
**Timber structures — Glued
laminated timber — Test methods
for determination of physical and
mechanical properties**

*Structures en bois — Bois lamellé-collé — Méthodes d'essai pour la
détermination de certaines propriétés physiques et mécaniques*

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Contents

Page

Foreword	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Symbols and suffixes	2
4.1 Symbols	2
4.2 Suffixes	3
5 Determination of dimensions of test specimens	3
6 Determination of moisture content of test specimens	3
7 Determination of density of test specimens	4
8 Conditioning of test specimens	4
9 Determination of local (shear-free) modulus of elasticity of the beam in bending	4
9.1 Test specimen	4
9.2 Procedure	4
9.3 Expression of results	5
10 Determination of global modulus of elasticity of the beam in bending	6
10.1 Test specimen	6
10.2 Procedure	6
10.3 Expression of results	7
11 Determination of shear modulus of the beam — Variable span method	7
11.1 General	7
11.2 Test piece	8
11.3 Procedure	8
11.4 Expression of results	9
11.4.1 Determination of K_1 and K_2	9
11.4.2 Shear modulus	9
12 Determination of bending strength of the beam	10
12.1 Test specimen	10
12.2 Procedure	10
12.3 Expression of results	11
13 Determination of the modulus of elasticity in tension parallel to the grain of the glued laminated timber	11
13.1 General	11
13.2 Test specimen	11
13.3 Procedure	11
13.4 Expression of results	12
14 Determination of the parallel to the grain tension strength of the glued laminated timber	12
14.1 Test specimen	12
14.2 Procedure	12
14.3 Expression of results	12
15 Determination of the modulus of elasticity in compression parallel to the grain of the glued laminated timber	13
15.1 General	13
15.2 Test specimen	13
15.3 Procedure	13
15.4 Expression of results	13

16	Determination of the parallel to grain compression strength of the glued laminated timber	14
16.1	Test specimen	14
16.2	Procedure	14
16.3	Expression of results	14
17	Determination of the modulus of elasticity in compression and tension perpendicular to the grain of the glued laminated timber	14
17.1	Requirements for test specimens	14
17.2	Procedure	15
17.3	Expression of results	15
	17.3.1 Compression perpendicular to the grain	15
	17.3.2 Tension perpendicular to the grain	16
18	Determination of tension and compression strengths perpendicular to the grain of the glued laminated timber	17
18.1	Requirements for test specimens	17
	18.1.1 Fabrication	17
	18.1.2 Surface preparation	17
18.2	Procedure	17
18.3	Expression of results	19
	18.3.1 Compression perpendicular to the grain	19
	18.3.2 Tension perpendicular to the grain	20
19	Determination of shear strength parallel to the grain — Small specimen test	20
19.1	Requirements for test specimens	20
	19.1.1 Fabrication	20
	19.1.2 Surface preparation	20
19.2	Procedure	21
19.3	Expression of results	22
20	Determination of shear strength parallel to the grain — Full size beam test	23
20.1	Specimen	23
20.2	Procedure	23
20.3	Expression of result	24
21	Test report	25
21.1	General	25
21.2	Test specimen	25
21.3	Test method	25
21.4	Test results	25
	Bibliography	26

Foreword

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This document was prepared by Technical Committee ISO/TC 165, *Timber structures*.

This third edition cancels and replaces the second edition (ISO 8375:2009), which has been technically revised.

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Timber structures — Glued laminated timber — Test methods for determination of physical and mechanical properties

1 Scope

This document specifies test methods suitable for determining the following characteristic values of glued laminated timber: modulus of elasticity in bending; shear modulus; bending strength; modulus of elasticity in tension parallel to the grain; tension strength parallel to the grain; modulus of elasticity in compression parallel to the grain; compression strength parallel to the grain; modulus of elasticity in tension perpendicular to the grain; tension strength perpendicular to the grain; modulus of elasticity in compression perpendicular to the grain; compression strength perpendicular to the grain and shear strength.

In addition, the determination of dimensions, moisture content and density are specified.

This document is applicable to rectangular shapes of glued laminated timber.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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

- ISO Online browsing platform: available at <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

density

characteristic mean density obtained at a 75 % confidence limit with mass and volume corresponding to equilibrium moisture content at a temperature of 20 °C and a relative humidity of 65 %

Note 1 to entry: ISO 12122-1 and ISO 12122-3 provide guidelines for statistical processing of data to determine characteristic values such as density.

