



DRAFT TANZANIA STANDARD

Plywood — Specifications

TANZANIA BUREAU OF STANDARDS

BCDC 6 (60) CD2: 2020/ISO 12465:2007

0. National Foreword

The Tanzania Bureau of Standards is the statutory national standards body for Tanzania, established under standards Act No. 3 of 1975, amended by Act No. 2 of 2009.

This draft Tanzania Standard is being prepared by BCDC 6 Sawn timber, logs and wood-based components Technical Committee under the supervision of the Building and Construction Divisional Committee (BCDC).

This draft Tanzania Standard is a modified adoption of the 1st Edition of International Standard ISO 12465: 2007 *Plywood — Specifications*.

Terminologies and conventions

The text of the International Standard is hereby being recommended for approval with deviation for publication as draft Tanzania standard.

Some terminologies and conventions are not identical with those used in Tanzania Standards; attention is drawn to the following;

The comma has been used as a decimal marker for metric dimensions. In Tanzania, it is current practice to use a full point on the baseline as the decimal marker.

Whenever the words “ISO Standard” appear referring to this standard, they should read as “Tanzania Standard”.

This standard of the International Organization for Standardization (ISO) was approved for publication as a Tanzania Standard with agreed modifications due to national requirements. A complete list of modifications, together with their justification, is given in the normative Annex E.

For the purposes of this standard, the following editorial changes have also been made:

- a) deletion of informative preliminary material from the adopted International Standard
- b) inclusion of national informative material (National foreword, terminologies and conventions)
- c) deletion of the translation text in French to retain English language which is the official national language
- d) changes in document layout (pagination, font type and size)

Plywood — Specifications

1. Scope

This draft Tanzania Standard establishes requirements for the specification of plywood for general and structural use, in dry, tropical dry/humid and high-humidity/exterior conditions. It includes requirements for the quality of veneer, glue bond, lay-up (construction), dimensions and tolerances, conformance verification and marking.

The values listed in this International Standard relate to product properties, but they are not characteristic values to be used in design calculations.

NOTE Such characteristic values are given by the manufacturer, based on testing according to ISO 16572.

Additional information on supplementary properties for certain applications is also given.

2. Normative references

The following referenced documents are indispensable for the application 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 Guide 65, General requirements for bodies operating product certification systems

BCDC 6 (53) CD2/ISO 1954, *Plywood — Tolerances on dimensions*

BCDC 6 (51) CD2: /ISO 2074, *Plywood — Vocabulary*

BCDC 6 (58) CD2/ISO 2426-2, *Plywood — Classification by surface appearance — Part 2: Hardwood*

BCDC 6 (59) CD2/ISO 2426-3, *Plywood — Classification by surface appearance — Part 3: Softwood*

ISO 9426, *Wood-based panels — Determination of dimensions of panels*

ISO 9427, *Wood-based panels — Determination of density*

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

BCDC 6 (67) CD2/ ISO 12466-2, *Plywood — Bonding quality — Part 2: Requirements*

ISO 16572, *Timber structures — Wood-based panels — Structural properties*

ISO 16978, *Wood-based panels — Determination of modulus of elasticity in bending and of bending strength*

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

3. Terms and definitions

For the purposes of this document, the terms and definitions given in BCDC 6 (51) CD2: /ISO 2074 and the following apply.

ISO 16979, Wood-based panels- Determination of moisture content

3.1 Dry conditions

Conditions in which the plywood will attain an equilibrium moisture content not exceeding 12 % except for only a few weeks per year (e.g. ambient temperature of 20 °C and relative humidity of 65 %)

NOTE 1 Plywood suitable for use in these conditions is considered as suitable for use in biological-use class 1 of ISO 21887.

NOTE 2 This plywood, under these conditions, is appropriate for dry internal applications excluding any extended direct exposure to water.

3.2 Tropical dry/Humid conditions

Conditions in which the plywood will attain an equilibrium moisture content not exceeding 18 % except for only a few weeks per year (e.g. ambient temperature of 30 °C and relative humidity of 85 %)

NOTE 1 Plywood suitable for use in these conditions is considered as suitable for use in biological-use class 1 and class 2 of ISO 21887.

