
**Timber structures — Determination
of characteristic values —**

**Part 1:
Basic requirements**

*Structures en bois — Détermination des valeurs caractéristiques —
Partie 1: Exigences de base*

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Reference number
ISO 12122-1:2014(E)

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Published in Switzerland

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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.

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).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 165, *Structural Timber*.

ISO 12122 consists of the following parts, under the general title *Timber structures — Determination of characteristic values*:

- *Part 1: Basic requirements*
- *Part 2: Sawn timber*

Introduction

This International Standard sets out a framework to establish characteristic values from test results on a sample drawn from a clearly defined reference population. The characteristic value is an estimate of the property of the reference population with a consistent level of confidence prescribed in this part of ISO 12122.

It is the intention that this part of ISO 12122 can be used on any structural product including but not limited to: sawn timber, glulam, structural composite lumber, I-beams, wood-based panels, poles, and round timber. Whenever it is used, this part of ISO 12122 alerts the user to the basic requirements for the determination of consistent characteristic values, but for some classes of products, additional requirements set out in other parts or Annexes to this part give further mandatory detail and explanation. It permits the evaluation of characteristic values on testing of commercial sized specimens.

In some cases, characteristic values determined in accordance with this part of ISO 12122 may be modified to become a design value.

This part of ISO 12122 has the following Annexes:

[Annex A](#) presents detail on a number of statistical methods that may be used in the evaluation of characteristic values.

[Annex B](#) presents a commentary on the provisions in this part of ISO 12122.

[Annex C](#) presents examples of the use of the statistical methods.

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Timber structures — Determination of characteristic values —

Part 1: Basic requirements

1 Scope

This International Standard gives methods for the determination of characteristic values for a defined population of timber products, calculated from test values.

It presents methods for the determination of

- a) characteristic value of mean-based properties, and
- b) characteristic value of 5th percentile-based properties.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

AS/NZS 4063.2, *Characterisation of structural timber — Part 2: Determination of characteristic values*

ASTM D2915, *Sampling and data-analysis for structural wood and wood-based products*

EN 14358, *Timber structures — Calculation of characteristic 5th percentile values and acceptance criteria for a sample*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

characteristic value

value of a property taken to represent the property of a designated population using a process of sampling, testing of specimens, and analysis

3.2

characteristic value of mean-based property

two alternative presentations of characteristic value for mean-based properties are possible:

- a) the mean property obtained from results of tests on the defined product;
- b) the mean property with 75 % confidence obtained from results of tests on the defined product

3.3

characteristic value of 5th percentile-based strength property

5th percentile value with 75 % confidence strength property obtained from results of tests on the defined product

3.4 population

all of the structural timber product that meets the description of the population

Note 1 to entry: See [Annex B](#) for some examples of the use of the term population.

3.5 sample

number of single members of the population, selected to represent the population

Note 1 to entry: See [Annex B](#) for some examples of the use of the term sample.

3.6 specimen

single element used in a test; the element may be a complete member, a member that has been trimmed to length, or a part of a member fabricated for a specific test

Note 1 to entry: See [Annex B](#) for some examples of the use of the term specimen.

4 Symbols and abbreviated terms

Symbols defined in the relevant ISO product or test standard shall be used.

In addition, the following apply:

f_m	is the characteristic bending strength
$k_{\text{mean}, 0,75}$	is a multiplier to give the mean property with 75 % confidence and is given in Table A1
$k_{0,05, 0,75}$	is a multiplier to give the 5th percentile value with 75 % confidence for a 5th percentile-based property and is given in Table A2
M	is the moment capacity
n	is the number of specimens in the test data
V	is the coefficient of variation of the test data
X_Δ	is the target difference between the reported characteristic value and the test result 5th percentile
X_i	is a generalized test value
X_{mean}	is the average of the individual test values (X_i)
$X_{\text{mean}, 0,75}$	is the mean property with 75 % confidence
$X_{0,05}$	is the 5th percentile value from the test data
$X_{0,05, 0,75}$	is the 5th percentile value with 75 % confidence
Z	is the section modulus

5 Reference population

The population to which the characteristic value applies shall be fully described. The description shall reference all of the attributes that may affect either the strength or stiffness and restrict the pieces to the grouping for which the characteristic value is required. These include but are not limited to:

- a) reference to the relevant product standard or specification;

- b) species or species grouping;
- c) designation of grade of the product;
- d) size or size range of the product;
- e) moisture condition of the product;
- f) treatment of the product;
- g) period in which the product was manufactured.

The reference population shall be a grouping from which it is possible to draw a representative sample, and on which it is possible to perform tests on specimens to characterize the required properties.

6 Sampling

6.1 Sampling method

The sampling method shall aim to produce a sample that is representative of the variants in the defined reference population that may affect the tested properties. The sampling shall minimize selection bias, and shall be appropriate to the purpose of the characteristic value and the nature of the reference population.

The sampling method shall be documented. The documentation shall include details of the steps taken to ensure that each of the variants listed in the population as described in [Clause 5](#) is included in the representative sample.

6.2 Sample size

The sample shall be large enough to cover variants of the product that impact on the tested properties, and give statistical significance to the result.

NOTE 1 Materials with larger assumed or assigned population coefficient of variation, (V), of the tested properties should have a larger sample size.

NOTE 2 Some product standards may define a minimum number of tests that must be undertaken to determine characteristic values to be used with described products.

NOTE 3 [Annex B](#) gives some guidance on selecting sample size.

NOTE 4 For some populations, a number of different sub-groups within the population may need to be sampled (e.g. different cross-sectional sizes). In these cases, the size of each of the sub-groups may have to be sufficient to allow meaningful pooling of the results as indicated in [Annex A](#).

NOTE 5 Where characteristic values are to support limit states (or LRFD) design, the sample size should be appropriate for the statistical method selected to determine the 5th percentile value strength (full distribution or tail-fit). However, where the data are used to support a full reliability design method, the sample size should be appropriate to also enable the full statistical distribution of the property to be defined.

7 Sample conditioning

Test data from the samples shall be compatible with the definition of the population by

- a) compliance with the specification of the reference population at the time of testing in accordance with [7.1](#) and [7.2](#), or
- b) adjustment of test data in accordance with [8.2](#) where compliance with [7.1](#) or [7.2](#) is not achieved.