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DRAFT EAST AFRICAN STANDARD

Wooden flush door shutters of solid core type — Specification — Part 1: Plywood face panels

EAST AFRICAN COMMUNITY

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Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

The Community has established an East African Standards Committee (EASC) mandated to develop and issue East African Standards (EAS). The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the public and private sector organizations in the community.

East African Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the Principles and procedures for development of East African Standards. XXXXXX.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

The committee responsible for this document is Technical Committee EASC/TC EASC/TC: 022,

Attention is drawn to the possibility that some of the elements of this document may be subject of patent rights. EAC shall not be held responsible for identifying any or all such patent rights.

Wooden flush door shutters of solid core type — Specification— Part 1: Plywood face panels

1 Scope

This Draft East Africa Standard specifies requirements and sampling methods of solid core wooden flush door shutters with face panels of plywood or cross-band and face veneers.

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 13608, Specification for veneered decorative plywood

EAS 324, Copper/chromium/arsenic compositions for the preservation of timber — Method for timber treatment

ISO 1804, Doors — Terminology

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

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

ISO 16895, Wood-based panels — Dry-process fibreboard

ISO 16893, Wood-based panels — Particleboard

3 Terms and definitions

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

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

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

3.1
type tests
tests carried out to prove conformity with the specification. These are intended for product/type approval of a given construction or a prototype of wooden flush door shutters

3.2
acceptance tests
tests carried out on a sample taken from a lot passing type tests for the purpose of acceptance of the lot on a batch to batch basis

4 Requirements

4.1 Type and construction

Solid core wooden flush door shutters shall be of decorative type or non-decorative (paintable) type. The nature of construction of these shutters shall, therefore, be specified based on both the type and different constructions of the core as given in Table 1.

Table 1 — Nature of construction of solid core wooden flush door shutters

Core	Type	Abbreviations
Blockboard	Decorative	BD
	Non-decorative	BN
Particleboard with or without blockboard	Decorative	PD
	Non-decorative	PN
Medium density fibreboard with or without blockboard	Decorative	MD
	Non-decorative	MN

4.2 Sizes

4.2.1 Sizes of wooden flush door shutters shall generally conform to the modular sizes specified in Table 2 (see Figure 1). Sizes other than modular sizes, as agreed to between the manufacturer and the purchaser, may also be permitted; provided, the thickness of shutters in such cases shall be any of those specified in 4.2.3 but not less than that specified against the nearest higher modular size given in 4.2.3.

Table 2 — Sizes of wooden flush door shutters

Designation of doors	Width mm	Height mm	
		min.	max.
8 DS 20	710	1 945	1 945
8 DS 21	760	1 980	2 045
9 DS 20	810	2 005	2 030
9 DS21	860	2 005	2 030
10 DS 20	900	2 005	2 100
10 DS 21	915	2 005	2 100
12 DT 20	1 100	1 905	2 100
12 DT 21	1 500	2 005	2 100

NOTE 1 Door, S =Single shutter, and T = Double leaf shutter.

NOTE 2 The designation indicates the size of door opening, the first number referring to width in modules of 100 mm and the last number the height in modules of 100 mm.

NOTE 3 In arriving at the standard widths and heights for wooden flush door shutters, an allowance of 60 mm has been made for door frames, 40 mm for floor finish and 5 mm for clearance all round (see Figure 1) between the door opening and door frame and 15 mm for rebate all round for the wooden flush door shutter into the frame. Furthermore, a gap of 5 mm has been provided between the bottom of the wooden flush door shutter and the finished floor level.

4.2.2 In case the modular height of door opening is taken from the finished floor level, the height of the wooden flush door shutters shall be the one given in column 3 of Table 2 for maximum height. In the case of double leaf shutters, the rebate shall be as given in 4.4.7.

