

Wood based panels – Melamine faced boards for interior uses – Test methods'

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Wood based panels – Melamine faced boards for interior uses – Test methods'

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Foreword

This Kenya Standard was prepared by the Plywood and boards Technical committee and under the guidance of the Standards Projects Committee, and it is in accordance with the procedures of the Bureau.

In the preparation of this standard, reference was made to the following publication:
EN 14323 Wood based panels – Melamine faced boards for interior uses – Test methods

PUBLIC REVIEW DRAFT

Wood based panels – Melamine faced boards for interior uses – Test methods

1 Scope

This Kenyan Standard specifies test methods for the determination of characteristics of melamine faced boards (MFB) as defined in KS 2886.

2 Normative references

The following referenced documents are indispensable for the application of this Kenya Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

KS 2886 Wood-based panels — Determination of dimensions of boards — Part 1: Determination of thickness, width and length

ISO 4586-2:2018 High-pressure decorative laminates (HPL, HPDL) -- Sheets based on thermosetting resins (usually called laminates) -- Part 2: Determination of properties

ISO 2813, Paints and varnishes — Determination of gloss value at 20°, 60° and 85° (ISO 2813)

ISO 3668, Paints and varnishes — Visual comparison of the colour of paints (ISO 3668)

ISO 4892-2:2013, Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc lamps (ISO 4892-2:2013)

ISO 9352, Plastics — Determination of resistance to wear by abrasive wheels

3 Test pieces

The test pieces for the following tests shall be taken at least 150 mm from the edge of the product. When needed, the longitudinal or transverse direction of the decorative surface shall be specified by the manufacturer for the tests on the products.

4 Conditioning of test pieces

Unless specified otherwise for the individual tests, the test pieces shall be tested in the received state. In cases of dispute or for type approval, the test pieces shall be conditioned in an atmosphere of (23 ± 2) °C and (50 ± 5) % relative humidity to constant mass prior to testing.

5 Test methods

5.1 Dimensions (thickness, length and width)

These properties shall be determined in accordance with KS 2886

5.2 Flatness

5.2.1 Principle

Flatness is determined by measuring the maximal deviation of the board surface from a metal straight edge placed at two selected positions parallel to the long and short edges of the board or panel.

5.2.2 Apparatus

Straight edge, of $(1\ 000 \pm 1)$ mm length, with dial indicator gauge (comparator) graduated to permit a reading accuracy of 0,1 mm.

5.2.3 Test pieces

The test piece shall be the complete board under test, as received, stored in the conditions recommended by the manufacturer.

5.2.4 Procedure

Place the board in a vertical position free from restraint with one long edge resting on an essentially horizontal floor. Place the flatness gauge on the concave surface at various positions. At each position, measure the greatest distance between board surface and the flatness gauge with an accuracy of 0,1 mm.

5.2.5

The result of the test is the highest recorded reading on the dial gauge in millimetres to the nearest

0,1 mm.

5.3 Edge damage

5.3.1 Principle

Edge damage is determined by placing a graduated mask or tape measure on the board or panel under test and measuring the size of chips of paper removed from the edges.

5.3.2 Apparatus

A metal tape measure or mask graduated in divisions of 1 mm.

5.3.3 Test pieces

The test piece is the board or panel as received.

5.3.4 Procedure

The test piece is laid level on a protective surface. Loose surface contamination is to be removed using a soft brush. Using the metal tape measure or the mask the size of the chip is measured at right angles to the board edge, across the chip towards the centre of the board.

5.3.5 Expression of results

Record the dimensions of the largest chip of paper removed to the nearest millimetre (mm).

5.4 Surface defects

5.4.1 Principle

Inspection of boards for surface appearance under standardized conditions of lighting and viewing. Surface defects are larger than 0,8 mm² and those that can be identified when the surface texture is viewed from a distance of 0,7 m and at an angle about of 45°.

5.4.2 Apparatus

The light source shall provide a diffused illumination of $(1\ 200 \pm 400)$ lx over the whole area. This may either be diffused daylight or be diffused artificial light. The daylight shall be unaffected by surrounding trees, etc. When artificial daylight is used, it shall have a correlated colour temperature of (5 000 to 6 500) K and a Ra greater than 92, by using a colour matching booth in accordance with ISO 3668.

A convenient distance of the lights from the inspection table is approximately 1,5 m.

5.4.3 Test pieces

The test piece shall be the board under test, as received.

