
INTERNATIONAL STANDARD



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**Wood — Test methods — Determination of ultimate stress in
compression parallel to grain**

Bois — Méthodes d'essai — Détermination de la contrainte de rupture en compression parallèle aux fibres

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 3787 was drawn up by Technical Committee ISO/TC 55, *Sawn timber and sawlogs*, and was circulated to the Member Bodies in March 1975.

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It has been approved by the Member Bodies of the following countries :

Austria	Ireland	Portugal
Belgium	Italy	Romania
Brazil	Mexico	South Africa, Rep. of
Canada	Netherlands	Spain
Czechoslovakia	New Zealand	Sweden
France	Norway	Turkey
Germany	Pakistan	U.S.S.R.
Hungary	Poland	Yugoslavia

The Member Body of the following country expressed disapproval of the document on technical grounds :

India

Wood — Test methods — Determination of ultimate stress in compression parallel to grain

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method for determining the ultimate stress of wood in compression parallel to grain.

2 REFERENCES

ISO 3129, *Wood — Sampling methods and general requirements for physical and mechanical tests.*

ISO 3130, *Wood — Determination of moisture content for physical and mechanical tests.*

3 PRINCIPLE

Determination of the ultimate stress by testing small clear test pieces in compression parallel to grain until failure occurs, at a gradually increasing compressive load.

4 APPARATUS

4.1 Testing machine ensuring a constant rate of loading of the test piece or constant rate of movement of the loading head and allowing measurement of the load to an accuracy of 1 %.

4.2 Uniform-loading device consisting of two self-aligning plates of hardened steel, whose spherical surfaces obtain uniform distribution of load over the ends of the test piece.

4.3 Measuring instrument, capable of determining the cross-sectional dimensions of the test piece to an accuracy of 0,1 mm.

4.4 Equipment for the determination of moisture content in accordance with ISO 3130.

5 PREPARATION OF TEST PIECES

5.1 Test pieces shall be prepared in the form of right prisms having a square cross-section of side 20 mm and length along the grain from 30 to 60 mm.

5.2 The preparation, moisture content and number of test pieces shall be in accordance with ISO 3129.

6 PROCEDURE

6.1 Measure the cross-sectional dimensions at the mid-point of the long axis of the test piece, to an accuracy of 0,1 mm.

6.2 Load the test piece using the uniform-loading device (4.2). The speed of testing (at a constant rate of loading or constant rate of movement of the loading head of the machine) shall be such that the test piece is broken in 1,5 to 2 min after the start of loading. Continue the test until the test piece is broken. Determine the maximum load (P_{max}), to an accuracy in accordance with that specified in 4.1.

6.3 After the test has been completed, determine the moisture content of the test pieces according to ISO 3130.

Take the whole test piece as the sample for the determination of moisture content. To determine the mean moisture content it is permissible to use only some of the test pieces. Calculate the minimum number of the test pieces to be used for the determination of moisture content in accordance with ISO 3129.

7 CALCULATION AND EXPRESSION OF RESULTS

7.1 The ultimate stress in compression parallel to grain, σ_w , of each test piece at a moisture content W at the time of test, shall be calculated, in megapascals,¹⁾ by the formula :

$$\sigma_w = \frac{P_{max}}{a \times b}$$

where

P_{max} is the maximum load, in newtons;

a and b are the cross-sectional dimensions of the test piece, in millimetres.

Express the result to the nearest 0,5 MPa.

1) 1 MPa = 1 N/mm²

7.2 When necessary, the ultimate stress, σ_W , shall be adjusted to a 12 % moisture content to the nearest 0,5 MPa by the following formula which is valid for a moisture content of 12 ± 3 % :

$$\sigma_{12} = \sigma_W [1 + \alpha (W - 12)]$$

where

α is the correction factor for the moisture content for the ultimate stress in compression parallel to grain, whose value shall be obtained from national standards;

W is the moisture content of the wood calculated according to ISO 3130.

7.3 The mean ultimate stress of the tested specimens shall be calculated to the nearest 0,5 MPa as the arithmetic mean of the test results of the individual test pieces.

8 TEST REPORT

The test report shall contain the following particulars :

- a) a reference to this International Standard;
- b) details concerning sampling of the test pieces;
- c) details in accordance with 6.4 of ISO 3129;
- d) dimensions of the test piece;
- e) the mode of failure;
- f) the test results, calculated in accordance with clause 7, and their statistical values;
- g) the value of coefficient α , used for the adjustment of the test results to a 12 % moisture content.

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