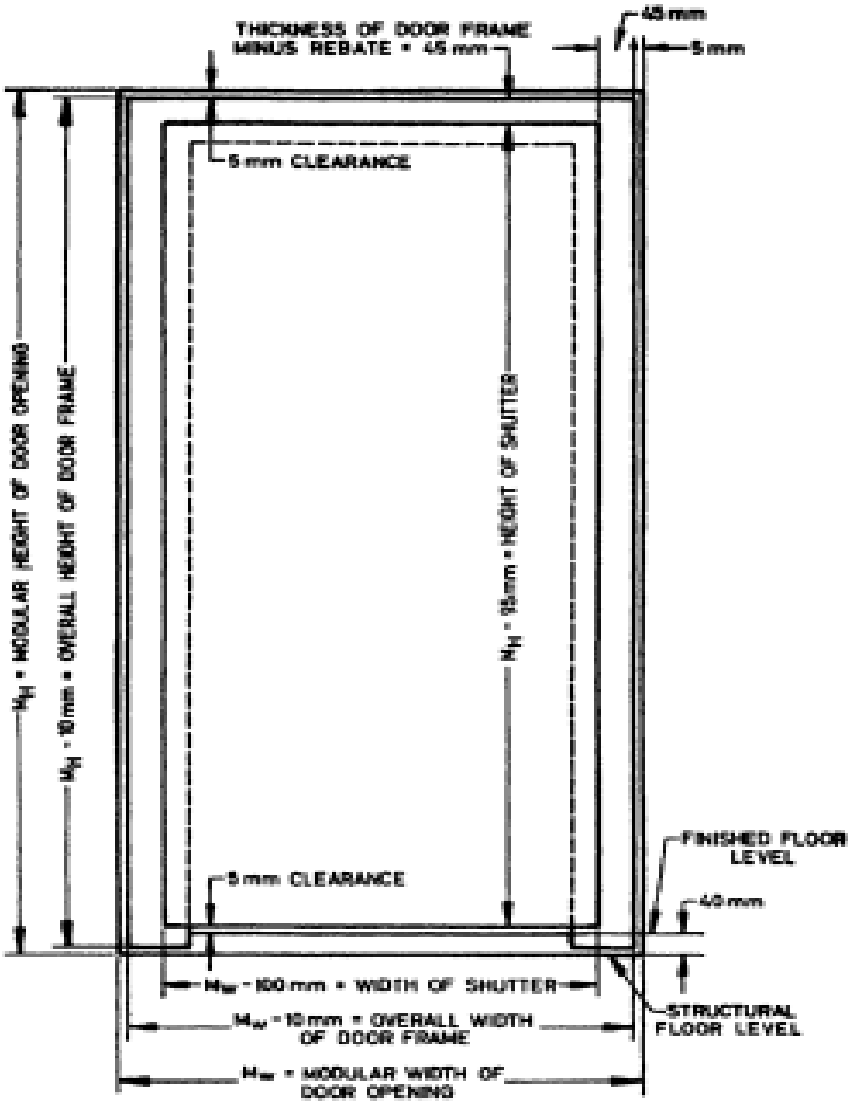


Figure 1 — Sketch illustrating dimensions of wooden flush door shutter

4.2.3 The nominal thickness of the wooden flush door shutters shall be 25 mm, 30 mm, 35 mm, 40 mm, 45 mm and 50 mm corresponding to each of the sizes as indicated in Table 3 or as agreed between manufacturer and purchaser. However, for sizes greater than 12 DT 21, the thickness of such shutters shall be greater than 50 mm and shall be as agreed to between the manufacturer and the purchaser.

Table 3 — Thickness of wooden flush door shutters

Wooden flush door designation	Thickness mm
8 DS 20 and 8 DS 21	25
9 DS 20 and 9 DS 21	30 or 35
10 DS 20 and 10 DS 21	40

12 DT 20 and 12 DT 21	45 or 50

4.3 Materials

4.3.1 General

Plywood, cross-band, face veneers and sapwood of all timbers used should be preservative-treated or heat treated, or any other treatment method(s) may be applied before assembly as specified in 4.3.2.5.

4.3.2 Timber

4.3.2.1 Any species of timber maybe used for the construction of the solid core wooden flush door shutters.

4.3.2.2 For stiles, rails and lipping, only suitable timber species may be used.

NOTE The suitability of timber for stiles, rails and lipping is normally based on the screw holdings properties of timber. However, in the absence of detailed data relating to screw holding properties of all the species, both the density of the species and the data relating to screw holding properties as available for some of the species can be used.

4.3.2.3 The moisture content in timber used in the manufacture of wooden flush door shutters shall not be more than 12 %.

4.3.2.4 Timber shall be free from decay and insect attack. Knots and knot holes less than half the width of cross section of the members in which they occur may be permitted. Pitch pockets, pitch streaks and harmless pin-holes shall be permissible except in the exposed edges of the core where they shall be cut out and filled in with carefully fitted glued pieces of wood of similar species and character with their grain running in the same direction.

4.3.2.5 Species of timber and sapwood of all timbers shall be preservative-treated before assembly as specified below:

a. for preservative treatment, the timber shall be treated as specified in EAS 324; and

b. qualitative test shall be conducted accordingly to determine the presence of preservative used.

The timber should be dried to a suitable moisture content before bonding.

4.3.3 Plywood

4.3.3.1 Commercial plywood used in wooden flush door shutters shall conform to ISO 12466-2 in respect to adhesive and grading.