3.2

strength

characteristic lower 5-percentile value at a 75 % confidence limit obtained from the results of tests using test specimens at an equilibrium moisture content resulting from a temperature of 20 °C and a relative humidity of 65 % or the strength value at the observed moisture content when full size members are tested

Note 1 to entry: ISO 12122-1 and ISO 12122-3 provide guidelines for statistical processing of data to determine characteristic values such as strength.

3.3 elasticity

characteristic mean stiffness at a 75 % confidence limit obtained from the results of tests using test specimens at an equilibrium moisture content resulting from a temperature of 20 °C and a relative humidity of 65 %

Note 1 to entry: ISO 12122-1 and ISO 12122-3 provide guidelines for statistical processing of data to determine characteristic values such as elasticity.

3.4 specimen

item to be tested for the determination of all characteristic values

Note 1 to entry: The minimum number of test specimens required for the determination of all characteristic values is provided in ISO 12122-1 and ISO 12122-3, unless otherwise noted for the specific test involved.

3.5 population

specimens (3.4) used to determine characteristic values

Note 1 to entry: Specimens should be reflective of the population they are intended to represent.

4 Symbols and suffixes

4.1 Symbols

A	cross-sectional area, in square millimetres
a	distance between a loading position and the nearest support in a bending test, in millimetres
b	width of cross section in a bending test, or the smaller dimension of the cross section, in millimetres
$E_{c,0}$	modulus of elasticity in compression parallel to the grain, in megapascals
$E_{c,90}$	modulus of elasticity in compression perpendicular to the grain, in megapascals
$E_{m,g}$	global modulus of elasticity in bending, in megapascals
$E_{m,app}$	apparent modulus of elasticity in bending, in megapascals
$E_{t,0}$	modulus of elasticity in tension parallel to the grain, in megapascals
$E_{t,90}$	modulus of elasticity in tension perpendicular to the grain, in megapascals
F	load, in newtons
$F_{c,90,max}$	maximum compressive load perpendicular to the grain, in Newtons
$F_{c,90,max,est}$	estimated maximum compressive load perpendicular to the grain, in Newtons
F_{max}	maximum load, in Newtons
$F_{max,est}$	estimated maximum load, in Newtons
$F_{t,90,max}$	maximum tensile load perpendicular to the grain, in Newtons
$f_{c,0}$	compressive strength parallel to the grain, in megapascals

$f_{c,90}$	compressive strength perpendicular to the grain, in megapascals
f_m	bending strength, in megapascals
$f_{t,0}$	tensile strength parallel to the grain, in megapascals
$f_{t,90}$	tensile strength perpendicular to the grain, in megapascals
f_v	shear strength parallel to the grain, in megapascals
G	shear modulus, in megapascals
h	depth of cross section in a bending test, or the larger dimension of the cross section, or the test specimen height in perpendicular to grain tests, in millimetres
h_0	gauge length, in millimetres
I	second moment of area, in millimetres to the fourth power
K, k	coefficients
k_G	coefficient for shear modulus
l	span in bending, or length of test specimen between the testing machine grips in compression and tension, in millimetres
S	section modulus, in millimetres to the third power
w	deformation, in millimetres

4.2 Suffixes

1, 2 loads or deformations at particular points of a test, referred to as necessary in the text

5 Determination of dimensions of test specimens

The dimensions of the test specimen shall be measured to an accuracy of 1 %. The dimension measuring devices shall be such as to permit measuring dimensions in millimetres to three significant figures. All measurements shall be made when the test specimens are conditioned as specified in [Clause 8](#). If the width or thickness varies within a test specimen, these dimensions should be recorded as the average of three separate measurements taken at different positions on the length of each specimen.

Where possible, the measurements should not be taken closer than 150 mm to the ends of the specimen.

6 Determination of moisture content of test specimens

The moisture content of the test specimen shall be determined on a section taken from the test specimen.

In strength tests for bending, shear, tension parallel and perpendicular to grain and compression parallel and perpendicular to grain, the moisture content of the test specimen shall be determined as soon as practical after testing or the specimen shall be sealed to prevent any further moisture change until testing can be initiated. The section shall be cut as close as possible to the fracture.

As an alternative, the provisions of ISO 3130 or ASTM D4442 may be used for determining moisture content.