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

Part 18: Vocabulary

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

Partie 18: Vocabulaire

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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.

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

This first edition of ISO 13061-18 cancels and replaces ISO 9086-1:1987, which has been technically revised. The main changes compared to the previous edition are as follows:

— title of the document has been changed to reflect the content;

— the content covers all common terminologies used in the sampling and test methods of small clear wood specimens;

— the terminologies were divided into four categories: general terms commonly used in test methods, terms related to wood macrostructure, physical and to mechanical tests properties.

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

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document defines terms which are commonly used in sampling and testing of small clear wood specimen for physical and mechanical properties. The need to be able to comprehend and communicate clearly and precisely on the methods of sampling and testing of physical and mechanical characteristics of wood is of prime importance because of the great variety of species, variability of the material, advancement of equipment and testing facility, and many other factors that may affect the test results. Only with good similar understanding on the methods of sampling and testing that the test data from various sources can be scientifically compared and inferred.

This document has been revised into a single standard document for terminologies related to testing of small clear wood specimens for physical and mechanical characteristics of wood.

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

Part 18: Vocabulary

1 Scope

This document lists the terms and definitions relating to general concepts, macrostructure, sampling, and methods of physical and mechanical testing of wood. Other terminologies that are not mentioned in this standard are defined in ISO 24294.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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

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

3.1 Common terms relating to wood macrostructure

3.1.1
annual ring
growth ring (3.1.2) corresponding to an annual period of growth

[SOURCE: ISO 24294:2021, 9.9, modified — Note 1 to entry was deleted.]

3.1.1.1
annual ring width
distance, measured radially, between boundaries of adjacent *annual rings* (3.1.1) of wood

3.1.2
growth ring
layer of wood produced in one growing season

[SOURCE: ISO 24294:2021, 9.8, modified — Note 1 to entry was deleted.]

3.1.2.1
growth ring width
distance, measured radially, between boundaries of adjacent *growth rings* (3.1.2)

Note 1 to entry: The width of *growth rings* (3.1.2) depends on the tree species and on growing conditions. In temperate growth zones, growth rings correspond to *annual rings* (3.1.1).

3.1.3
juvenile wood
wood formed during the early years, found at the centre of the stem and branches, possessing physical and mechanical properties different from those of wood formed later

3.1.4
latewood content
portion of *growth ring* (3.1.2) or *annual ring width* (3.1.1.1) occupied by the late wood

3.1.5
wood macrostructure
wood structure which may be examined with the unaided eye or by means of a magnifier

3.2 General terms relating to testing of wood

3.2.1
clear wood
free of defects and imperfections

3.2.2
conditioning of wood
seasoning of wood at atmospheric pressure with constant set temperature and relative humidity until equilibrium moisture content is reached

3.2.3
longitudinal
parallel to the grain of wood

Note 1 to entry: Generally, *test pieces* (3.2.10) are cut with their long axis along the grain of wood.

3.2.4
mechanical properties of wood
quantitative characteristic relating a response of a *test piece* (3.2.10) to applied forces or deformations

EXAMPLE Strength, modulus of elasticity.

3.2.5
physical properties of wood
quantitative characteristic relating a condition of a *test piece* (3.2.10) and not involving in its manifestation a chemical change

EXAMPLE Density, moisture content.

3.2.6
radial
perpendicular to the *growth rings* (3.1.2) or parallel to the rays of wood

Note 1 to entry: In practice, it often means roughly perpendicular to the *growth rings* (3.1.2).

3.2.7
sampling
process of selecting wood sections from logs or sawn timber to represent the population for the purpose of testing

Note 1 to entry: Methods for the extensive and limited sampling of wood, conditioning and preparation of *test pieces* (3.2.10) are described in ISO 3129.

3.2.8
straight-grained wood
wood in which the fibres run essentially parallel to the long axis of a piece

3.2.9
tangential
parallel to the *growth rings* (3.1.2) or perpendicular to the rays of wood

Note 1 to entry: In practice, it often means roughly parallel to the *growth rings* (3.1.2).