4.3.3.2 Decorative plywood used in wooden flush door shutters shall conform to ISO 13608.

4.3.4 Cross-bands

Cross-band used in wooden flush door shutters shall conform to the requirements provided in clause 4.3.2.5.

4.3.5 Face veneers

4.3.5.1 Commercial face veneers used in wooden flush door shutters shall conform to the requirements laid down for veneers for marine grade plywood as specified in Annex A.

4.3.5.2 Decorative face veneers used in wooden flush door shutters shall conform to the requirements of decorative veneers plywood specified in ISO 13608.

4.3.6 Adhesives

4.3.6.1 Adhesive used for bonding plywood or cross band and face veneers to the core shall be phenol formaldehyde synthetic resin adhesive or any other suitable adhesives.

4.3.6.2 Phenol formaldehyde synthetic resin adhesive or other suitable adhesives shall be used for bonding core members to one another, including, core frame, and for lipping, glazing frame, venetian frame and other exposed parts where such bonding is done.

4.3.7 Particleboard

Particleboard used for the core of the wooden flush door shutters shall be of either FPT-1 or XPS designation of ISO 16893.The swelling of the particleboard in thickness and length, when tested shall not exceed 5 %.

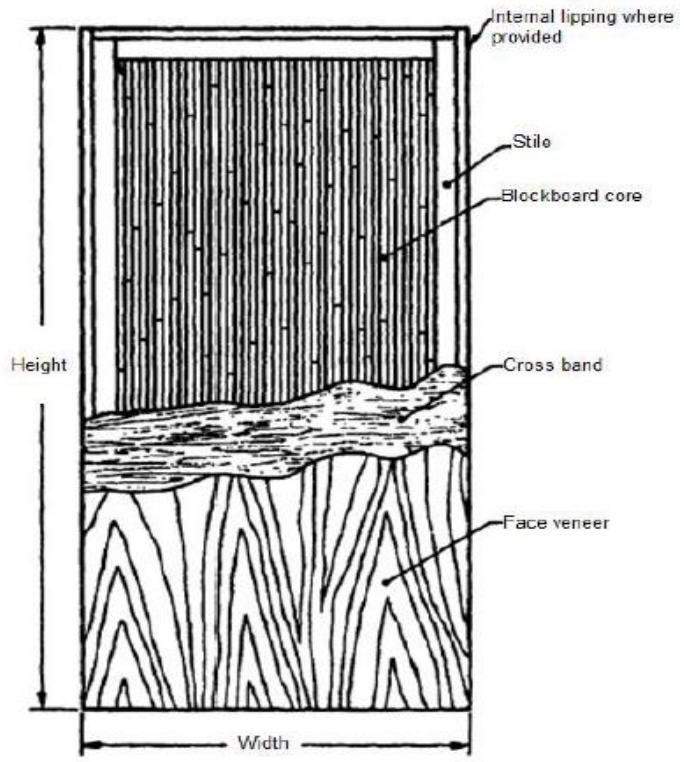
4.3.8 Medium Density Fibre (MDF)

Medium Density Fibre board used for the core of wooden flush door shutters shall conform to ISO 16895

4.4 Construction

4.4.1 Blockboard core

4.4.1.1 The blockboard core shall conform to the requirements specified in 4.4.1.2. A frame constructed of stiles and rails shall be provided for holding the core. The width of the frame including lipping, where provided, shall not be less than 45 mm and not more than 75 mm as show in Figure 2 below.



