

Kenya Standard — Paints and Varnishes — Varnish for wooden surface — Specification

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Foreword

This standard has been prepared by the Technical Committee on paints and allied products under the guidance of the Standards Projects Committee, and it is in accordance with the procedures of the Kenya Bureau of Standards.

Varnish is a transparent, hard, protective finish or film primarily used in wood finishing but also for other materials. It's made of a drying oil, a resin, and a thinner or solvent. Finishes are usually glossy but may be designed to produce satin or semi-gloss sheens.

Varnish may or may not have colour, is transparent, and has no added pigment, as opposed to paints or wood stains, which contain pigment and generally range from opaque to translucent, its applied over wood stains as a final step to achieve a film for gloss and protection.

Parameters covered in this Standard include, drying time, types, grades and scratch resistance among others. The standard will be used to check the quality of varnish imported into the country and manufactured locally.

During the preparation of this Standard reference was made on;

SANS : 887 2005 — Varnish for interior use

Acknowledgment is hereby made for the assistance derived from this source.

Draft Kenya Standard

Kenya Standard — Paints and Varnishes — Varnish for wooden surface — Specification

1 Scope

This Kenya Standard prescribes the requirement and methods of sampling and test for two types of varnish for interior use on wooden surfaces.

2 Normative references

The following documents are indispensable for the application of this standard:

KS ISO 2813, Paints and varnishes — Method of test — Determination of specular gloss of paint films.

KS 812, Table 1 (8): Paints and varnishes — Matt emulsion paints — Specification.

KS161-4, Determination of specific gravity or weight/litre.

KS ISO 1524, Paints and varnishes — Method of test — Part 18 — Determination of fineness of grind.

KS ISO 3856-1, Paints and varnishes -- Determination of "soluble" metal content -- Part 1 Determination of lead content -- Flame atomic absorption

KS ISO 4618-1, Paints and varnishes — Terminology.

ISO 9117-3:2010 Paints and varnishes -- Drying tests -- Part 3: Surface-drying test using ballotini as test method.

ISO 17132:2007 Paints and varnishes -- T-bend test

KS ISO 2813:1994 Paints and varnishes -- Determination of specular gloss of non-metallic paint films at 20 degrees, 60 degrees and 85 degrees

KS 2581:2014

3 Definitions

For the purposes of this standard, the terms and definitions given below and those in KS ISO 4618-1 shall apply.

3.1

Batch

- a) when varnish is supplied in single containers(single pack), a final blend of material in one large vessel from which smaller containers are filled for distribution and marketing or
- b) when material is supplied in dual containers (two pack), a final blend of the base component in one vessel and curing agents in another vessel, from which separate containers of base component and curing agents are filled for distribution and marketing.

3.2

varnish

- a) material supplied in single container, or
- b) product obtained by mixing base component and curing agent, supplied in separate containers, and mixed as per e manufacturer's instructions .

4 Types

The varnish shall be of two types

4.1 type I

General purpose glossy or matt

4.2 type II

Solvent, heat and chemical-resistant glossy or matt varnish

5 Requirements

5.1 Condition in the container

Freshly opened containers of the material shall show no sign of livering or instability .Glossy varnish and its components shall be clear, transparent and free from sediment. Any sediment present in matt varnish or its component shall be capable of being easily and rapidly dispersed with a stirrer to a smooth homogeneous state. Type I varnish shall be free from skins and lumps.

5.2 Pot life for type II Varnish

When tested in accordance with annex A, the varnish shall show no signs of separation, incompatibility or gelation.

5.3 Colour of glossy varnish

When tested in accordance with ISO 4630-1, the colour of glossy varnish shall not exceed the appropriate value given in table 1.

Table 1-Colour of glossy varnish

1 Type	2 Gardner units
I	12
I(Pale)	6
II	6

5.4 Resistance to skinning of type I varnish

When tested in accordance with annex B, type I varnish shall not skin.

5.5 Fineness of grind of matt varnish

When tested in accordance with KS ISO 1524, the fineness of grind of matt varnish shall not exceed 25µm.

5.6 Application properties

When tested in accordance with annex C,

5.6.1 Type I varnish shall brush well and shall show good spreading, joining and leveling properties. It shall show no noticeable pull under the brush and shall not set rapidly. The dried film shall be uniform in gloss and shall be free from brush marks, nibs, sags, wrinkles and other undesired properties.

5.6.1 Type II varnish shall have acceptable brushing properties and shall show no cissing or tendency to blush. The dried film shall be uniform in gloss and shall be free from bubbles, nibs, brush marks, sags and other undesirable properties.

5.7 Spraying properties

When tested in accordance with annex D, the varnish shall spray well and shall show no cissing, bubbling or tendency to blush, sag, creep, run or produce an orange peel effect.