5.4.4 Procedure

Place the board, decorative face uppermost, on the inspection table and wipe it free of any loose contamination, if necessary, with a soft cloth and any suitable cleaning agent if necessary. Inspect it from the distance required (specified in 5.4.1) for defects such as smudges, smears, finger-prints, scratches, foreign particles, damage or any other form of blemish evident within the decorative surface.

In case of cut to size panels the inspection shall be performed on the edges too.

The evaluation of the total area of spot-type defects in square millimetres and of the total length of hair-like defects in millimetres may be carried out with the help of the Tappi Size Estimation Chart¹⁾ or with an equivalent system. In case of dispute the inspection shall be carried out by three observers using the Tappi Chart or an equivalent system.

The inspector shall have normal vision, corrected if necessary. No magnifying glass shall be used in viewing the sheet. In cases of doubt or dispute, three observers are required for the visual assessment. All observers shall have good colour vision. In case of three observers, the reported rating for the test surface shall be the average to the nearest nominal value.

5.4.5 Expression of results

Record all defects identifying type, number and size of defects and sum up surfaces and length.

The admissible size of defects is based on a maximum contamination area equivalent to a unit of defects and is proportional to the standard delivery size of the manufacturer. The total admissible area of contamination may be concentrated in one spot or dispersed over an amount of smaller defects.

In case of pre-cut panels, the cumulative defect is referred to the standard delivery sizes of the manufacturers or amount of delivery.

EXAMPLE Permitted unit of defect (see EN 14322) in this sample is 2 mm²/m²
Standard delivery size of the manufacturer: 5 000 mm × 2 000 mm

Points:

The permissible total error (TE) is calculated as follows:

TE = Board length × Board width × Permitted unit of defect = 5 000 mm × 2 000 mm × 2 mm²/m² = 20 mm²

The following errors are therefore permitted:

1 × 20mm²defect, or

2 × 10mm²defect, or

3 × 6,6 mm² defect etc. Length:

The permissible total error (TE) is calculated as follows:

T E = Board length × Board width × Permitted unit of defect = 5000 mm × 2000 mm × 20 mm/m² = 200 mm

The following errors are therefore permitted:

1 × 200 mm defect

2 × 100 mm defect

3 × 66 mm defect etc

5.5 Resistance to scratching

5.5.1 Principle

Increasing loads are applied in specified steps to a diamond scratching point of defined geometry. The resistance to scratching of the melamine faced board under test is expressed as a numerical rating which defines the minimum applied load which is producing a continuous surface scratch. The test result is verified by visually confirming that the next higher load-step produces a continuous scratch.

5.5.2 Apparatus

Scratch testing apparatus and viewing enclosure as described in ISO 4586-2,

5.5.3 Test pieces

Cut a test piece 100 mm × 100 mm from the board under test. Wipe the surface using cotton fabric impregnated with a solvent such as acetone. It is important that, once cleaned, the surface is not fingered in the test area. Before making the scratch test store the test piece for 4 days in the standard atmosphere according to Clause 4.

5.5.4 Procedure

Follow the procedure in ISO 4586-2, with the following modifications.

Start the test by making two scratches at 1,0 N with a spacing of approximately 1 mm between the scratch marks. On the same test piece repeat this procedure with loads in increment of 0,5 N up to a load of 4 N leaving a space of approximately 3 mm between each pair of scratches. Place the scratched samples in the standard atmosphere, defined in Clause 4, for 24 h before final inspection.

5.5.5 Expression of results

During the examination, the operator shall ensure that the double circle of scratch marks selected is truly > 90 % continuous.

The examination of the surface should take no longer than 10 s.

Record the minimum load giving a continuous mark visible after 24 h in the standard atmosphere. In cases of dispute, three observers shall view the test piece and report their results independently; the final result shall be the average of the three reported values, rounded to the next 0,1 N.

5.6 Resistance to staining

5.6.1 Principle

Test pieces are left in contact with a series of staining agents which are likely to be encountered in everyday use. The time and conditions of contact are specified for each staining agent. At the end of the specified contact period the test pieces are washed and examined for residual surface marks.

5.6.2 Staining agents

The test is carried out with the two representative staining agents: acetone and black coffee. Acetone is applied at ambient temperature; black coffee of normal drinking strength is applied at approximately

80 °C. If the product under test meets specification requirements, then it is deemed to comply with the specification for stain resistance. Other staining agents are included in Annex A for information only and can be used after agreement between supplier and customer.

5.6.3 Apparatus

- glass covering (e.g. watch glass) to prevent evaporation;
- cleaning agent;
- diffuse light source.

Light source providing evenly diffused light giving an illumination on the test surface of $(1\ 200 \pm 400)$ lx. This may either be diffused daylight or be diffused artificial daylight.