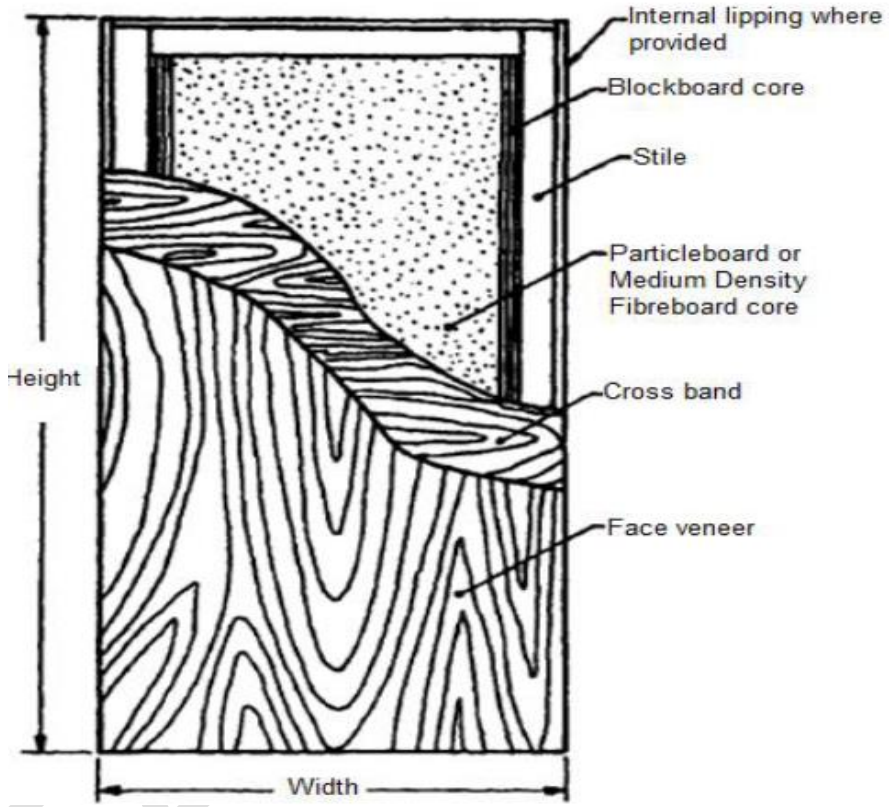
(Width and height in accordance to Table 2)

Figure 2 — Typical blockboard core of a wooden flush door shutter

4.4.1.2 The wooden strips for core shall be cut out from the timber and seasoned to a moisture content not exceeding 12 %. The width of each strip of wood shall not exceed 30 mm. These strips may consist of pieces of small lengths placed end to end with the end joints staggered. In anyone blockboard, the core strips shall be of one species of timber only. The strips of wood may be laid separately or spot glued or otherwise jointed to form a core which is glued between two or more outer veneers with the direction of the grain of core blocks running at right angles to that of the adjacent veneer.

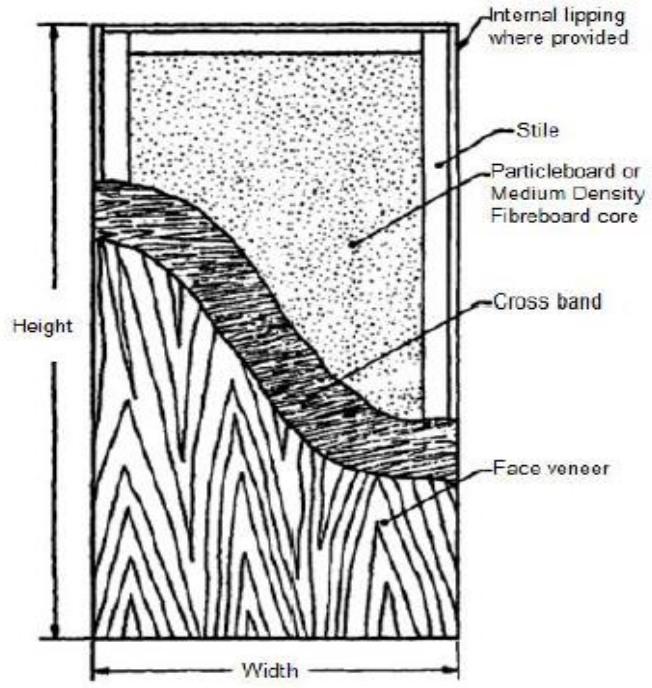
4.4.2 Particleboard, MDF board core with or without blockboard

4.4.2.1 Particleboard, MDF board core with or without blockboard construction shall conform to Figure 3 and Figure 4.



(Width and height in accordance to Table 2)

Figure 3 — Particleboard or Medium Density Fibreboard and blockboard core of a wooden flush door shutter



(Width and height in accordance with Table 2)

Figure 4 — Typical Particleboard or Medium Density Fibre board core flush door shutter

4.4.2.2 The core shall be either particleboard or MDF board or a combination of blockboard and particleboard or blockboard and MDF board. In a combined construction, the width of blockboard construction shall extend at least 150 mm from inner edge of the stile, on either side and the rest shall be particleboard or MDF board. Blockboard shall conform to the requirements specified in 4.4.1.2 and the particleboard and MDF board shall be as specified in 4.3.7 and 4.3.8 respectively. The frame for holding the core, including lipping where it occurs, shall not be less than 45 mm and not more than 100 mm in width.

4.4.3 Stiles and rails

Stiles and rails shall be made of one piece without any joint.

4.4.4 Levelling

Levelling, not necessarily by planning of surfaces, shall be carried out during each stage of construction, that is:

a. fabrication of core; and

b. bonding of cross-bands and face veneers.

The thickness of core shall be checked for uniformity before bonding the plywood or cross bands and face veneers as the case may be.

