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Laminated products made of bamboo strips for indoor furniture purposes

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Foreword

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This document was prepared by Technical Committee ISO/TC 296 Bamboo and rattan.

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

Laminated bamboo products have found use for the construction, furniture, handicrafts and novelty items. They have large market for the construction industry such as for floor planks/boards. Furniture for the “high end” and Do-It-Yourself markets have also found an application of laminated bamboo products. The market size for bamboo furniture was valued at USD10.09B in 2018 and is expected to expand from 2019 to 2025 at a CAGR of 5,2 %. One of the main materials for bamboo furniture are laminated bamboo products. Accordingly, the market for laminated bamboo furniture is growing steadily.

In view of the above, such applications of laminated bamboos in the furniture industry warrant the development of a standard testing procedure and property requirements. A standard for bamboo flooring is presently being drafted but there is no initiative yet on developing a standard for furniture for indoor applications using laminated bamboo. This Draft aims to address the need for a standard for laminated products made of bamboo strips for indoor furniture purposes.

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Laminated products made of bamboo strips for indoor furniture purposes

1 Scope

This document specifies the requirements and test methods for laminated products made of bamboo strips for indoor furniture purposes. It does not cover other laminated bamboo products not made of bamboo strips.

It also specifies handling, storage, packaging and marking requirements.

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 9426:2003, *Wood-based panels: Determination of dimensions of panels*

ISO 12460-1:2007, *Wood-based panels — Determination of formaldehyde release — Part 1: Formaldehyde emission by the 1-cubic-metre chamber method*

ISO 12460-2:2018, *Wood-based panels — Determination of formaldehyde release — Part 2: Small-scale chamber method*

ISO 12460-4:2016, *Wood-based panels — Determination of formaldehyde release — Part 4: Desiccator method* <https://standards.iteh.ai/catalog/standards/sist/37bac8dc-3213-4f82-8c71-4d0046039817/iso-dis-6128>

ISO 12466-1:2007, *Plywood — Bonding quality — Part 1: Test methods*

ISO 12466-2:2007, *Plywood — Bonding quality — Part 2: Requirements*

ISO 16978:2003, *Wood-based panels: Determination of elasticity in bending and of bending strength*

ISO 16979:2003, *Wood-based panels: Determination of moisture content*

ISO 16999:2003, *Wood-based panels — Sampling and cutting of test pieces*

ISO 13061-12:2017, *Physical and mechanical properties of wood — Test methods for small clear wood specimens — Part 12: Determination of static hardness*

ISO 13061-17:2017, *Physical and mechanical properties of wood — Test methods for small clear wood specimens — Part 17: Determination of ultimate stress in compression parallel to grain*

ISO 21629-1:2021, *Bamboo floorings — Part 1: Indoor use*

ISO/FDIS 23478, *Bamboo structures – Engineered bamboo products – Test methods for determination of physical and mechanical properties*[under development]

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 21625:2020 apply.

4 Requirements

4.1 Appearance requirements

The material used for laminated bamboo products for indoor furniture purposes shall be free from physical damage, decay and insect attack.

There will be variations from element to element, but the total impression of laminated bamboo product shall show a homogeneous character.

Any part of the material that impedes preservation, bonding and finishing shall be removed entirely.

As bamboo is a natural material, color variations may occur, also due to an effect of light over time.

The appearance requirements of laminated bamboo shall be as indicated in [Table 1](#).

Table 1 — Appearance requirements

Types of defects	Face layer	Sub / middle layer(s)
Bamboo outer layer	Not permitted	Not permitted
Bamboo inner layer		Permitted if this does not impair the bonding strength between the strips and/or the layers of the laminated bamboo product ^a
Splinters	Not permitted	Permitted as long as these splinters do not impair the use quality of the laminated bamboo product ^b
Cracks	Permitted as long as these cracks and/or gaps do not impair the use quality of the laminated bamboo product ^c	
Gaps		
Delamination	Not permitted	Not permitted
Glue penetration	Not permitted	Permitted as long as the glue penetration do not impair the use quality of the laminated bamboo product ^d

^a If the bonding strength between the strips and/or the layers of the laminated bamboo product is impaired by bamboo inner layer, they shall be removed.

