KENYA STANDARD

KS 667: 2012
ICS 87.040

Specification for water thinned priming paints for wood

(First Revision, 2012)

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REVISION OF KENYA STANDARDS

In order to keep abreast of progress in industry, Kenya Standards shall be regularly reviewed. Suggestions for improvements to published standards, addressed to the Managing Director, Kenya Bureau of Standards, are welcome.

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Specification for water thinned priming paints for wood

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Foreword

This Kenya Standard was prepared by the Technical Committee on Paints and Allied Products under the guidance of the Standards Project Committee, and it is in accordance with the procedures of the Kenya Bureau of Standards.

This Standard was first published in 1988 and has since been revised. During the first revision of this standard requirement for dry opacity was introduced. The earlier edition specified test for wet opacity,this has since been changed to dry opacity of 90% minimum. The maximum lead content in the paint was also introduced in the Standard. This has been specified to be 0.045% maximum..

During the revision of this standard, reference was made to the information provided by the Industry.

Acknowledgement is hereby made for the assistance received from this source.

KENYA STANDARD

Specification water thinned priming paints for wood

1. Scope

This Kenya Standard specifies the requirement and test methods for water-thinned paints intended for application by mechanical means and/or by brush to exterior and interior softwood joinery.

2. Composition

2.1 General — The paint shall be based on a pigmented aqueous emulsion of a suitable polymer; neither this emulsion nor the paint based on it shall contain any added plasticizer.

2.2 Non-volatile Content — The paint for application by brush shall have a non-volatile content of not less than 50 per cent by mass when tested by the method described in KS 03-161: Part 5*.

3. Sampling

For the purpose of the tests specified, representative samples of the paint measuring not less than 500 mL shall be taken randomly and examined by the method described in KS 03-161: Part 3†. Glass or other non-corrodible containers shall be used for packing.

4. Condition in the container

The paint shall be in such a condition that manual stirring readily produces smooth uniform mixture.

5. Hard-drying

The paint when applied to a clean glass panel by means of a suitable applicator to give a wet film thickness of 50 µm to 60 µm, and when tested by use of a drying time recorded, shall be hard-dry in not more than 75 min.

6. Appearance of dried film

The paint when applied and tested as described in Clause **6** shall give a dry film which is smooth, uniform and free from surface imperfections.

7. Blocking

Note 1:*This clause is applicable only to paints intended for use on factory-prepared joinery likely to be stacked after priming.*

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* Methods of test for paints, varnishes, lacquers and enamel Part 5. Determination of volatile and non-volatile matter.

† Methods of test for paints, varnishes, lacquers and enamels Part 3. Determination of flow time by use of a flow cup

When the paint is tested by the method in Appendix A, the films shall show no evidence of damage.

8. Low temperature film formation

Note 2*: This clause is applicable only to paints intended for site application.*

The paint, when tested by the method described in Annex B, shall give a satisfactory film which shows no spreading of the ink.

9. Blister resistance

The paint, when tested by the method described in Appendix C, shall not show blistering or cracking.

10. Dry Opacity

When tested using a cryptometer method, the dry opacity of the paint shall be 90% minimum.

11. Resistance to natural weathering

The paint, when tested by the method described in Annex D, shall show no cracking, no flaking and not more than slight chalking after an exposure of six months.

12. Resistance to accelerated weathering test

The paint, when tested using a xenon tester machine for 600 h shall show no cracking, flaking and no more than slight chalking.

13. Maximum lead content

The paint, when tested by the method described in Annex E, shall not have a lead content more than 0.045 per cent by mass, determined on the dry film.

14. Compatibility with glazing putty

When the paint is used to prime glazing bars, putty[†] shall adequately adhere to the dried film of the paint, and the paint shall have no deleterious effect upon the drying properties of the putty. When tested according to the method described in Appendix F, the condition of the putty after drying for 40 h shall be:

(*a*) Such that it can be painted, with a good quality alkyd or aloe-resinous white undercoating, without lifting or disturbance of its surface;

(*b*) Such that the coat of white undercoating applied as in (*a*) shall dry in 24 h and not show discoloration, wrinkling, grittiness or other defects.