The daylight should be unaffected by surrounding trees, etc. When artificial daylight is used it is recommended that it should have a correlated colour temperature of (5 000 to 6 500) K and a Ra greater than 92, by using a colour matching booth in accordance with ISO 3668.

5.6.4 Test pieces

Individual test pieces of any suitable size shall be used cut from the board under test. Where surface finishes are different, state the side to be tested.

Alternatively, a single piece test specimen, large enough to allow the staining materials to be applied side by side, can be used. Keep the test piece flat during the test. An area of about 100 mm x 100 mm is required for each test.

5.6.5 Procedure

The pieces shall be initially at room temperature. Apply a small quantity (for example 2 or 3 drops) of staining agent to the test area. Cover the staining agents with a glass cover.

After 16 h contact time has elapsed remove the staining agents completely. Then wash the test areas with any suitable cleaning agent.

Leave the test pieces 24 h in normal ambient conditions. Then view from various angles at a distance of 400 mm using normal eyesight, corrected where necessary.

NOTE If agreed, another examination can be made after a further specified period of time

5.6.6 Expression of results

Use following rating scale for evaluation:

- rating 5: No visible change; test area indistinguishable from adjacent surrounding area;
- rating 4: Minor change; test area distinguishable from adjacent surrounding area, only when the light source is mirrored on the test surface and is reflected towards the observer's eye, e.g. discoloration, change in gloss and colour;
- rating 3: Moderate change; test area distinguishable from adjacent surrounding area, visible in several viewing directions, e.g. discoloration, change in gloss and colour;
- rating 2: Significant change; test area clearly distinguishable from adjacent surrounding area, visible in all viewing directions, e.g. discoloration, change in gloss and colour, and/or structure of the surface slightly changed, e.g. cracking, blistering;
- rating 1: Strong change; the structure of the surface being distinctly changed and/or discoloration, change in gloss and colour, and/or the surface material being totally or partially delaminated.

5.7 Resistance to cracking

5.7.1 Principle

To determine the ability of the decorative surfaces of melamine faced board to resist to cracking under dry heat at 70 °C.

5.7.2 Apparatus

- electrically heated oven, provided with air circulation capable of being controlled at (70 ± 2) C;
- hand-lens with approximately 6x magnification;
- lighting of intensity (800 to 1 000) Lux.

5.7.3 Test pieces

A 250 mm × 250 mm test piece shall be cut out of the product. The edges which define decorative sides shall be chamfered about 3 mm wide at an angle of about 45° to avoid any notch effect from the edge.

5.7.4 Procedure

The test piece shall be stored in an oven with air turbulence controlled at (70 ± 2) °C for 24 h. After subsequent cooling in standard reference atmosphere 23 °C/50 % relative humidity for 24 h, a magnifier with 6x magnification shall be used to determine whether, and to what extent, cracks have appeared, when examined under a light intensity of (800 to 1 000) Lux

5.7.5 Expression of results

Cracks are divided into 2 classes. Hairline cracks that are difficult to see by eye and surface cracks that may cut into the surface finish and may reach the board. These can be clearly seen and felt.

The result of the examination of the surface and reverse side shall be expressed in accordance with the following rating scale.

- rating 5: without cracks;
- rating 4: isolated hairline cracks;
- rating 3: hairline cracks randomly distributed over the total surfaces;
- rating 2: in addition to stage 3, 1 to 2 small cracks < 25 mm have appeared on the surface which are still visible at an observation distance of 400 mm;
- rating 1: more cracks spread over the total surface area.

Surface cracks, which originate due to edge damage, are not taken into consideration for overall judgement.

5.8 Colour matching and surface texture

5.8.1 Principle

To assess the colour and texture of each face of a test piece against a reference sample agreed between supplier and customer.

5.8.2 Reference sample

A sample, as retained by the manufacturer, approximatively A4 size. This sample shall be stored away of lights and heat sources.

5.8.3 Test piece

A A4 size test piece shall be cut from the board under test. Where printed decors are to be examined, care should be taken to select the test piece from the same area as the reference sample to reflect the identical panel.

5.8.4 Apparatus

Light box for colour comparison: The light box is to be painted matt black and fitted with a light source (daylight, colour temperature 6 500 K) giving a light intensity of (800 to 1 000) Lux. The size of the box is to permit both the reference sample and the test piece to stand side by side and vertically at the rear such that shadow free, non-reflected light strikes the samples.

5.8.5 Procedure

5.8.5.1 General

The tester shall have normal eyesight, corrected if necessary, and not have any colour perception impediment.

