by SFS.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2010, and conflicting national standards shall be withdrawn at the latest by October 2010.

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.

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Introduction

In this revised edition, changes have been made to the equations giving the relativities between properties in 6.2.1, and the method of calculating the 5-percentile density. Also, the verification requirements in Clause 9 have been rewritten.

Structural codes can only function effectively if standard methods of determining the mechanical and physical properties exist.

Whilst total accuracy of characteristic values for any defined population is an aim, it is recognized that this is not achievable. A major aim of the procedures given in this standard is to produce characteristic values that are comparable in terms of the populations they represent. It is also important that the standard permits the use of as much existing test data as possible from various sampling and testing techniques.

Where methods are given to permit characteristic values to be determined from a less than ideal amount of structural size test data or from small, clear, defect-free specimen test data, reduction factors to reflect a lower degree of confidence are employed.

This standard covers the stages of population definition, sampling, testing and analysis and presentation of data in the determination of characteristic values.

1 Scope

This European Standard gives a method for determining characteristic values of mechanical properties and density, for defined populations of visual and/or mechanical strength grades of sawn timber.

A method is also given for checking the strength of a timber sample against its designated value.

The values determined in accordance with this standard for mechanical properties and density are suitable for assigning grades and species to the strength classes of EN 338.

NOTE 1 For assigning grades and species to the strength classes in EN 338 only three characteristic values, i.e. bending strength, mean modulus of elasticity parallel to grain and density, need to be determined, other properties may be taken from the table in EN 338.

NOTE 2 EN 1912 gives examples of assignment to strength classes of established national or regional visual grades.

2 Normative references

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

EN 338, *Structural timber — Strength classes*

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

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

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

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

ISO 3131:1975, *Wood — Determination of density for physical and mechanical tests*

3 Terms and definitions

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

3.1

characteristic value

generally, value that corresponds to a fractile of the statistical distribution of a timber property

NOTE For strength properties, modulus of elasticity and density the fractile is the 5-percentile. For modulus of elasticity, the mean value is also a characteristic value.

3.2

p-percentile

value for which the probability of getting lower values is p %

3.3

population

material for which the associated characteristic values are relevant

NOTE The population is defined by parameters such as species or species combination, source and strength grade.

3.4

sample

number of specimens of one cross section size and from one population

NOTE See 5.1.

3.5

small clear test

test to determine mechanical properties of small defect-free specimens

3.6

specimen

piece of timber for testing

3.7

thickness

lesser dimension perpendicular to the longitudinal axis of a piece of timber

3.8

width

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

3.9

depth

dimension perpendicular to the longitudinal axis of a timber beam, in the plane of the bending forces

4 Symbols and abbreviations

a_f	distance between the inner load points of the bending test (in millimetres)
COV	coefficient of variation
$\bar{E}$	mean modulus of elasticity for one sample (in newtons per square millimetre)
$E_{0,\text{mean}}$	mean characteristic value of modulus of elasticity parallel to grain (in newtons per square millimetre)
$E_{0,05}$	5-percentile characteristic value of modulus of elasticity parallel to grain (in newtons per square millimetre)
$E_{90,\text{mean}}$	mean characteristic value of modulus of elasticity perpendicular to grain (in newtons per square millimetre)
$E_{\text{mean,acc}}$	mean modulus of elasticity for an acceptable quality lot (in newtons per square millimetre)
$E_{\text{mean,unacc}}$	mean modulus of elasticity for an unacceptable quality lot (in newtons per square millimetre)
f	strength property
$f_{c,0,k}$	characteristic value of compression strength parallel to grain (in newtons per square millimetre)
$f_{c,90,k}$	characteristic value of compression strength perpendicular to grain (in newtons per square millimetre)
f_k	characteristic value of strength (in newtons per square millimetre)