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[*] Methods of test for paints, varnishes, lacquers and enamels
Part 10. Determination of contrast ratio of light coloured paints at a fixed spreading rate (using polyester film).

[†] Relevant Kenya Standard to be prepared.

15. Storage stability

The paint, when stored in the original sealed container in normal temperature conditions, shall retain the properties detailed in Clauses **4** to **15** inclusive and shall be free from mould and petrefaction for one year from the date of manufacture.

16. Marking

Containers in which the paint is packed shall be marked with:

(i) Manufacturer's name and/or registered trade mark;

(ii) Instructions for use;

(iii) Date of manufacture.

Annex A

(normative)

Blocking test

A.1 Apparatus and material

The following apparatus and material are required:

(*a*) Microscope slides* two, 25 m wide;

(*b*) Suitable applicator;

(*c*) Bridges, two suitable bridges are shown in Figure 1;

(*d*) Kraft paper machine glazed 55 g/m^2.

* Relevant Kenya Standard to be prepared.

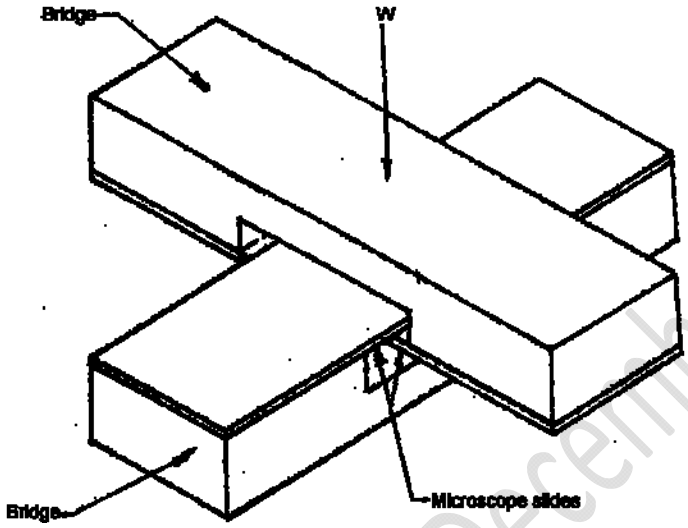

Fig.1 — test for blocking

A.2. Procedure

A.2.1 Apply the paint to the glazing face of the kraft paper by means of the applicator to give a dry film mass per unit area of 0.005 g/cm^2 to 0.006 g/cm^2 (27.5 ± 0.5 µm) and allow it to dry for 2 h at a temperature of 23 ± 2 ^{0}C and a relative humidity of 65 ± 2 per cent.

A.2.2 After this period of time cut two pieces 25 mm x 50 mm of the coated paper, and by means of double-sided adhesive tape fix one piece of coated paper to each microscope slide so that the coated side is uppermost.

A.2.3 Place the slides so that they are at 90^0 to each other and form a cross with the coated faces in contact.

A.2.4 Place a weight of 250 g on the intersection of the slides and leave for 2 h at a temperature of 23 ± 2 ^{0}C and a relative humidity of 65 ± 2 per cent. Then place the upper slide across one of the bridges and place the other bridge across the other slide. Apply weights on the second bridge until the two slides separate.

A.2.5 Inspect the films for damage.

Annex B
(normative)

Method of test for low temperature film formation

B1. Apparatus and materials

The following apparatus and materials are required:

(*a*) Refrigerator or controlled temperature enclosure;

(*b*) Suitable applicator;

(*c*) Kraft paper, machine glazed, 55 g/m^2;

(*d*) Washable ink, complying with KS 518*.

B.2 Procedure

B.2.1 Fix the kraft paper with its glazed face uppermost to a glass panel by means of double-sided

B.2.2 adhesive tape and place in the refrigerator at a temperature of 4 ^{0}C for 2 h together with the applicator and paint.