3.2.10
test piece
test specimen
specimen
unit or section of definite dimensions and shape intended for tests

Note 1 to entry: Usually cut from a wood piece with direction generally parallel to the grain of wood or the long axis of a work piece *sample* (3.2.13).

3.2.10.1
full-size test piece
test piece (3.2.10) of identical size to the product or differing in length only

3.2.10.2
side plane of the test piece
side surface of the *test piece* (3.2.10)

3.2.10.3
small clear test piece
small clear test specimen
small clear wood specimen
test piece (3.2.10) of small cross-section of the *clear wood* (3.2.1), *straight-grained wood* (3.2.8)

3.2.11
transverse section
cross-section
section perpendicular to the wood grain

Note 1 to entry: Usually perpendicular to the long axis of the *test piece* (3.2.10).

3.2.12
working section
working part of the test piece
section of the *test piece* (3.2.10) where the effect of the characteristic being investigated is most important

3.2.13
workpiece sample
unit or part of products intended for preparation of *test piece* (3.2.10)

3.3 Common terms relating to physical tests

3.3.1
dimensional stability
ability to resist changes in dimension and volume with variation in *moisture content* (3.3.5)

3.3.2
density
mass per volume of a *test piece* (3.2.10) at a specified *moisture content* (3.3.5)

Note 1 to entry: Influenced by rate of growth, percentage of late wood and in individual pieces, the proportion of heartwood.

Note 2 to entry: The *moisture content* (3.3.5) is specified for both mass and volume.

Note 3 to entry: Usually expressed in kg/m^3 or g/cm^3.

3.3.2.1
density in the absolutely dry condition
oven-dry density
density (3.3.2) based on oven-dry mass and oven-dry volume of a *test piece* (3.2.10)

[SOURCE: ISO 13061-2:2014, 3.2]

3.3.2.2
density at specified moisture content
density (3.3.2) based on mass of a test piece including moisture and its volume at the same *moisture content* (3.3.5)

[SOURCE: ISO 13061-2:2014, 3.3]

3.3.2.3
basic (conventional) density
density (3.3.2) based on oven-dry mass of a test piece and its *green volume* (3.3.4)

[SOURCE: ISO 13061-2:2014, 3.4]

3.3.4
green volume
volume of a test piece at *moisture content* (3.3.5) greater than or equal to the fibre saturation point before any shrinkage occurs due to drying

[SOURCE: ISO 13061-2:2014, 3.5]

3.3.5
moisture content
amount of water contained in the *test piece* (3.2.10), expressed as a percentage of the mass of the wood in the oven-dry state

Note 1 to entry: Determined as mass of evaporable water divided by mass of wood in oven-dry state.

Note 2 to entry: When *moisture content* (3.3.5) is specified for production, it is expressed as either an average moisture content with a limit on the variation, or as a moisture content limit, which a large portion of the production should not exceed.

[SOURCE: ISO 24294:2021, 6.1, modified — In the definition, "in wood" was replaced by "in the test piece".]

3.3.6
specific gravity
relative density
ratio of the oven-dry weight of wood at a specified *moisture content* (3.3.5) to the weight of volume of water equal to the volume of wood

3.3.7
shrinkage
decrease in the dimensions or volume of *test piece* (3.2.10) due to reduction of *moisture content* (3.3.5) below fibre saturation point

3.3.7.1
radial shrinkage
shrinkage (3.3.7) in *radial* (3.2.6) direction

3.3.7.2
tangential shrinkage
shrinkage (3.3.7) in *tangential* (3.2.9) direction

3.3.7.3
volumetric shrinkage
decrease in volume of *test piece* (3.2.10) due to reduction of *moisture content* (3.3.5) up to fibre saturation point

3.3.8
swelling
increase in dimension or volume of *test piece* (3.2.10) due to an increase in water below fibre saturation point

3.3.8.1
radial swelling
swelling (3.3.8) in *radial direction* (3.2.6)

3.3.8.2
tangential swelling
swelling (3.3.8) in *tangential direction* (3.2.9)

3.3.8.3
volumetric swelling
increase in volume of *test piece* (3.2.10) due to increase of *moisture content* (3.3.5) up to fibre saturation point

Note 1 to entry: The initial measurements shall be taken on *test pieces* (3.2.10) at absolutely dry (oven-dry) and the final measurements in fully saturated condition.