5.8.5.2 Colour matching

The colour matching of these surfaces is carried out visually against the reference sample in the evaluation box using daylight (colour temperature 6 500 K). The samples are placed at the rear of the box, standing in a slightly inclined position side by side, and are viewed from about 70 cm distance.

NOTE Alternatively colour matching of unicolour or white decors can be done using a colour measuring apparatus.

5.8.5.3 Surface texture

Surface texture control is carried out visually against the reference sample in the evaluation box. The samples are placed at the rear of the box, standing side by side, with diffused reflected light across the surfaces.

5.8.5.4 Expression of results

The test pieces shall be judged as described above using the following rate scale for evaluation:

- R 5: no visible deviations;
- R 4: slight deviations of colour and/or texture;
- R 3: marked deviations of colour and/or texture;

- R 2: severe deviations of colour and/or texture.
- R 1: very severe deviations of colour and/or texture

5.9 Resistance to abrasion of the decorative surface layer

5.9.1 Principle

This test measures the ability of the decorative surface of melamine surfaces board to resist abrasive wear-through to the sub-layer. Abrasion is achieved by rotating a specimen in contact with a pair of loaded cylindrical wheels covered with abrasive paper. The number of revolutions of the specimen required to cause a defined degrees of abrasion is used as measures of resistance to surface abrasion.

NOTE Printed decorations can be influenced by the hardness and thickness of the resin or protective layer over the decoration, single-colour decorations by the hardness and thickness of the decorative layer over the board.

5.9.2 Test pieces

Three square test pieces, edge length 100 mm, shall be cut out of the product. A hole shall be drilled in the middle of the test piece for clamping on the plate. The thickness of the test pieces shall be so selected that the height of the pivots on the supporting arms on which the friction wheels are positioned are always substantially parallel to the surface of the test piece. If needed, thicker test pieces shall be planed down on the underside.

5.9.3 Preconditioning of the test pieces and abrasive paper

The surface to be tested shall be cleaned with a non-hazardous organic solvent which is immiscible with water. The test pieces and the abrasive strips shall then be stored for 72 h in the standard reference atmosphere, as defined in Clause 4. In cases of dispute condition until constant mass is reached. Constant mass is considered to be reached when the results of two successive weighing operations, carried out at an interval of 24 h, do not differ by more than 0,1 % of the mass of the test piece.

5.9.4 Apparatus

Test machine as specified in ISO 9352.

5.9.5 Materials

See ISO 4586-2:

5.9.6 Procedure

See ISO 4586-2:

For test of boards complying with class 1 or 2 for wear, examine the specimen for wear after each 10 revolutions.

For test of boards complying with class 3A, 3B and 4 examine the specimen for wear after each 25 revolutions. When coming close to the IP, the assessment shall be carried out every 10 revolutions.

5.9.7 Expression of results

See ISO 4586-2: for definition of Initial Wear Point (IP). Record the IP as the number of revolutions.

The results shall be the mean value of the 3 test pieces

5.10 Resistance to water vapour

5.10.1 Principle

The test is used to determine the homogeneous bonding or the surface properties of a product. Hot steam stresses the decorative layer to a high degree.

NOTE If there is insufficient impregnation of the decorative layers and if the polycondensation of the resins in has not cured correctly suffers loss of gloss and/or trends to lead to blistering and swelling of the board surface. The cellulose paths before pressing is too far advanced, hot steam can cause blistering. Surface resin which

5.10.2 Apparatus

See ISO 4586-2:

5.10.3 Test pieces

One test piece measuring 100 mm x 100 mm is required. Where different surface finish and laminate quality exists, the surface tested shall be stated.

5.10.4 Procedure

See ISO 4586-2:

5.10.5 Expression of results

See ISO 4586-2:

5.11 Resistance to colour change in xenon arc light

5.11.1 Principle

A test specimen taken from the melamine faced board under test is partly exposed to the light of one or more xenon arc lamp(s), simultaneously with a set of blue wool references. The radiant exposure is determined by assessing the effect on blue wool references and related degradations of the colour of the specimen is assessed by the contrast between the exposed and unexposed portions of the test specimen.

The test method is fully described in ISO 4892-2.

5.11.2 Apparatus

As described in ISO 4892-2 with an evenly humidity control.

5.11.3 Test pieces

As specified in ISO 4892-2 and ISO 4586-2: Where different surface finish and laminate quality exists, the surface tested shall be stated.

5.11.4 Procedure

Carry out the test using the single exposure method described in ISO 4892-2, Table 3, method B, cycle n°2 and discontinue the exposure when Blue Wool Standard No. Six shows a contrast between exposed and unexposed portions equal to Grade 4 of the grey scale.