B.2.3 Remove and apply the paint to the glazed face of the kraft paper by means of the applicator to give a dry film mass per unit area of 0.005 g/m^2 (27.5 ± 0.5 µm) and replace the glass panel and paper immediately in the refrigerator for 24 h at a temperature of 4 ± 1 ^{0}C.

B.2.4 After a period of 5 min, examine for lateral penetration of the ink into the paint film.

Annex C
(normative)
Test for blister resistance

C1. Apparatus and material

(*a*) *Blister box* — A suitable box is shown in Figure 2. The box is constructed of 20 mm thick wood and has two pieces of 12.5 mm aluminium angle fixed across the top to support the test panels;

(*b*) *Two panels* — Of pine, 150 mm x 100 mm x 20 mm, rubbed smooth with No. 0 glass paper.

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* Specification for fountain pen inks.

Dimensions in millimetres

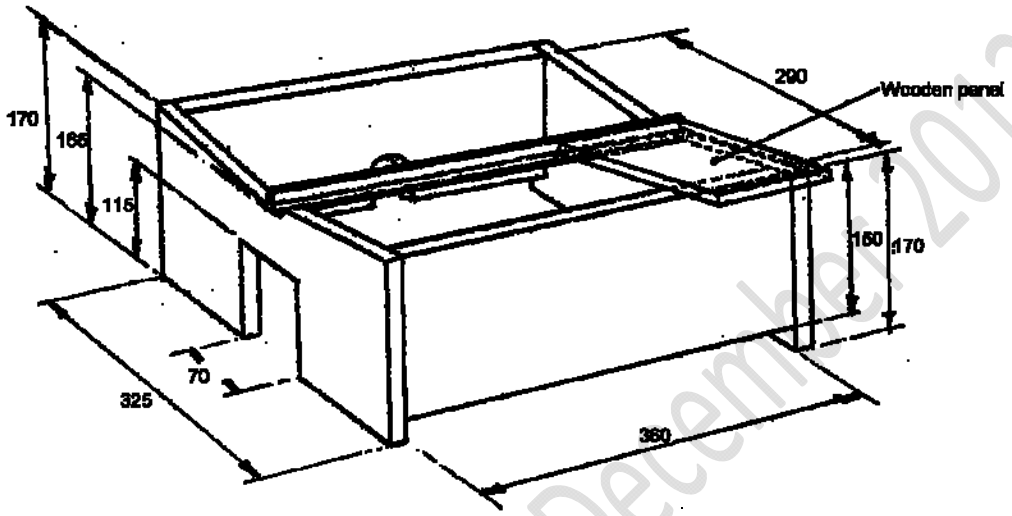

Fig. 2 — example of a blister box

C.2 Procedure

C.2.1 Coat one face and all edges of duplicate panels of the softwood with the paint and allow them to dry for 2 h at a temperature of 23 ± 2 ^{0}C and a relative humidity of 65 ± 2 per cent. Then overpaint the primed surface of each panel with a good quality alkyd or oleo-resinous undercoating and allow to dry for 16 h to 24 h. Apply a coat of good quality alkyd gloss finishing paint and allow to dry at a temperature of 23 ± 2 ^{0}C and a relative humidity of 65 ± 2 per cent for 7 days.

C.2.2 After this period place the blister box over a water-bath (an electrically heated bath is very suitable) controlled at a temperature of 65 ± 2 ^{0}C and place the panels on the box with the face which is unpainted downwards for a period of 50 h. Unused spaces of the box shall be covered with panels.

C.2.3 After this period remove the panels and examine the painted faces with x3 magnification for blistering and cracking.

Annex D
(normative)
Method of test for resistance to natural weathering

D1. Materials

The following materials are required:

(*a*) Cypress wood with a water content not exceeding 13 per cent and free from fungal infection.

(*b*) Panels of dimensions 304 mm x 95 mm x 20 mm cut from cypress wood (*a*) with a straight sided groove, 254 mm x 15 mm x 6 mm deep cut in the centre of the face on the outer side of the panels.

