INTERNATIONAL STANDARD ISO 3345

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Wood — Determination of ultimate tensile stress parallel to grain

Bois — Détermination de la contrainte de rupture en traction 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 3345 was drawn up by Technical Committee ISO/TC 55, *Sawn timber and sawlogs,* and circulated to the Member Bodies in December 1973.

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

Austria	Germany	Romania
Belgium	Hungary	South Africa, Rep. of
Bulgaria	India	Spain
Canada	Ireland	Sweden
Chile	Italy	Thailand
Czechoslovakia	Netherlands	Turkey
Egypt, Arab Rep. of	New Zealand	United Kingdom
Finland	Norway	U.S.S.R.
France	Poland	Yugoslavia

No Member Body expressed disapproval of the document.

Wood — Determination of ultimate tensile stress parallel to grain

1 SCOPE AND FIELD OF APPLICATION

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

2 REFERENCES

ISO 3129, *Wood — Sampling methods and general requirements for physical and mechanical tests.* [1]

ISO 3130, *Wood — Determination of moisture content in physical and mechanical tests.* [1]

3 PRINCIPLE

Determination of the ultimate tensile stress parallel to grain by application of a gradually increasing load to a test piece.

4 APPARATUS

4.1 Testing machine ensuring the rate of loading of the test piece or of movement of the loading head according to 6.2 and allowing measurement of the load to 1 %.

The grips shall ensure that the load is applied along the longitudinal axis of the test piece and shall prevent longitudinal twisting of the test piece.

4.2 Measuring instrument for determining the cross-sectional dimensions of the test piece gauge portion to an accuracy of 0,1 mm.

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

5 PREPARATION OF TEST PIECES

5.1 The general direction of the wood grain in blanks for test pieces shall be parallel to the longitudinal axis of the gauge portion. The gauge portion shall have a rectangular cross-section with dimensions from 10 to 20 mm in the radial direction and from 5 to 10 mm in the tangential direction. The gauge length of the test piece shall be from 50 to 100 mm.

The ends of the test pieces shall be so shaped as to ensure that the failure occurs within the gauge portion and to minimize stress concentration in the transition area.

It is permitted to use test pieces with laminated ends.

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 of the gauge portion of the test piece to an accuracy of 0,1 mm.

6.2 Clamp the ends of the test piece between the grips of the testing machine (4.1) at a distance of 20 to 25 mm from the gauge portion. Load the test piece at constant rate. The rate of testing (with a constant rate of loading or a constant rate of movement of the machine loading head) shall be such that the test piece is broken in 1,5 to 2 min from the moment of loading. Read the maximum load to the accuracy specified in 4.1.

Discard results obtained on test pieces which fail outside the gauge portion.

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

Take the gauge portion of the test piece as the sample for determination of moisture content. The size of the sample may differ from that recommended in ISO 3130. To determine the mean moisture content, it is permissible to use only some of the test pieces. The minimum number of test pieces for moisture content determination shall be in accordance with ISO 3129.

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1) At present at the stage of draft.

7 CALCULATION AND EXPRESSION OF RESULTS

7.1 The ultimate tensile stress parallel to grain, σ_W, of each test piece at a moisture content W at the time of test, is given, in megapascals, by the formula :

$$\sigma_W = \frac{P_{max}}{bh}$$

where

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

b and h are the cross-sectional dimensions of the gauge portion of the test piece, in millimetres.

Express the result to an accuracy of 1 MPa.

7.2 When necessary, the ultimate stress, σ_W, shall be adjusted to a 12 % moisture content to an accuracy of 1 MPa according to the following formula which is valid for a moisture content of 12 ± 3 % :

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

where α is the correction factor for moisture content, whose value shall be obtained from national standards.

7.3 The average ultimate tensile stress parallel to grain of the test pieces shall be calculated to an accuracy of 1 MPa as the arithmetic mean of the test results obtained on individual test pieces.

8 TEST REPORT

The test report shall include the following particulars :

a) a reference to this International Standard;

b) details in accordance with 6.4 of ISO 3129;

c) the method of loading (the rate of loading or the rate of movement of the machine loading head);

d) a description and the volume of the material submitted (the stand and the number of trees sampled, the lot of sawn timber and the number of boards sampled);

e) the method of manufacturing the test piece, its dimensions and shape;

f) the number of test pieces tested;

g) the number of test pieces which failed outside the gauge portion;

h) the test results calculated as specified in clause 7, and their statistical values;

i) if necessary, the value of the coefficient α used in 7.2 for the adjustment of the test results to a 12 % moisture content;

j) the date when the test was carried out;

k) the name of the organization which carried out the test.