5.11.5 Expression of results

Examine the contrast between exposed and unexposed portions of the test piece and record it in terms of grades on the grey scale.

Express the result in relation to the resistance to colour change of Blue Wool Standard No. Six as shown in Table 1.

Table 1 — Resistance to colour change

Test piece contrast (Grey Scale Grade No.)	Resistance to colour change (Blue Wool Standard No.)
> 4	> 6
4	6
< 4	< 6

5.12 Gloss level

5.12.1 Principle

Using either a specular gloss meter, or a reflectometer, the aim of this test is to assess the specular gloss of the test piece as a numerical value or to compare the specular gloss of the test piece against a master sample.

5.12.2 Test piece

Cut a 200 mm × 200 mm test piece from the board or panel under examination. Where different designs and surface finishes are used the surface for comparison shall be stated.

5.12.3 Apparatus

Gloss meter as specified in ISO 2813.

5.12.4 Procedure

Place the gloss meter on the surface of the test piece.

Measurements shall be carried out by using gloss meter with the specified geometries and according to the following procedure:

Measure the gloss using the 60° geometry method. If the result is greater or equal to 70 unit (high specular gloss) additional measurement shall be carried out using the 20° geometry method.

NOTE 1 The 20° geometry method, which uses a smaller receptor aperture, is intended to obtain improved differentiation of high specular gloss.

If the result is less than 10 units (low specular gloss) additional measurements shall be carried out using the 85° geometry method.

NOTE 2 The 85° geometry method, which uses a larger receptor aperture, is intended to obtain improved differentiation of low specular gloss.

The same geometry shall be used for all the measurements of a test piece.

At least 2 measurements shall be carried out in each of the four directions of the board (longitudinal and transverse) at the agreed angle. Calculate the mean value for each direction, rounded to the next whole number

5.12.5 Expression of results

The result is the mean value of numerical value expressed in gloss grade and in case of comparison; the result is the difference between the reference sample and the test piece.

5.13 Resistance to impact by large-diameter steel ball

5.13.1 Principle

A test piece from the board under test is covered with a sheet of carbon paper and subjected to the impact of a steel ball which is allowed to fall from a known height. Impact resistance is expressed as the maximum drop height which can be achieved without incurring visible surface cracking or producing an imprint greater than a specified maximum diameter.

5.13.2 Apparatus

See ISO 4586-2:

5.13.3 Test pieces

The test pieces shall be clamped in the frame without any support.

The 5 test pieces shall be (230 ± 5) mm square.

5.13.4 Procedure

See ISO 4586-2:

5.13.5 Expression of results

See ISO 4586-2

6 Test report

The test report shall include the following information for each test:

- a) name of the laboratory;
- b) reference to the relevant clause of this Kenyan standard according to the test;
- c) name, type and thickness of product and when necessary colour, texture and side tested;
- d) test results;
- e) any deviation from the specified procedure;
- f) date of the test.

Annex A
(informative)
Staining agents

Table A.1 — Staining agents

Staining agents	Test conditions
<p>GROUP 1 * Acetone Other organic solvents Toothpaste Hand cream Urine Alcoholic beverages Natural fruit and vegetable juices Lemonade and fruit drinks Meats and sausages Animal and vegetable fats and oils Water Yeast suspension in water Salt (NaCl) solutions Mustard Lyes, soap solution Cleaning solution 23 % dodecylbenzene sulphonate 10 % alkyl aryl polyglycol ether 67 % water Stain or paint remover based on organic solvents Citric acid (10 % solution)</p>	<p>Apply staining agent at ambient temperature. Contact time: 16 h</p>
<p>GROUP 2 * Coffee Black (120 g of coffee per litre of water) Black tea (9g of tea per litre of water) Milk (all types)</p>	<p>Apply test material at approximately 80 °C. Contact time 16 h</p>
<p>Cola beverages Wine vinegar Alkaline-based cleaning agents diluted to 10 % concentration with water Hydrogen peroxide (3 % solution) Ammonia (10 % solution of commercial concentrate) Nail varnish Nail varnish remover Lipstick Water colours Laundry marking inks Ball point inks</p>	<p>Apply test material at ambient temperature Contact time 16 h</p>
<p>If the product under test meets specification requirements when tested with the materials marked with an asterisk then it is deemed to comply with the specification for stain resistance. The other test materials are included for information only.</p>	
<p>NOTE Acids and alkalies in stronger concentration, which can be contained in commercial cleaning agents, can cause surface damage or marking, even with very short contact time.</p>	