5.8 Recoating properties

KS 2581:2014

A second coat of varnish applied in accordance with annex E, after the first coat has been allowed to dry for appropriate period(s) given in table 2, shall cause no wrinkling, blistering or lifting of the first coat and shall show no other defects.

Table 2:—Time periods required before recoating property is determined

1 Type	2	3
	Recoating time, hours	
	Brushing	Spraying
I	16	16
II	6	6

5.9 Drying time

When tested in accordance with ISO 9117-3:2010, the varnish shall have surface dry time and hard dry time as shown in table 3 below.

Table 3:— surface dry time and hard dry time

1 Type	2 Surface dry, hours, max	3 Hard dry, hours, max
I	4	16
II	1	8

5.10 Scratch resistance

When tested in accordance with annex F,

5.10.1 Type II varnish shall not be marked when a mass of 500g is applied, and

5.10.2 The scratch produced on type I varnish by application of a mass of 1500 g and on type II varnish by application of 1800 g, shall be free from jagged edges and shall not penetrate to the underlying surface.

5.11 Flexibility

When tested in accordance with ISO 17132:2007 the varnish shall not crack or show loss of adhesion when bent through 180° over a 4 mm diameter mandrel.

5.12 Specular gloss

When tested in accordance with KS ISO 2813 on black glass panels prepared in accordance with annex F, the varnish film shall have the appropriate specular gloss specified in table 4.

Table 4—Requirements for specular gloss

1	2	3
Type	Specular gloss at	
	20 ⁰	60 ⁰
I and II, glossy	85,min	-
I and II, matt	-	0 to 20 ⁰

5.13 Yellowing

When tested in accordance with annex G, the increase in yellowness of type I varnish and Type II varnish if type II varnish is claimed to be non-yellowing, shall not exceed that of the reference varnish tested at the same time.

5.14 Resistance to cold water

When tested in accordance with annex H,

5.14.1 Type I film shall show no lifting (either between coats or away from substrates) or other visible defects , except slight whitening or dulling or both and not more than slight softening. after a 4 hour recovery period, it shall be free from whitening, dulling, softening and other defects.

5.14.2 Type II film shall show no lifting (either between coats or away from substrates) or other visible defects. After 1 hour of recovery period, it shall be free from softening and other defects.

5.15 Solvent resistance of type II varnish

When tested in accordance with annex I, to the action of methyl iso-butyl ketone, type II varnish film shall show no blistering, wrinkling, or lifting. After a 4 hour recovery period, the exposed portion of the film shall show no softening.

5.16 Heat resistance of type II varnish

When tested in accordance with annex J, type II varnish shall show no tendency to adhere to the container and the container shall leave no visible mark on the film.

5.17 Chemical resistance of type II varnish

When tested in accordance with annex H, type II varnish after exposure to the action of an alcohol, an acid, alkali and beverage shall immediately after removal of reagents, show no

KS 2581:2014

blistering, wrinkling or loss of adhesion, and not more than slight softening or change of colour. After two hour of recovery period, the exposed portion of the film shall comply with requirements of 5.10.2.

5.18 Lead content

When tested in accordance ISO 3856 the maximum permissible lead level is 100 ppm

6 Marking and packaging

6.1 Marking

Each container shall be legibly and indelibly marked with the following information.

- i. the words, "glossy" or "matt" varnish ;
- ii. the words, " wood varnish",
- iii. name and address of the manufacturer or brand name or both;
- iv. the type
- v. recommended thinner

- vi. Volume in litres;
- vii. Dated of manufacture;
- viii. Batch number

- ix. Best before date;

- x. Instruction for use ;disposal and safety precautions.

6.2 Packaging

6.2.1 The varnish shall be packed in suitable containers in the following measurements 20ℓ, 4ℓ, 1ℓ, ½ℓ and ¼ℓ.

6.2.2 The containers shall be strong enough to withstand normal usage and shall be adequately sealed to prevent leakage and contamination of its content during normal transportation and handling.

7 Sampling

Representative samples of not less than 2 by 1 litre shall be taken randomly from the factory, market or elsewhere and tested for compliance with the requirements of this standard.

8 Quality of reagents

Unless otherwise specified, analytical grade reagents and distilled water or de-ionized water of equivalent purity shall be used in all tests.

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**Annex A
(normative)**

Determination of pot life for type 2 varnish

A.1 Apparatus

A.1.1 Tin container, 500 mL .

A.2 Procedure

A.2.1 Fill a clean 500mL tin plate container with freshly mixed varnish, cover the container with tight fitting lid and invert momentarily.

A.2.2 Store in an upright position at temperature of 25 ± 2 °C for a period of 8 hours minimum (measured at the time of mixing) ,during this period do not agitate or disturb it.

A.2.3 At the end of the period inspect and test the contents of the container for compliance with the requirement of clause 5.2.

**Annex B
(normative)**

Resistance to skinning of type I varnish

B.1 Apparatus

B.1.1 Container, 500mL with airtight lid.