NOTE In a blockboard construction, the impression of the core strips on the outside face maybe minimized to a large extent by following the provision of 4.4.4 but cannot be eliminated altogether because of the nature of construction.

4.4.5 Face panel

4.4.5.1 The face panel shall be formed by gluing on both faces of the core either plywood or cross bands and face veneers by the hot press process. The thickness of the cross bands as such or in the plywood shall be between 1 mm and 3 mm. The thickness of the face veneer as such or in the plywood shall be between 0.5

mm and 1.5 mm for commercial veneers and between 0.4 mm and 1.0 mm for decorative veneers, provided that the combined thickness of both is not less than 2.2 mm.

4.4.5.2 The plywood conforming to these requirements shall be glued under pressure on both faces of the core. When the panel consists of cross bands and face veneers glued separately, the cross bands shall be laid with their grains at right angles to those of the core and glued to its both faces. Face veneer shall then be laid with their grains at right angles to those of the cross bands. Where it is desired to have wooden strips in the blockboard core horizontal rather than vertical, this shall be permitted only if three-ply panel is pressed on both sides of the core and the total is a seven-ply construction.

4.4.5.3 Application of a decorative face veneer on a finished face panel having veneer in the same direction as the facing veneer shall be avoided. However, where, this is unavoidable due to special circumstances, the already existing veneer, whether commercial or decorative, shall be so sanded that the total thickness of both the existing and the applied face veneers together shall not exceed the maximum thickness specified; the thickness of decorative veneer after finishing is, in no case, less than 0.4 mm.

4.4.6 Lipping

4.4.6.1 General

Lipping shall be provided, if so desired by the purchaser. Lipping, where provided, may be concealed or exposed as specified by the purchaser. Joints shall not be permitted in the lipping. Some typical ways of lipping are shown in Figure 5 for guidance.

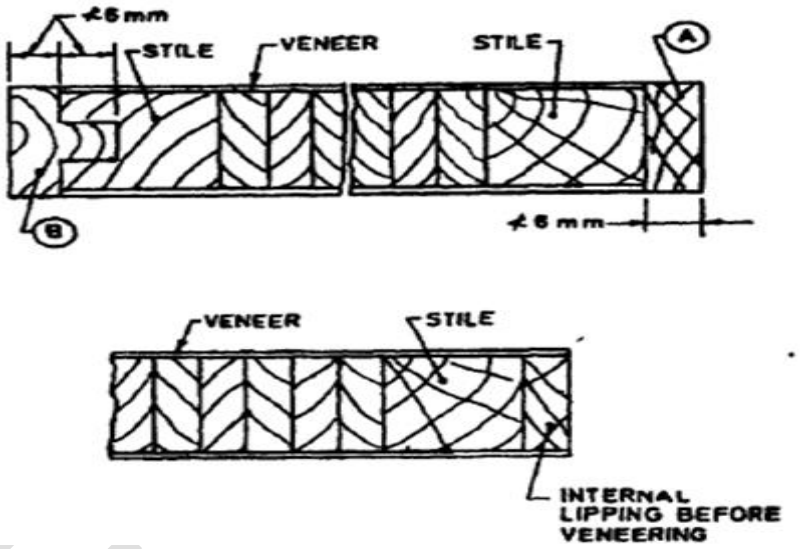


Figure 5 — Typical figures showing different ways of lipping

Where;

A external lipping after veneering; and

B external lipping with tongue and grove for single or double leaf shutter.

4.4.6.2 Concealed lipping

Internal lipping shall have a total depth of not less than 30 mm (see also 4.4.7). It may be provided separately, when it is of a species different from that of backing or as one piece with the stile, designated as frame-cum-lipping. When internal lipping and backing are of the same species, the overall width shall be as given in 4.4.1.1 unless specifically asked for by the purchaser.

4.4.6.3 Exposed Lipping

Where provided, exposedlipping shall be solid and shall measure at least 6 mm on the face of the wooden flush door.

4.4.7 Rebating

In the case of double-leaved shutters, the meeting of the stiles shall be rebated by 8 mm to 10 mm. The rebating shall be either splayed or square type as shown in Figure 6. Where lipping is provided, the depth of lipping at the meeting of stiles shall not be less than 30 mm.

