INTERNATIONAL STANDARD

ISO 22157-1

First edition
2004-06-01

Bamboo — Determination of physical and mechanical properties —

Part 1: Requirements

Bambou — Détermination des propriétés physiques et mécaniques —

Partie 1: Exigences

Reference number
ISO 22157-1:2004(E)

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Published in Switzerland

Contents

Page

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.

ISO 22157-1 was prepared by Technical Committee ISO/TC 165, *Timber structures*, in collaboration with INBAR, International Network for Bamboo and Rattan.

ISO 22157 consists of the following parts, under the general title *Bamboo — Determination of physical and mechanical properties*:

— *Part 1: Requirements*

— *Part 2: Laboratory manual*

Introduction

This part of ISO 22157 was originally prepared and submitted by INBAR, the International Network for Bamboo and Rattan, which is an international agency with its head office in Beijing. The aim is to bring bamboo towards the level of an internationally recognized and accepted building and engineering material. INBAR aims to do so in favour of the well-being of lower income groups in developing countries, and in favour of a better environment in bamboo-growing countries.

Discussion about the need of an International Standard started already in 1988, during the International Bamboo Workshop in Cochin, India. Due to lack of funds, the real work started as late as in 1997, when INBAR was launched as an International Agency, and when the Dutch Government provided the required funding.

In 1998, draft texts were written and distributed to a group of specialists inside INBAR who acted as volunteers and spent their time and expertise to propose improvements. Members of this group met for the first time in a meeting on 30-31 October 1998 in San José, Costa Rica. Participants were N.S. Adkoli, K. Ghavami, R. Gnanaharan, H.N.S. Jagadeesh, J.J.A. Janssen, K.S. Pruthi, I.V. Ramanuja Rao, D. Sands, J.O. Siopongco, K. Stochlia and D. Tingley.

During 1999, the results from this meeting were incorporated in the draft texts. In September, these were discussed in a meeting with ISO/TC 165 in Harbin, China. In October 1999, a meeting took place with representatives of the National Standard Institutes of Bangladesh, China, Colombia, Ecuador, Ethiopia, India, Indonesia, Nepal, Philippines, Tanzania, Thailand and Vietnam. This meeting was held at FPRDI in Los Baños, Philippines. The outcome of this meeting was a considerable improvement of the texts, and a general agreement to submit the draft texts to ISO for the formal procedure.

Besides INBAR, CIB (especially committee W 18 B) has also been involved in the preparation. Discussions during meetings of W 18 B (e.g. Singapore 1987 and Kuala Lumpur 1992) have greatly contributed.

Because this part of ISO 22157 is the first Iinternational Standard on bamboo, it does not cancel or replace other documents in whole or in part, besides the draft documents prepared and distributed for internal discussion by INBAR during 1998 and 1999. For similar reasons, significant technical changes from previous editions apply only to these previous draft documents.

Bamboo — Determination of physical and mechanical properties —

Part 1: Requirements

1 Scope

This part of ISO 22157 specifies test methods for evaluating the following characteristic physical and strength properties for bamboo: moisture content, mass per volume, shrinkage, compression, bending, shear and tension.

This part of ISO 22157 covers tests on specimens of bamboo that are conducted to obtain data, which can be used to establish characteristic strength functions and to arrive at the allowable stresses. The data can also be used to establish the relationship between mechanical properties and factors, such as moisture content, mass per volume, growth site, position along the culm, presence of node and internode, etc., for quality-control functions.

2 Terms and definitions

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

2.1
bamboo culm
single shoot of bamboo that is usually hollow, except at nodes which are often swollen

2.2
bamboo clump
cluster of bamboo culms emanating from two or more rhizomes in the same place

2.3
cross-sectional area
area of the section perpendicular to the direction of the principal fibres and vessels

NOTE This is calculated as $(\pi/4) \times [D^2 - (D - 2t)^2]$, in which D and t are the means of the outer diameter and the wall thickness, resulting from measurements on the specimen.

2.4
outer diameter
diameter of a cross-section of a piece of bamboo measured from two opposite points on the outer surface

2.5
moisture content
percentage of water related to oven-dry mass

2.6
wall thickness
thickness of the wall of a piece of bamboo