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# International Standard



# 4470

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

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## Sawn timber — Determination of the average moisture content of a lot

*Bois sciés — Détermination de l'humidité moyenne d'un lot*

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**Descriptors** : wood, sawn timber, physicochemical tests, measurement, humidity, test specimen conditioning.

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

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 4470 was developed by Technical Committee ISO/TC 55, *Sawn timber and sawlogs*, and was circulated to the member bodies in March 1980.

It has been approved by the member bodies of the following countries :

Austria	France	New Zealand
Belgium	Germany, F.R.	Norway
Brazil	Ghana	Poland
Bulgaria	Hungary	Portugal
Canada	India	Romania
Czechoslovakia	Italy	Turkey
Egypt, Arab Rep. of	Korea, Rep. of	USSR
Finland	Mexico	Yugoslavia

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Ireland  
Netherlands  
South Africa, Rep. of  
Sweden

# Sawn timber — Determination of the average moisture content of a lot

## 1 Scope and field of application

**1.1** This International Standard specifies two methods for the determination of the average moisture content of a homogeneous lot of sawn timber of the same cross-section.

**1.2** The method using an electrical moisture meter is applicable to timber having moisture contents from 7 to 28 % (m/m), and does not require cutting of the test pieces. The method cannot be used for determining the moisture content of frozen sawn timber.

If measuring the moisture content of sawn timber having a wet surface, due to water or to a surface protection treatment, the electrical moisture meter should be used with electrode needles that are covered, except for their tips, with an insulated coating.

**1.3** The method by drying requires cutting of the test pieces. It is applicable irrespective of the moisture content, and is the only method applicable in cases of dispute.

## 2 Reference

ISO 2859, *Sampling procedures and tables for inspection by attributes*.

## 3 Principle

### 3.1 Method using an electrical moisture meter

Measurement of the electrical resistance or conductance of the test pieces, using an electrical moisture meter to relate the resistance or conductance measured to the moisture content.

### 3.2 Method by drying

Determination of the loss in mass after drying test pieces until absolutely dry.

## 4 Electrical moisture meter method

### 4.1 Apparatus

**4.1.1 Moisture meter**, of any design, calibrated for the species of wood concerned, and capable of making an individual measurement with an error of not more than  $\pm 2\%$  (m/m) at moisture contents from 7 to 28 % (m/m).

### 4.2 Sampling

Take samples at random in accordance with ISO 2859, table 1 general inspection level II. The type of inspection is normal.

### 4.3 Procedure

**4.3.1** Measure the moisture content of the test pieces in the middle of the width of each face, at a distance not less than 0,5 m from either end.

Select the measuring areas at random, the number being not less than two for test pieces more than 1,5 and up to 2,5 m long, not less than three for test pieces more than 2,5 and up to 4 m long, and not less than four for test pieces more than 4 m long.

The measuring areas shall not contain any dirt or visible wood defects.

Drive the electrodes into the wood so that the line between the tips of the needles lies in the direction of, or perpendicular to, the grain, according to the design of the electrical moisture meter.

**4.3.2** Make at least three measurements in each measuring area, 10 to 15 mm apart, to avoid any accidental error due to the electrodes piercing an inner invisible defect of the wood. Take as the result the arithmetic mean of three readings closest in their values.

### 4.4 Calculation and expression of results

Calculate the mean of the individual measurements, and express the average moisture content,  $\bar{W}$ , of the lot, or of one board, as a percentage by mass, to the nearest 1 %.

## 5 Drying method

### 5.1 Apparatus

5.1.1 **Balance**, accurate to 0,1 g.

5.1.2 **Equipment for drying wood**, ensuring free internal circulation of air and capable of maintaining a temperature of  $103 \pm 2$  °C.

5.1.3 **Desiccators**, containing a hygroscopic substance.

5.1.4 **Moisture-proof film or glass vessels**, preferably of capacity 2 to 3 dm<sup>3</sup>, capable of being hermetically sealed.

### 5.2 Sampling

Take samples at random in accordance with ISO 2859, table 1, special inspection level S-4. The type of inspection is normal.

### 5.3 Preparation of test pieces

Saw one test piece from each sample.

Each test piece shall consist of a 20 mm length taken in the direction of the grain and of full cross-section. The test pieces shall be sawn from any portion of sample, at a distance not less than 0,5 m from either end.

The test pieces shall be free from bark and defects in the wood.

### 5.4 Procedure

5.4.1 For determination of the average moisture content of the lot, weigh all the test pieces free from sawdust and burrs, at one time, to an accuracy of at least 1 %. If it is desired to determine the variability of the moisture content, weigh each test piece separately.

5.4.2 In exceptional cases, when it is not possible to weigh the test pieces immediately after cutting, place them in previously tared packets of moisture-proof film (5.1.4) or in previously tared glass vessels (5.1.4). The packets and vessels shall be filled as far as possible and shall be hermetically sealed. Determine the masses of the test pieces by difference.

5.4.3 Dry the weighed test pieces at a temperature of  $103 \pm 2$  °C, checking by repeated weighings of two or three control pieces. The test pieces are considered to be absolutely

dry when, for each control piece, the difference in mass between two successive weighings separated by an interval of 6 h is less than 1 %.

5.4.4 Cool the dried test pieces to room temperature in the desiccators (5.1.3) and weigh as described in 5.4.1.

NOTE — It is also permissible to weigh the test pieces immediately after removal from the oven, without cooling in the desiccators.

### 5.5 Calculation and expression of results

5.5.1 Calculate the moisture content,  $W$ , as a percentage by mass, using the formula

$$W = \frac{m_1 - m_2}{m_2} \times 100$$

where

$m_1$  is the mass, in grams, of sample taken (i.e. one test piece, all the test pieces, or part of the test pieces) before drying;

$m_2$  is the mass, in grams, of the same sample after drying.

Express the result to the nearest 0,1 % ( $m/m$ ).

5.5.2 Calculate the average moisture content,  $\bar{W}$ , of the lot, as a percentage by mass, as the arithmetic mean of the moisture contents of all the test pieces.

Express the result to the nearest 1 % ( $m/m$ ).

## 6 Test report

The test report shall include the following information :

- a) a reference to this International Standard;
- b) the method used;
- c) the characteristics of the electrical moisture meter, if used;
- d) information on the selection of test pieces;
- e) the results obtained in accordance with 4.4 or 5.5 including the individual values;
- f) the date of the test;
- g) the name of the organization responsible for the test.