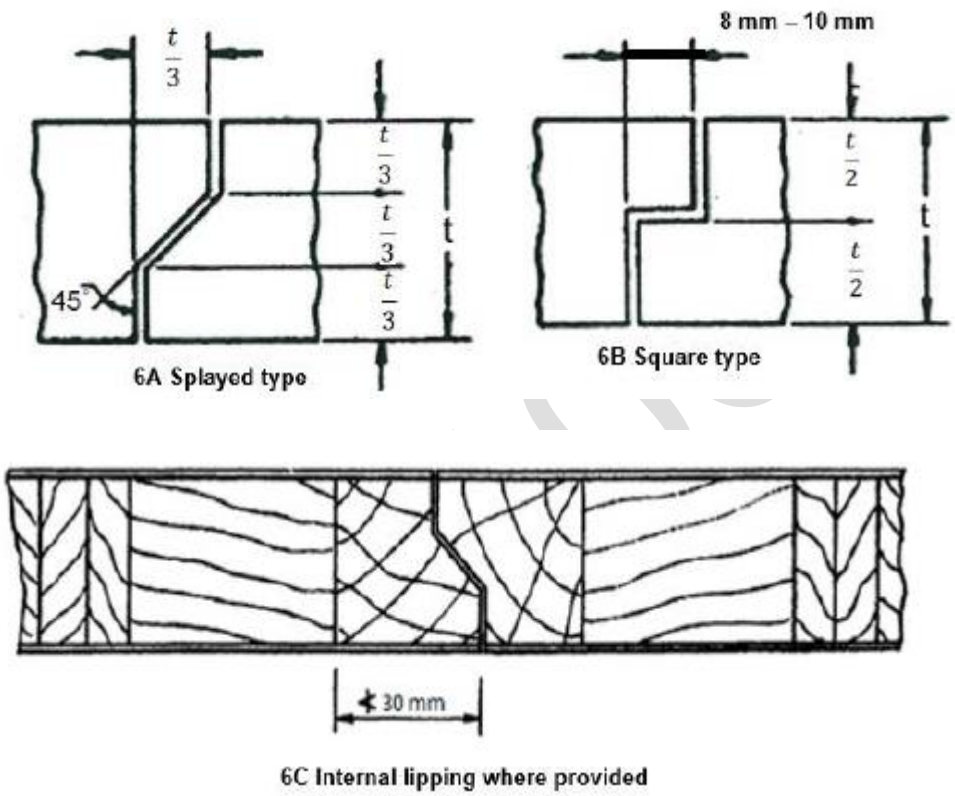


Figure 6 — Meeting of stiles for double-lipped wooden flush door shutter

4.4.8 Opening for glazing

When required by the purchaser, opening for glazing shall be provided and, unless otherwise specified, the opening provided shall be 250 mm in height and 150 mm or 200 mm in width. Unless otherwise specified by the purchaser, the bottom of the opening shall be at a height of 1.4 m from that of the bottom edge of the shutter as specified in Figure 7. The opening for glazing shall be lipped internally with solid timber.

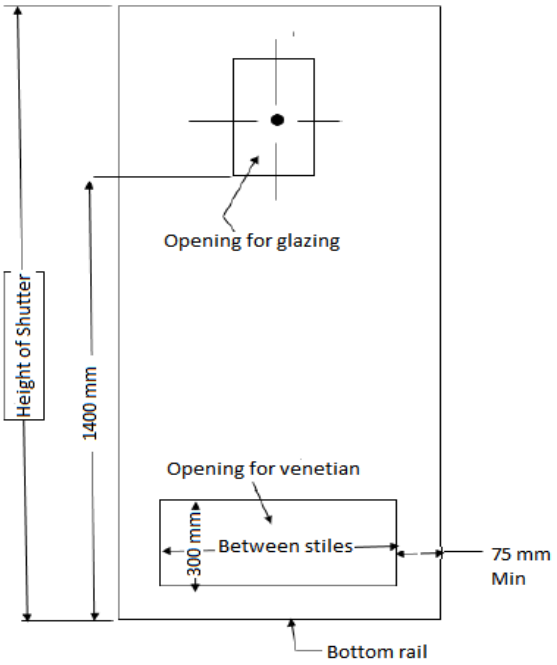


Figure 7 — Typical location of opening for glazing and venetian

4.4.9 Venetian

When required by the purchaser, a venetian opening shall be provided and, unless otherwise specified, the height of the opening shall be 350 mm from the bottom of the wooden flush door shutter. The width of the opening shall be as specified by the purchaser but shall provide for a clear space of at least 75 mm between the edge of the door and the venetian opening.

4.5 Fitting of locks

Wooden flush door shutters shall be shop-prepared for taking mortice locks or latches as may be agreed to. Shop-preparing the door with mortised holes for lock fixing shall be done only when desired, suitable blocks of wood may be provided for fixing the hardware; in the absence of specific requirements, the sizes of blocks shall preferably correspond to the maximum size of the lock.

