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

Part 12: Determination of static hardness

Propriétés physiques et mécaniques du bois — Méthodes d'essais sur petites éprouvettes de bois sans défauts —

Partie 12: Détermination de la dureté statique

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 218, *Timber*.

This first edition of ISO 13061-12 cancels and replaces ISO 3350:1975, which has been technically revised with regards to the sizes, moisture content of test pieces, and adjustment for moisture content.

A list of all parts in the ISO 13061 series can be found on the ISO website.

Introduction

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

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

Part 12: Determination of static hardness

1 Scope

This document specifies a method for determining of the static hardness of wood by measuring resistance of a test piece to the penetration of a plunger under gradually increasing load.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 3129, *Wood — Sampling methods and general requirements for physical and mechanical tests*

ISO 13061-1, *Physical and mechanical properties of wood — Test methods for small clear specimens — Part 1: Determination of moisture content for physical and mechanical tests*

ISO 13061-2, *Physical and mechanical properties of wood — Test methods for small clear specimens — Part 2: Determination of density for physical and mechanical tests*

ISO 24294, *Timber — Round and sawn timber — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 24294 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

4 Principle

The static hardness of wood is determined by measuring the resistance of a test piece to the penetration of a plunger to a specified depth under gradually increasing load.

5 Apparatus

5.1 Testing machine, ensuring the rate of movement of the loading head according to 7.1 and allowing measurement of the load to a precision of 1 %.

5.2 Device consisting of a body, a plunger with a hemispherical tip of radius 5,64 mm ± 0,01 mm, and an instrument for measuring linear movements to a precision of 0,01 mm.

5.3 Equipment for the determination of moisture content and density in accordance with ISO 13061-1 and ISO 13061-2, respectively.

6 Preparation of test pieces

6.1 The sampling and preparation of test pieces shall be in accordance with ISO 3129.

6.2 The test pieces shall be prepared in the form of right prisms having a square cross-section of 50 mm × 50 mm and the length along the grain not less than 50 mm.

If the static hardness is measured in all three directions, the length along the grain shall be at least 50 mm. If only one side is tested, then the height of the test piece in the direction of loading may be reduced as long as splitting does not occur and the test face shall be 50 mm × 50 mm.

6.3 Moisture content of test pieces

6.3.1 Test pieces can be tested in green or in air-dry condition.

6.3.2 The moisture content of test pieces tested in green condition shall be equal or exceed fibre saturation point (FSP).

6.3.3 Test pieces tested in air-dry condition shall be conditioned to a constant mass in an atmosphere with a relative humidity of (65 ± 5) % and a temperature of (20 ± 2) °C.

NOTE Constant mass is considered to be reached when the results of two successive weighing operations, carried out at an interval of 8 h, do not differ by more than 0,2 % of the mass of the test piece.

6.3.4 After preparation, the test pieces shall be stored under conditions, which ensure that their moisture content remains unchanged before testing.

7 Procedure

7.1 Apply the load to the plunger on the centre line of the radial, tangential or end surface of the test piece at a constant speed of 3 mm/min to 6 mm/min. When the depth of indentation equal to the radius of the hemispherical tip of the plunger (5,64 mm) or, if splitting of the test piece occurs, to a depth of 2,82 mm, is reached, read the load to the accuracy specified in 5.1.

NOTE Starting point of the indentation is determined when the plunger physically contacts the test piece and the load increases, or is about to continuously increase.

7.2 As soon as the test has been completed, cut a portion of the test piece having indentation marks as the test piece for the determination of moisture content in accordance with ISO 13061-1. Density shall be determined using the undamaged portion of the test piece in accordance with ISO 13061-2.

8 Calculation and expression of results

8.1 The static hardness, H_W, of each test piece at a moisture content, W, at the time of test, shall be calculated as the load, in Newtons, necessary to obtain an indentation whose area of projection is equal to 1 cm^2, using Formula (1):

$$H_W = K \times F \tag{1}$$

where