3.4 Common terms relating to mechanical tests

3.4.1
duration of load
duration of test
time during which a load acts on a *test piece* (3.2.10)

Note 1 to entry: Usually associated with the *speed of test* (3.4.2) or loading applied gradually and consistently to minimize its influence on the results.

3.4.2
speed of test
speed of testing
rate of loading or rate of displacement of load head applied to a *test piece* (3.2.10)

3.4.3
stress
intensity of internal force acting on an area

Note 1 to entry: Usually expressed as force per unit area.

[SOURCE: ISO 6707-1:2020, 3.7.3.25]

3.4.4
strength
ability of a *test piece* (3.2.10) to sustain stress or absorb energy without failure

Note 1 to entry: In a specific mode of test, strength is the maximum stress sustained by a test piece loaded to failure.

3.4.4.1
ultimate stress in compression parallel to grain
compressive strength parallel to grain
maximum stress sustained by a *test piece* (3.2.10) upon a compressive loading along its *longitudinal* (3.2.3) axis

3.4.4.2
strength in compression perpendicular to grain
compressive strength perpendicular to grain
stress at proportional limit sustained by a *test piece* (3.2.10) upon a compressive loading perpendicular to its *longitudinal* (3.2.3) axis

Note 1 to entry: Load may be applied in the *radial* (3.2.6) direction, in the *tangential* (3.2.9) direction or at any angle to the *growth rings* (3.1.2). Generally, wood is the weakest an angle of 45° to the growth rings.

3.4.4.3
static hardness
ability of a *test piece* (3.2.10) to resist the penetration of a plunger to a specified depth under gradually increasing load

3.4.4.4
impact bending strength
ability of a *test piece* (3.2.10) to absorb shocks that cause stresses beyond the proportional limit upon applying an impact load in bending

Note 1 to entry: In the impact bending test, a hammer of a given weight is dropped upon a beam from successively increased heights until rupture occurs or the beam deflects 152 mm (6 in.) or more.

3.4.4.5
shear strength
ability of a *test piece* (3.2.10) to resist internal slipping of one part upon another

Note 1 to entry: When the load is applied along the *longitudinal* (3.2.3) axis, the shear strength parallel to grain is determined. The shearing plane may be *radial* (3.2.6) or *tangential* (3.2.9).

3.4.4.6
modulus of elasticity in static bending
measure of ability of a *test piece* (3.2.10) to resist flexural deformation below proportional limit

Note 1 to entry: When shear strain is ignored, referred to as “apparent modulus of elasticity”.

Note 2 to entry: Abbreviation “MOE” is commonly used.

3.4.4.7
modulus of rupture in static bending
measure of the ultimate strength of a *test piece* (3.2.10) in static bending

Note 1 to entry: Measured as a ratio of the maximum bending moment borne be a *test piece* (3.2.10) to its section modulus.

Note 2 to entry: Abbreviation “MOR” is commonly used.

3.4.4.8
tensile strength parallel to grain
ultimate tensile stress parallel to grain
maximum stress sustained by a *test piece* (3.2.10) upon a tensile loading along its *longitudinal* (3.2.3) axis

3.4.4.9
tensile strength perpendicular to grain
ultimate tensile stress perpendicular to grain
maximum stress sustained by a *test piece* (3.2.10) upon a tensile loading perpendicular to its *longitudinal* (3.2.3) axis

Note 1 to entry: Load may be applied in the *radial* (3.2.6) direction or in the *tangential* (3.2.9) direction.