

INTERNATIONAL STANDARD

ISO 9087

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Wood — Determination of nail and screw holding power under axial load application

*Bois — Détermination de la résistance à l'arrachement des pointes et des
vis à bois à l'application axiale de la charge*

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ISO 9087:1998(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 9087 was prepared by Technical Committee ISO/TC 165, *Timber structures*.

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Wood — Determination of nail and screw holding power under axial load application

1 Scope

This International Standard specifies a method for determining the specific resistance of wood to the extraction of nails and screws.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3129:1975, *Wood — Sampling methods and general requirements for physical and mechanical tests.*

ISO 3130:1975, *Wood — Determination of moisture content for physical and mechanical tests.*

ISO 3131:1975, *Wood — Determination of density for physical and mechanical tests.*
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3 Principle

Determination of the maximum axial force required to extract a nail or a screw, and calculation of the specific resistance of the wood as a ratio of this force to the depth of nail or screw penetration.

4 Apparatus

4.1 Testing machine, capable of measuring the load to an accuracy of ± 1 %.

4.2 Device for extracting nails and screws, capable of ensuring the application of the extraction force along their axes.

4.3 Measuring instrument, capable of measuring the diameter of nails and screws to an accuracy of $\pm 0,1$ mm.

4.4 Measuring instrument, capable of measuring linear dimensions to an accuracy of ± 1 mm.

4.5 Equipment for determining the moisture content, in accordance with ISO 3130.

5 Preparation of test pieces

5.1 Test pieces shall be cut in the form of a rectangular prism with square sections having dimensions no smaller than those shown in figure 1.

Dimensions in millimetres

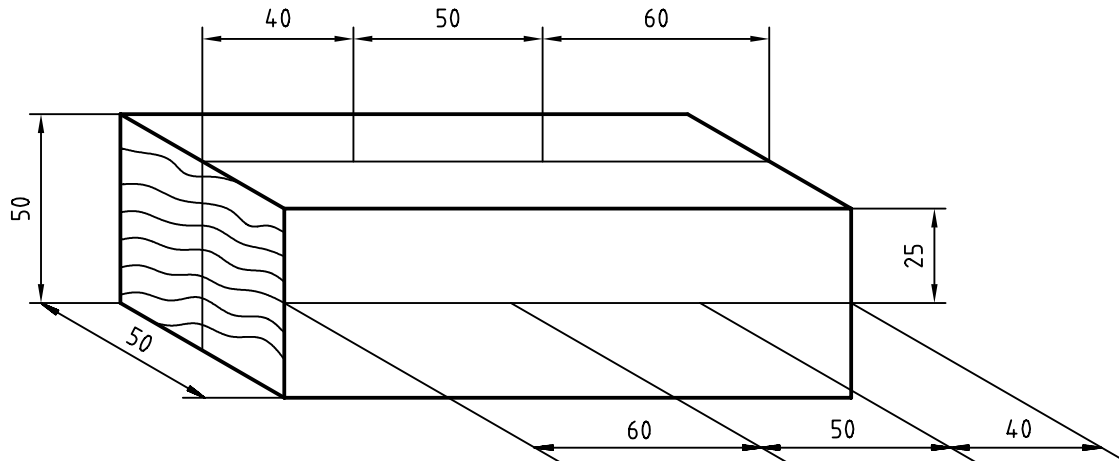


Figure 1 — Marking of test piece for insertion of nails or screws

When test pieces of other dimensions are used, the area for the insertion of nails or screws shall be as close as possible to the central vertical axis of the test piece. Test pieces shall have sufficient dimensions to avoid splitting when the nails or screws are being hammered or screwed.

5.2 Holes for screws shall be drilled so as to ensure insertion of the screws by hand. Diameters of the holes shall be of a size which provides optimal screwing force consistent with maximum resistance to extraction. The drilling depth shall not be less than the length of the screw thread.

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

5.4 The characteristics of the nails or screws shall be recorded in the test report. Nails and screws selected shall be free of oil or grease.

It is not permissible to use rusted, distorted, blunted, or asymmetric (in relation to the head) nails and screws.

Each nail or screw shall be used for only one test.

6 Procedure

max, to an accuracy of $\pm 1\%$.

6.3 After completion of testing, determine the moisture content of the test pieces in accordance with ISO 3130. Take as a sample a length of 5 mm, cut from the central portion of the test piece. The minimum number of test pieces for determination of moisture content shall be in accordance with ISO 3129.

Test pieces with a moisture content which differs from the standardized value by more than 2 % shall be rejected.

6.4 If necessary, determine the density of specimens in accordance with ISO 3131.

7 Calculation and expression of results

7.1 Calculate the specific resistance of the wood to the extraction of nails or screws, σ_w , with a moisture content, W , at the time of testing, in newtons per millimetre, using the formula

$$\sigma_w = \frac{F_{\max}}{l}$$

where

F_{\max} is the maximum load, in newtons;

l is the depth of penetration of a nail or screw, in millimetres.

Express the result to the nearest 0,1 N/mm.

7.2 Take the arithmetic mean of the results of two determinations on each surface of each test piece, as the specific resistance of the wood to the extraction of nails or screws. If the values of these two determinations differ by more than 10 % relative to their arithmetic mean, this should be noted in the test report.

8 Test report

The test report shall contain the following information:

- a) reference to this International Standard with an indication of test purpose;
- b) information concerning the sampling of the test pieces, in accordance with ISO 3129;
- c) dimensions of the test pieces and a diagram showing insertion of nails or screws;
- d) number of test pieces used, their moisture content, density and hole diameter;
- e) characteristics and number of nails or screws tested (type, sizes, material, surface coating, and other particulars);
- f) test results, calculated in accordance with clause 7, and their statistical parameters;
- g) date of testing;
- h) name of organization responsible for testing.

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