D2. Procedure

Paint all sides and edges of triplicate panels with one coat of the paint and then expose the panels horizontally, grooved face uppermost, in an open position for the specified period. Then examine the panels using a x10 magnification for signs of deterioration of the film e.g. cracking, flaking or chalking.

Failures resulting from obvious defects in the substrate shall be ignored.

Annex E

(normative)

Determination of lead content

E.1 Extraction of lead solution

E1.1 **Reagents** — Analytical grade and distilled water (or deionized water) shall be used:

(a) Hydrochloric acid, approximately 5.5 M solution;

(b) Nitric acid, approximately 5 M solution;

(c) Kaolin;

(d) Sodium sulphide, 1 per cent (w/v) solution.

E1.2 **Procedure** — Weigh to the nearest 0.01 g about 5 g of the well-mixed sample into a silica or porcelain crucible.

E1.2.1 Place the crucible and its contents on a hot plate to remove volatile solvents, and add about 0.1 g kaolin weighed to an accuracy of 0.010 g.

E1.2.2 Heat the crucible over a Bunsen flame which has had the flame adjusted so that the luminous zone is just eliminated. The flame shall be kept as low as possible to avoid causing loss of lead by volatilization or fusion into the glaze of the crucible.

E1.2.3 The sample shall be allowed to catch fire and ashing shall be carried out without the temperature exceeding 500 ^{0}C. The final removal of carbon is best completed by heating in a muffle furnace fitted with a pyrometer so that the temperature can be maintained at 500 ^{0}C.

E1.2.4 Transfer the ash to a 250 mL beaker, add 100 at the approximately 5.5 M hydrochloric acid and boil gently for 15 minutes. Allow to stand for a further 15 minutes on a steam bath. Filter by decantation through a medium texture filter paper (Whatman No. 40 or Barcham Green 803) into 250 mL beaker and wash the paper and residue with hot water. Make the filtrate and washing up to a total volume of 250 mL in a one mark volumetric flask. This solution is further diluted and the lead concentration determined by AAS. The range covered is from 0.2 per cent to 2 per cent by weight calculated on the liquid paint.

E.2. Determination of lead by atomic absorption spectroscopy

E2.1 **Apparatus** — Atomic absorption spectrophotometer, consisting of an atomizer, air-acetylene slit burner, pressure regulating and metering devices for air and acetylene, a lead hollow cathode lamp with regulated voltage supply, an optical system to isolate the derived radiation line, a photosensitive detector connected to an electronic amplifier and a read-out device.

E2.2 **Reagents** — The reagents shall be of recognized analytical reagent quality and distilled water or water other wise prepared of at least equal purity shall be used:

(*a*) Concentrated nitric acid, sg. = 1.42;

(*b*) Concentrated hydrochloric acid, sg. = 1.18;

(*c*) Hydrochloric acid, approximately 5.5 M. Add to water an equal volume of hydrochloric acid (*b*)*;*

(*d*) Hydrochloric acid, approximately 0.5 M. Add 45 mL of the hydrochloric acid (*b*) to water and dilute to 1 000 mL.

(*e)* Standard lead stock solution, containing 100 ppm of lead (Pb). Dissolve in water 1.598 g of lead nitrate $Pb(No_3)_2$ previously dried for 2 h at 105 ^{0}C, add 10 mL of nitric acid (*a*) dilute to 1 000 mL with water.

(*f*) Intermediate standard lead solution, containing 100 ppm of lead (Pb). Dilute 10.0 mL of the stock lead solution (*e*) to exactly 100 mL with the hydrochloric acid *(d).*

(*g*) Working standard lead solutions, contiaining 0 to 20 ppm of lead (Pb). Dilute suitable aliquots of the intermediate standard lead solution (*f*) to 100 mL with the hydrochloric acid (*d*) to give solutions containing 0, 5, 10, 15 and 20 ppm of lead.

Note1: *The working standard lead solutions shall be freshly prepared for each series of test samples or at least daily.*

E2.3 Calibration and Standardization of Spectrophotometer — Consult the manufacturer's literature in order to establish the optimum operating conditions for the particular AAS to be used.