^b If the use quality of the laminated bamboo product is impaired by splinters, they shall be removed.

^c If the use quality of the laminated bamboo product is impaired by cracks and/or gaps, they shall be filled.

^d If the use quality of the laminated bamboo product is impaired by glue penetration, the glue marks shall be removed.

4.2 Dimension requirements

[Table 2](#) specifies the common dimension requirements for laminated bamboo.

Table 2 — Dimension requirements

Parameters	Test method	Common product dimensions / number of layers		Requirements	
Length (mm)	ISO 9426	Plank	1 000 ~ 3 000	±1	
		Panel	1 000 ~ 3 000		
		Lumber	1 000 ~ 3 000		
Width (mm)	ISO 9426	Plank	60 ~ 220	±1	
		Panel	600 ~ 1 200		
		Lumber	50 ~ 100		
Thickness (mm)	ISO 9426	Plank / Panel	4 ~ 5	1 to 5 layers	±0,25
			6 ~ 14		±0,50
			15 ~ 24		±0,60
		Lumber	50 ~ 100	>5 layers	±1
Squareness (mm/m)	ISO 9426	—		TO BE DEFINED	
Edge straightness (mm)				±1	
Flatness (mm)				TO BE DEFINED	

NOTE 1 This table illustrates the common dimension requirements for laminated bamboo products for indoor furniture purposes.

NOTE 2 Other specific dimensions of the product are permitted upon agreement of both supplier and buyer.

4.3 Property requirements

4.3.1 Physical properties requirements

The physical requirements for laminated bamboo shall be as indicated in [Table 2](#).

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Table 3 — Physical requirements

Parameters	Test method	Requirements
MC (%)	Annex A	5,0 ≤ MC ≤ EMC or agreement between supplier and customer
Density (kg/m ³)	ISO 9427	≥500

NOTE This table illustrates the physical property requirements of laminated bamboo products for indoor furniture purposes.

MC = Moisture content

4.3.2 Mechanical properties requirements

Mechanical properties of the laminated bamboo and the minimum requirements depend on the design of the final use of the product. The information shall be provided by the supplier of the laminated bamboo. The mechanical requirements for laminated bamboo shall be as indicated in [Table 4](#).

Table 4 — Mechanical requirements

Parameters	Test method	Requirements
Hardness (N)	ISO 13061-12	≥4 560
Bonding quality	ISO 12466-1	Class 1 or Class 2 (ISO 12466-2)

NOTE This table illustrates the mechanical property requirements of laminated bamboo products for indoor furniture purposes.

4.4 Formaldehyde emission

Formaldehyde emission of laminated bamboo shall be lower than the maximum requirements of the country/locality where it will be used.

4.5 Treatment and Durability

In case the durability of the final product shall be improved, the bamboo strips shall be treated with environment-friendly process and/or preservative such as, but not limited to, those without heavy metals that can harm the environment.

4.6 Other declarations at the time of the first delivery

Where it is applicable, the following can refer to the bamboo furniture or can be declared accordingly if required by local regulations: emissions and content of dangerous substances, reaction to fire, thermal properties, and biological durability.

5 Handling, Storage, Packaging and Marking

5.1 Handling, storage and packaging

The manufacturer shall have procedures in providing methods of product handling, packaging and shall provide suitable storage areas to prevent damage or deterioration.

5.2 Marking

By agreement between the buyer and supplier, the package shall be clearly marked with the following minimum information:

- Name and address of manufacturer or supplier
- Trade name
- Reference to this document, i.e., ISO 6128;
- Dimensions
- Construction
- Category: plank/panel/lumber (optional)
- Bamboo species
- Date of production and/or Batch number
- Quantity of products