INTERNATIONAL STANDARD 3346

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Wood — Determination of ultimate tensile stress perpendicular to grain

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FOREWORD

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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 3346 was drawn up by Technical Committee ISO/TC 55, *Sawn timber and sawlogs*, and circulated to the Member Bodies in February 1974.

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

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

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

Germany

Printed in Switzerland

Wood — Determination of ultimate tensile stress perpendicular to grain

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method for determining the ultimate tensile stress of wood perpendicular to grain in the radial and tangential directions.

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 perpendicular to grain by the application of a gradually increasing load to a test piece.

4 APPARATUS

4.1 Tensile 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 of the machine 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 gauge portion of test pieces 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 gauge portion of the test piece shall have a rectuangular or square cross-section with one dimension from 10 to 25 mm, and the other from 20 to 50 mm. If the gauge portion is in the form of a right prism, its length shall be not less than 5 mm. If not, the radius of curvature between the ends shall be not less than 12 mm. The ends shall be shaped to ensure the failure of the test piece within the gauge portion.

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 at a distance of 10 to 15 mm from the gauge portion.

Load the test piece at a constant rate. The rate of testing (with a constant rate of loading or a 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 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. 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.

1) At present at the stage of draft.

7 CALCULATION AND EXPRESSION OF RESULTS

7.1 The ultimate tensile stress perpendicular 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 :

$$\sigma_W = \frac{P_{max}}{b\,h}$$

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 0,01 MPa.

7.2 When necessary, the ultimate stress, σ_W, shall be adjusted to a 12 % moisture content to an accuracy of 0,01 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 moisture content, whose value shall be obtained from national standards.

7.3 The average ultimate tensile stress perpendicular to grain of the test pieces shall be calculated to an accuracy of 0,01 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) reference to this International Standard;

b) details in accordance with 6.4 of ISO 3129;

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

d) description and 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) shape and dimensions of test pieces;

f) number of test pieces tested;

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

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

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

j) date when the test was carried out;

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