Switch on the instrument and apply the recommended current to the lead hollow cathode lamp. Adjust and set the wavelength to obtain maximum response for the 283.3 mm lead line. Set the slit width.

Adjust and set the air and acetylene flow pressures and ignite the burner according to the manufacturer's instructions. Aspirate water for at least 15 minutes to clean the atomizer, etc., and stabilize the flame temperature.

Adjust the controls to give maximum absorption with the working standard lead solution containing 20 ppm of lead and zero absorption with a reagent black. Aspirate each of the working standards in turn and record the corresponding instrument reading. Aspirate water between each standard.

Construct a graph showing instrument readings against lead concentrations between 0 and 20 ppm.

Note 2: The instrument should be recalibrated and a new graph constructed whenever new working standard solutions are prepared.

E2.4 **Procedure** — Using the acid extract obtained in Clause **E1**, add 7 mL of hydrochloric acid in **E2.2** (*c*) to each of two separate 5.0 mL aliquots and dilute each to exactly 100 mL with water. Aspirate each of the diluted solutions and record the instrument readings.

NOTE: The two readings should be within 2 per cent absolute. Determine the lead concentration of the solutions in ppm by reference to the calibration graph and calculate the average lead concentration (*c*).

E2.5 **Calculation and Report** — Calculate and report the lead (Pb) content as a percentage by weight of the sample from the expression per cent.

$$Pb = \frac{C}{2w}$$

where,

C = the average concentration of lead (Pb), in ppm in the solution; and

W = the original sample weight, in grams.

Annex F
(normative)
Test for compatibility with glazing putty

F1. Apparatus and material

The following apparatus and materials are required:

(*a*) Suitable putty knife;

(*b*) *Wood moulding* — Length approximately 250 mm, with a 12.5 mm x 12.5 mm rebate down its length, made from a piece of solid wood which is free from knots;

(c) Linseed oil putty.

F.2 Procedure

F.2.1 Apply a coat of the paint to the wood moulding and allow it to dry for seven days. Then with the thumb, fill the moulding with putty and smooth off with one stroke of the putty knife to a clean surface so that a cross section of the putty presents a triangular area.

F.2.2 After allowing the putty to dry for 48 h at a temperature of 23 ± 2 ^{0}C and a relative humidity of 65 ± 2 per cent, coat the surface of the putty with a good quality alkyd or oleo-resinous white under-coating by means of a brush and allow to dry for 24 h at a temperature of 23 ± 2 ^{0}C and a relative humidity of 65 ±2 per cent. Observe during the coating operation if there is any lifting or disturbance of the putty surface.

F.2.3 After the 24 h drying period, determine whether the white under-coating is surface-dry by carrying out the test described in Appendix G and also examine the undercoat film for discoloration, wrinkling, grittiness or other defects.

Annex G
(normative)
Surface drying test

G1. Definitions

G1.1 **Surface-drying State** — The state of the surface of a coating of paint or varnish, i.e. whether 'surface- dry' or not.

G1.2 **Surface-dry** — Surface drying state of a coating of paint or varnish when ballotini can be lightly brushed away without damaging the surface of the coating.

G1.3 **Ballotini** — Small transparent glass spheres. It is obtained by sieving from a suitable commercial grade of ballotini and shall be graded so that none passes a sieve of nominal mesh aperture of 250 µm.

G2. Procedure

G.2.1 Place the wood-moulding (Annex F) in a horizontal position.

Pour 0.5 g of the ballotini (**G1.3**) onto the surface of the coating from a height of not less than 50 mm and not more than 150 mm.

***Note 3**: It is convenient to pour the ballotini down a glass tube of appropriate length and with an internal diameter of approximately 25 mm, in order to avoid undue spreading of the ballotini and thus enable further tests to be made, if necessary on other areas.*

G.2.2 After 10 s hold the moulding at an angle of 20^0 to the horizontal and brush the coating lightly with a soft-haired brush.Examine the surface of the coating using normal corrected vision. The coating is surface-dry if all the ballotini can be brushed away without damage to the surface.

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