4.6 Workmanship and finish

4.6.1 All the four edges of a wooden flush door shutter shall be squared.

4.6.2 Both faces of the wooden flush door shutter shall be sanded to a smooth even texture. If required by the purchaser, all the surfaces of shutters which are required to be painted ultimately shall be covered evenly by painting with suitable priming coat as may be ordered by the purchaser. However, only unpainted doors shall be subjected to the tests mentioned under clause 5.

4.6.3 Workmanship and the finish of the face panels shall be in conformity with the requirements of non-decorative type and decorative type.

5 Tests

5.1 Classification of test

5.1.1 Acceptance tests

The following shall constitute the acceptance (product identification) tests:

a. dimensions and squareness test;

b. general flatness test;

c. local planeness test;

d. slamming test;

e. end immersion test;

f. knife test; and

g. glue adhesion test.

5.1.2 Type tests

The following shall constitute type (product approval) tests:

a. dimensions and squareness test;

b. general flatness test;

c. local planeness test;

d. impact indentation test;

e. flexure test;

f. edge loading test;

g. shock resistance test;

h. buckling test;

i. slamming test;

j. misuse test;

k. varying humidity test;

l. end immersion test;

m. knife test;

n. glue adhesion test; and

o. screw withdrawal test.

5.2 Conformity assessment

5.2.1 Dimensions and squareness test

Wooden flush door shutters, when tested, the dimensions of nominal width and height shall be within a limit of ± 5 mm. The door shutters shall not deviate by more than 1 mm on a length of 500 mm. The thickness of the wooden flush door shutters shall be uniform throughout with the permissible variation of not more than 0.8 mm between any two points. The nominal thickness of the shutter shall be within a limit of ± 1 mm.

5.2.2 General flatness test

Wooden flush door shutters, when tested, the twist, cupping and warping shall not exceed 6 mm.

5.2.3 Local planeness test

Wooden flush door shutters, when tested, the depth of deviation measured at any point shall not be more than 0.5 mm.

5.2.4 Impact indentation test

Wooden flush door shutters, when tested, shall have no defects such as cracking, tearing or delamination and the depth of indentation shall not be more than 0.2 mm.

5.2.5 Flexure test

Wooden flush door shutters, when tested, there shall not be any residual deflection of more than one tenth of the maximum deflection. The deflection at the maximum load shall not be more than one thirtieth of the length and one fifteenth of the width, whichever is less.

5.2.6 Edge loading test

Wooden flush door shutters, when tested, the deflection of the edge at the maximum load shall not be more than 5 mm. On removal of the loads, the residual deflection shall not be more than 0.5 mm. In case the door shutter is failing the above test, the test procedure may be repeated on the other edge in the reverse direction. Also there shall be no lateral buckling by more than 2 mm during loaded condition and no residual lateral buckling after removal of the load.

5.2.7 Shock resistance test

5.2.7.1 Wooden flush door shutters, when tested, there shall be no visible damage in any part of the door after twenty five blows on each end.

5.2.7.2 Wooden flush door shutters, when tested, the normally hung shutter, with hangings, fixings and fastenings should withstand without any significant permanent deformation and without deterioration the five impacts on both sides of the shutter.

5.2.8 Buckling test

Wooden flush door shutters, when tested, shall not show any deterioration and any residual deformation more than 5 mm after 15 min of unloading and the initial deflection also shall not be more than 50 mm.

5.2.9 Slamming test

5.2.9.1 Anyone of the following tests given in 5.2.9.2 and 5.2.9.3 shall be used.

5.2.9.2 Wooden flush door shutters, when tested, shall not have any visible damage in any part of the door at the end of 50 successive impacts.

5.2.9.3 Wooden flush door shutters, when tested, shall not have any visible damage in any part of the door at the end of 100 successive impacts.

5.2.10 Misuse test

Wooden flush door shutters, when tested , there shall not be any permanent deformation of the fixing or any other part of the door set hindering its normal working after the test.

5.2.11 Varying humidity test

Wooden flush door shutters, when tested, there shall not be any visible warping, twisting or delamination and where precision is required, the maximum departure from the general planeness shall not be more than 1.0 mm. The recovery of the original size after subjecting the door to high and low humidity shall be at least 90 % of the change in dimensions.

5.2.12 End immersion test

Wooden flush door shutters, when tested, shall have no delamination at the end of the test. This test shall be carried out on door shutters only after they pass in glue adhesion test.

5.2.13 Knife test

5.2.13.1 Wooden flush door shutters, when tested, the results of adhesion shall be as those given in 5.2.13.2 to 5.2.13.4.