NOTE 2 This plywood, under these conditions, is appropriate for protected external applications (e.g. behind cladding or under roof coverings), but is also capable of resisting weather exposure for short periods (e.g. when exposed during the construction). It is also suitable for interior situations where the service moisture condition is raised above the humidity of dry conditions.

3.3 High-humidity/exterior conditions

Conditions leading to a higher equilibrium moisture content than in tropical dry/humid conditions or prolonged exposure to weather

NOTE Plywood suitable for use in these conditions, is considered as suitable for use in biological-use class 1, class 2 and 3 of ISO 21887.

3.4 Structural use

Load-bearing application for which predictable reliable load and/or engineering design values (characteristic values with appropriate safety factors) are required

4. Materials

4.1 Veneer

The following requirements apply at the time of pressing.

4.1.1 Species

Any wood species is permitted.

Veneer shall be identified according to its species, or species group, or mechanical property.

When multiple veneers are used in parallel to create a layer, the veneers should be of similar mechanical and physical properties.

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4.1.2 Thickness

Maximum thickness: 6.0 mm.

4.1.3 Quality

The quality (grade) of veneer shall be controlled in accordance with limits for the characteristics defined in Annex A.

4.1.4 Jointing

Edge joints (parallel to grain) are permitted, glued or unglued.

End joints shall be structurally made (i.e. scarfed or equivalent) and glued.

4.2 Adhesives

The adhesive, in combination with the veneer used, shall be capable of providing a bond of the performance necessary to meet the requirements for the bond type as specified in Clause 8.

5. Manufacturing of panels

The lay-up (construction) shall be controlled, including the thickness, orientation, wood species and quality of the plies as given in Annex B. Characteristics defining the quality of plies shall be defined according to TABLE C.1.

The manufacturing characteristics of the end products shall be controlled; these characteristics shall be defined according to TABLE C.2.

The grain direction of each ply shall be at 90° to at least one adjacent ply.

6. Dimensions and tolerances

Unless stated otherwise by the manufacturer, dimensions of plywood are determined in the conditions given in ISO 9426, and tolerances applied in the conditions given in BCDC 6 (53) CD2/ISO 1954.

Width, length and thickness shall be specified in mm.

7. General requirements

7.1 Classification by surface appearance

If required, classification by surface appearance shall be carried out in accordance with BCDC 6 (58) CD2/ISO 2426-2 and BCDC 6 (59) CD2/ISO 2426-3.

7.2 Mechanical characteristics

7.2.1 General

If required, bending strength and/or stiffness shall be determined on small test pieces in accordance with ISO 16978.

Bending strength and/or stiffness values determined according to ISO 16978 are not suitable for the determination of characteristic values or design properties for structural use, unless a correlation between these values and values determined according to 7.2.2 has been established.

7.2.2 Structural application

Characteristic values used for the determination of design properties and capacities shall be determined in accordance with ISO 16572.

7.3 Physical properties

If required, physical properties shall be determined according to ISO 16979 and ISO 9427.

8. Bonding quality

The bonding quality shall be established by testing in accordance with the requirements of ISO 12466-1 and classified in accordance with BCDC 6 (67) CD2/ ISO 12466-2.

In addition to the testing and classification according to 7.1, the maximum size of permitted characteristics (Annex A) should take into account any adverse effects those characteristics may have on bonding quality and bond durability.

- a) For plywood for use in dry conditions, the bonding quality shall comply with the requirements of bonding class 1 of BCDC 6 (67) CD2/ ISO 12466-2.
- b) For plywood for use in tropical dry/humid conditions, the bonding quality shall comply with the requirements of bonding class 2 of BCDC 6 (67) CD2/ ISO 12466-22.
- c) For plywood for use in high-humidity/exterior conditions, the bonding quality shall comply with the requirements of bonding class 3 of BCDC 6 (67) CD2/ ISO 12466-2.

9. Supplementary properties

For certain applications, information on some supplementary properties can be required. Some of these supplementary properties and corresponding test methods are listed in TABLE D.1.

If there is no national or International Standard available, the method used shall be fully described in the test report.

10. Conformance

Plywood conforming to this standard shall be manufactured under a quality system which

- a) includes in-plant production and quality-control procedures;
- b) includes external and internal auditing of the in-plant procedures;
- c) is consistent with the requirements of ISO Guide 65.

11. Marking, identification and documentation

The marking and the accompanying information shall be placed on the product itself, on a label attached to it, on its packaging, or in the accompanying commercial documents.

