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Physical and mechanical properties of wood — Test methods for small clear specimen —

Part 1:
Determination of moisture content for physical and mechanical tests

Propriétés physiques et mécaniques du bois — Méthodes d'essai sur petits modules —

Partie 1: Détermination de l'humidité en vue des essais physiques et mécaniques

(Revision of ISO 3130:1975)

ICS 79.040

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Foreword

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committee 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.

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This International Standard ISO 13061-1was prepared by Technical Committee ISO/TC 218: *Timber*, This ISO 13061-1 cancels and replaces the ISO 3130:1975, which has been technically revised.

Introduction

The main purpose of this International Standard is to establish the common international point of member countries of international organization for standardization (ISO), concerning testing methods for small clear wood specimens and general requirements for determining physical and mechanical properties of wood.

This International Standard is the first revision of the ISO 3130:1975 Wood – Determination of moisture content for physical and mechanical tests which has been approved for revision by the technical committee ISO/TC 218 – Timber during the 6th plenary meeting in Lviv, Ukraine. Countries that have voted for this approval of this revision include Belarus, Canada, China, Japan, Malaysia, New Zealand, Nigeria, Russia, Ukraine,U.S.A.

Physical and Mechanical Properties of Wood – Test Methods for Small Clear Specimens -- Part 1 : Determination of moisture content for physical and mechanical tests

1 Scope

This International Standard specifies oven drying methods for determining the moisture content of wood for physical and mechanical tests on small clear specimens.

2 Normative references

The following referenced document is indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3130:1975 Wood – Determination of moisture content for physical and mechanical tests

3 Terms and definitions

For the purpose of this International Standard, the definitions below and those contained in ISO 24294: (under revision) Round and Sawn Timber — Vocabulary apply.

3.1
Moisture Content

The amount of water contained in the wood, usually expressed as a percentage of the mass of moisture in wood expressed as a percentage of its oven-dry mass .

4 Principle

Moisture content is one of the most important variables affecting the physical and mechanical properties of wood. The procedure described in this standard is designed for obtaining the most precise values of moisture content consistent with the needs of the user.

The determination of moisture content is by weighing the test piece before and after drying to a constant mass. Moisture content is calculated based on the loss in mass as a percentage of the mass of the test piece after drying.

The moisture content of wood can be expressed as a percentage of oven-dry mass of the sample (oven-dry basis) or as a percentage of initial mass (wet basis). The method describes in this standard refer to the oven-dry basis; thus the moisture content values may exceed 100%.

The procedures described in this standard are designed for obtaining the values of moisture content consistent with the needs of the user at two different levels of precision: to the nearest 1% or 0,1% (see Clause 7).

5 Apparatus

5.1 Balance – capable of weighing to the nearest 0,01g (or 0,001g for testing under 7.5)

5.2 Oven - A forcedconvection oven that can be maintained at a temperature of (103 ± 2) °C throughout the drying chamber for the time required to dry the specimen to the endpoint, shall be used. Ovens shall be vented to allow the evaporated moisture to escape.

5.3 Desiccators – A vapor-tight container containing silica gel, to maintain the air as close as possible to the absolutely dry condition.

6 Preparation of test pieces

6.1 Test pieces for determination of moisture content shall be prepared from material selected in accordance with ISO 3129, and made preferably in the form of right prisms having a square cross-section of side 20 mm and length along the grain of (25 ± 5) mm. After preparation, the test pieces shall be stored under conditions which ensure that their moisture content remains unchanged. The minimum number of test pieces shall be in accordance with ISO 3129.

6.2 To determine MC of test specimens for other physical or mechanical tests and/or to determine the relationship between MC and other properties of wood, the specimens made for other tests or samples cut from them shall be used.

The form, dimensions and method of taking samples depend on the form and dimensions of the test specimens. At least one test piece per test specimen shall be taken near the point of interest (e.g. in the vicinity of the failure zone in destructive tests).

7 Procedure

7.1 Weigh the test piece to the nearest 0,01g (or 0,001g for testing under 7.5)

7.2 Dry the test piece to constant mass at a temperature of (103± 2)°C.

NOTE Constant mass is considered to be reached when the results of two successive weighing operations, carriedat a minimum interval of 6 h, do not differ by more than 0,1 % of the mass of the test pieces.

7.3 Test pieces for wood species containing volatile organic substances (resins, gums, etc.) in quantities exceeding the error of the determination shall be vacuum-dried.

7.4 Dried test pieces shall be cooled and weighed as soon as possible to minimize moisture content uptake. All weighing shall be carried out to the nearest 0,01 g. If higher precision is necessary, guidelines of 7.5 shall be followed.

7.5 If it is necessary to determine the moisture content with precision of 0,1 %, all weighing shall be carried out using closed weighing jars to the nearest 0,001 g.

8 Calculation and expression of results

8.1 The moisture content, MC, of each test piece shall be calculated to the nearest 1 % from the formula:

$$MC = \frac{m_1 - m_2}{m_2} \times 100 \quad (1)$$

where

m_1 is the initial mass of the test piece before drying, g, and

m_2 is the oven-dry mass of the test piece, g.

8.2 If it is necessary to determine the moisture content to the nearest 0,1% using jars, the following formula shall be used:

$$MC = \frac{m_1 - m_2}{m_2 - m_0} \times 100 \quad (2)$$

where

$m_o$is the mass of the flask, g;

m_1 is the mass of the flask containing the test piece before drying, g, and

m_2 is the mass of the flask containing the test piece after drying, g.

8.3 Calculate the arithmetic mean and standard deviation of the results obtained for the individual test pieces.

9 Test report

The test report shall include the following particulars :

a) a reference and the level of the precision used to this International Standard;

b) details concerning sampling of the test pieces;

c) sampling details in accordance with ISO 3129;

d) the average value and the standard deviation for the moisture content of the test pieces as calculated in clause 8.