5.2.13.2 The adhesion is excellent when it is difficult to find the glue line and impossible to keep the tool within it for more than 6 mm without cutting into adjacent wood. On pressing upwards, the veneer/facing sheet usually breaks off over a width only slightly greater than that of the tool.

5.2.13.3 The adhesion is poor when the knife meets little opposition into the glue line and the prise results in the easy removal of almost all the veneers/facings sheets from one side of the tests specimen. The separated veneers/facing sheets are usually almost free from adjacent fibre.

5.2.13.4 Wooden flush door shutters designated as poor shall be declared as unsatisfactory.

5.2.14 Glue adhesion test

Wooden flush door shutters, when tested, shall be considered to have passed the test if no delamination has occurred in the glue lines in the plywood or if no single delamination of more than 50 mm in length and more than 3 mm in depth has occurred in the assembly glue lines between the plywood faces and stile and rail. Delamination at a knot, knot hole, a pitch pocket and wormhole or other permissible wood defects shall not be considered in assessing the sample. A Wooden flush door shutter shall be deemed to have passed the test if both the specimen tested passed the test.

5.2.15 Screw withdrawal resistance test

Wooden flush door shutters, when tested, the required load to withdraw the screw completely shall not be less than 1 000 N. On withdrawal, there shall be no visible damage to the surface either by delamination or extra chipping off at the points of withdrawal.

6 Sampling and criteria for conformity

6.1 Lot in any consignment

All wooden flush door shutters of the same type and manufactured under similar conditions of production shall be grouped together to constitute a lot.

6.2 Sample size

6.2.1 The number of specimens to be taken for testing of wooden flush door shutters for dimensions and squareness, flatness, and local planeness shall be in accordance with column 2 of Table 4.

6.2.2 For knife test, glue adhesion test, slamming test and end immersion test, the number of wooden flush door shutters shall be in accordance with column 4 of Table 4.

6.2.3 For impact test, and screw withdrawal resistance test, wooden flush door shutters shall be tested on production of 1 000 shutters of the same size and type.

6.2.4 For flexure edge loading, shock resistance, misuses and buckling test the shutters shall be tested once a year.

6.3 Criteria for Conformity

The lot shall be declared as conforming to the requirements of the standard when the number of defective samples do not exceed the permissible number given in column 4 of Table 4.

Table 4 — Sample size and criteria for conformity

Lot size		Sample size	Permissible number of defective samples	Sub sample size
Min	Max			
26	50	8	0	1
51	100	13	1	2
101	150	20	1	2
151	300	32	1	3
301	500	50	2	4
501	and above	80	2	5

7 Marking

Each wooden flush door shutter shall be legibly and indelibly marked on any of its edges with the following information:

a) name of the manufacturer and trade-mark, if any;

b) abbreviation indicating the nature of construction of the wooden flush door shutter ;

c) whether the size of the wooden flush door shutter is 'modular' or 'non-modular';

d) designation for modular sizes; or the actual size (width and height) for non-modular sizes along with appropriate designation for wooden flush door shutters;

e) thickness of wooden flush door shutters; and

f) products complying with requirements of this standard shall be marked with a number for this standard.

Annex A
(Normative)

Requirements for manufacture of marine plywood

A.1 Materials

Veneers shall be either sliced or rotary cut. Veneers prepared by either method shall have smooth surfaces. The outer plies of a panel shall be prepared by the same method, i.e. sliced or rotary cut, except for decorative face veneers. The permissible number of natural defects and edge joints shall not exceed the limits given in Table x.

Table A.1- Permissible frequencies of' defects and joints in veneer for outer and inner plies

Defect/joint type	Veneer for outer plies	Veneer for inner plies
Pin knots	Up to 6 per square meter of panel surface	No limit
Closed splits	A maximum of 2 per meter width of panel area with a rotary length of 200mm	A maximum of 1 spilt of up to 0.5mm wide on any panel edge
Small worm holes. <1.5 mm diameter	Up to 2 per square metre Holes in plane of veneer not permitted	Greater number permitted including some in plane of veneer, provided they do not produce voids
Variation in colour	Low contrast variation in colour is permitted if free from fungal decay	Permitted, if free from fungal decay
Edge joints	Not permitted	Not permitted
Compression failure	Not permitted	Not permitted
Others: Knots other than pin knots Worm holes >1.5mm diameter Fungal decay	Not permitted	Not permitted
Repairs	Not permitted	Properly made and tightly fitted glued patches with their grain aligned with the grain of the veneer and having a maximum dimension of 60mm permitted up to 3 per square meter

Bibliography

[1] US 1652-1:2017, Wooden flush door shutters — Specification for solid core type — Part 1: Plywood face panels

