# INTERNATIONAL STANDARD 3133

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION·МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ·ORGANISATION INTERNATIONALE DE NORMALISATION

# Wood — Determination of ultimate strength in static bending

*Bois — Détermination de la résistance à la flexion statique*

First edition — 1975-11-01



UDC 674.03 : 539.384

Ref. No. ISO 3133-1975 (E)

**Descriptors** : wood, tests, bend tests, breaking load, flexural strength, physical tests, mechanical tests.



Price based on 2 pages

## 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 3133 was drawn up by Technical Committee ISO/TC 55, *Sawn timber and sawlogs*, and circulated to the Member Bodies in June 1973.

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

| | | |
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| Australia | Germany | Romania |
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| Belgium | India | Sweden |
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The Member Body of the following country expressed disapproval of the document on technical grounds :

Japan





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# Wood — Determination of ultimate strength in static bending

## 1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method for determining the ultimate strength of wood in static bending.

## 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 maximum load required to cause rupture of the test piece 1,5 ± 0,5 min from the beginning of loading, and estimation of the stress at this load.

## 4 APPARATUS

**4.1 Testing machine** capable of measuring load to the nearest 1 %.

**4.2 Device** capable of ensuring bending of the test piece by applying a load to its side surface mid-way between the centres of the device supports. The radius of curvature of the supports and a loading shoe shall be 30 mm.

**4.3 Measuring instrument** capable of determining the cross-sectional dimensions of the test pieces 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 of 300 to 380 mm.

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

## 6 PROCEDURE

**6.1** Mid-way along the test piece, measure the breadth in a radial direction and the height in a tangential direction to an accuracy of 0,1 mm.

**6.2** Carry out the test with the ratio of the distance between the centres of the device supports and the test piece height being from 12 to 16. Apply the bending load to a radial surface of the test piece (tangential bending) mid-way between the supports.

**6.3** The loading of test pieces shall be carried out uniformly at constant speed. The speed of testing (at 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 ± 0,5 min from the beginning of loading. Determine the maximum load $P_{max}$ to an accuracy which shall not exceed that specified in 4.1.

**6.4** After the test has been carried out determine the moisture content of the test pieces, when required, in accordance with ISO 3130.

Take, as the sample for the determination of moisture content, a portion of the test piece 25 ± 5 mm long, cut from near the point of rupture. To determine the mean moisture content, it is permissible to use only some of the test pieces. Calculate the minimum number of test pieces for the determination of moisture content in accordance with ISO 3129.

## 7 CALCULATION AND EXPRESSION OF RESULTS

**7.1** The ultimate strength in static bending $\sigma_{bW}$ at the moisture content, $W$, at the time of test is given, in megapascals, by the formula :

$$\sigma_{bW} = \frac{3P_{max}l}{2bh^2}$$

where

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

$l$ is the distance between the centres of the supports, in millimetres;

$b$ is the breadth of the test piece, in millimetres;

$h$ is the height of the test piece, in millimetres.

Express the result to an accuracy of 1 MPa.