Insofar as these data have not been given by other marking rules, panels, or possibly packages, which comply with this standard shall be marked to provide the following information:

- a) the reference of this standard;
- b) the name (or logo) or code of the manufacturer;
- c) the bonding class;
- d) species, species group or mechanical/structural property identification;
- e) reference to the quality system and optionally
- f) the nominal dimensions, in millimetres;
- g) the quality label and the certification body, if any;
- h) the batch number, or the production week and year;
- i) supplementary properties (e.g. the formaldehyde release).

NOTE 1 Further documents, if requested, will be provided by the manufacturer.

NOTE 2 In case of cut-size panels, where the first purchaser is the user of the product and where (s)he agrees that marking (other than on the package) is unnecessary, the marking of such individual panels in the package need not be undertaken.

Annex A

(normative)

Veneer quality

TABLE A.1 provides a standard list of some characteristics to be identified in determining each veneer quality suitable for the range of products to be manufactured.

Each veneer quality shall be separately identified.

TABLE A.1 — **Veneer quality**

Veneer quality: Q_i ^a		
	Characteristics	Specified max. limit
1	Knots – sound (live) Knots – checked (dead)	
2	Knot holes	
3	Grain, irregularities (e.g. rough, sloped, torn grain)	
4	Splits (tapering to a point)	
5	Bark, resin pockets	
6	Borer holes	
7	Fungal decay	
8	Wane (missing wood)	
9	Sum of characteristics measured across piece	
10	Discoloration	
^a A separate table is required for each different quality (grade) of veneer.		

NOTE Other characteristics may be required and added, if necessary.

Annex B

(normative)

Panel lay-up (construction)

TABLE B.1 provides a format for defining the lay-up (construction) of a specified panel.

TABLE B.1 — **Species/thickness of plies**

Ply ^a	Thickness mm	∥ or ⊥ to face ply	Veneer identification	
			Species	Veneer quality ^b
(Face) 1		∥		
2				
3				
—				
—				
—				
—				
—				
<i>n</i> ^c				

^a Plies are numbered from face (1) to back (*n*).

^b Quality Q_i as defined in Annex A and/or Annex C.

^c *n* = total number of plies.

Annex C
(normative)

Ply grading

TABLE C.1 gives ply characteristics and Table C.2 provides a standard list of minimum characteristics of the plies according to their location in the final product.

	Inner ply	Outer ply	Face	Other
Veneer quality index	Q _i	Q _j
NOTE Q _i , Q _j ...are given in accordance with Annexes A and B.				

TABLE C.2 — Manufacturing characteristic limits in end-product

Category of defect or characteristic	Inner ply-basic	Outer plies (face/back)	Face ply (If better than outer ply)
(manufacturing characteristics)			
Open joints			
Overlaps			
Blisters/Delamination			
Hollows/Imprints/Bumps			
Roughness			
Sand throughs			
Short veneer			
Narrow veneer			
Edge void			
Edge defect (sawing/sanding)			
Repairs			
Surface finish			

NOTE Other characteristics may be required and added, if necessary.

Annex D

(normative)

Supplementary propertiesTABLE D.1 — **Supplementary properties**

Properties	Reference document
Physical properties	
Moisture content	ISO 16979
Density	ISO 9427
Mechanical properties	
Tension properties	ISO 16572
Shear properties	ISO 16572
Compression properties	ISO 16572
Other properties	
Formaldehyde release	ISO 12460

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Annex E

Normative changes from the adopted ISO standard

For the purposes of this Tanzania Standard, the following changes have been made from the adopted ISO 12465: 2007 standard:

TABLE E.1 — Normative changes made on this standard from the adopted ISO standard

Clause/Subclause	Modifications	Explanation
3.4 (2 nd line)	modified the statement “(characteristic values)” to “(characteristic values with appropriate safety factors)”.	to reflect the actual meaning for the clause

Bibliography

- [1] ISO 2426-1, *Plywood — Classification by surface appearance — Part 1: General*
- [2] ISO 12460 (all parts)2), *Wood-based panels — Determination of formaldehyde release*
- [3] ISO 21887 2), *Durability of wood and wood-based products — Definition of use classes*
- [4] ISO 21892 2), *International framework for classifying wood products durability based on use classes*