B.1.2 Spatula.

B.1.3 Porcelain spot plate.

B.2 Procedure

Fill the tin to three quarters of its capacity, with well mixed sample. Put the lid on securely, invert the tin for a few seconds and then allow it to stand undisturbed in the normal upright position for 48 hours. Open the lid and observe for skinning.

**Annex C
(normative)**

Application properties

C.1 Apparatus

C.1.1 Wooden panels, 450mm x 450mm.

C.2 Procedure

C.2.1 For type I ,apply varnish on the wooden panels described in annex F at 12.3 m²/L to 14.3 m² /L and allow a wet edge of 5 minutes.

C.2.2 For type II, apply as type I but starting in a top corner in a criss-crossing manner to the area stated above and lay of slightly with curved stokes. Continue application along the edges in this area in the same way. Keep the edges wet and in each case lay off into the previously varnished portion until the entire surface of the panel is covered with varnish.

C.4 Report

Check for compliance with clause **5.6**.

**Annex D
(normative)**

Spraying properties

D.1 Apparatus

D.1.1 Wooden panels, 450 mm x 450 mm.

D.1.2 Applicator

D.2 Procedure

D.2.1 Use varnish as supplied, or

D.2.2 after thinning nine parts of the varnish with more than one part of the thinner recommended by the manufacturer.

D.3.3 Apply the varnish at wet film thickness of 65µm to 75 µm and allow no wedge time. Examine the wet film, and after allowing the film to dry(with the panels in vertical position) for the appropriate period specified in table 2. Examine the film again for compliance with clause 5.7.

**Annex E
(normative)**

Recoating properties

E.1 Procedure

E.3.1 Allow panels used in annex D and F for appropriate period (2) specified in table 2. Apply second coat in the same manner, and Inspect immediately after application for compliance with clause 5.8

Annex F (normative)

Scratch resistance

F.1 Apparatus

F.1.1 Panels

F.1.1.1 Clear glass panels of thickness approximately 6mm and superficial size 70 mm x 150 mm unless different size is specified in the test method.

F.1.1.2 Plane polished black glass panels of thickness 6 mm and superficial size 70 mm x 15 mm.

F.1.1.3 Corrosion-free cold rolled steel panels of superficial size 70mm x 150 mm and thickness of 0.6 to 0.90 mm.

F.1.1.4 Tin plated panels of size 150 mm x 70 mm x 0.31 mm.

F.1.1.5 White glazed porcelain tiles of size 150 mm x 150 mm, and with reflectance of at least, 80%.

F.1.1.6 Pine veneer-faced laminated wooden panels of size at least 150 mm x 300 mm.

F.1.2 Degreasing

Clean test panels to remove grease before use. If steel panels are not to be used immediately, store them in the desiccator until they are required.

F.1.3 Application of films

Apply the varnish with an applicator blade at film thickness of 70 μm to 80 μm , unless otherwise specified.

F.1.4 Drying and aging

F.1.4.1 Air-drying

Immediately after application of the film, place panels in horizontal position in standard test conditions for drying.

F.1.4.2 Aging

Air-dry test panels in standard test conditions for a period of 168 hours.

**Annex G
(normative)**

Yellowing

G.1 Reference varnish, consisting of

G.1.1 Resin, sunflower-oil-modified alkyd resin with phthalic anhydride content of 24 % (by mass) and an oil length of 65% (by mass)

G.1.1.1 Solvent, petroleum spirit of low aromatic content, enough to give varnish consistency with similar application properties as samples under test.

G.1.1.2 Driers, grams per 100g of the resin:

cobalt naphthenate 0.05 g (expressed as Co)

Calcium naphthenate 0.25 g (expressed as Ca)

G.2 Procedure

G.2.1 Type I varnish

G.2.1.1 Prepare tiles in accordance with annex F, and using 50mm applicator blade, apply the reference varnish to one of a panel and varnish under test to other half. Air dry for 24 hours

G.2.1.2 Store the panel in the dark cupboard and in standard test conditions for a period of six weeks. Do not open the cupboard during the test.

G.2.1.3 At the end of this period assess the degree of yellowing of each film by comparing its colour (visually) with that of a 24 hour old film of the same varnish (i.e reference or test varnish, as relevant) for compliance with clause 5.13.

G.2.1 Type II varnish claimed to be non-yellowing

G.2.1.1 Prepare and edge two panels as described in **G.2.1**. Store on e tile in the dark as described in G.2.1.2 and expose the other tile (indoors) to normal ambient and seasonal conditions of diffuse daylight and darkness at the same period. At the end of the exposure period assess as described in **G.2.1.3**.

Annex H

(normative)

Resistance to cold water

H.1 Apparatus

H.1.1 Panels

H.1.1.1 Clear glass panels of thickness approximately 6mm and superficial size 70 mm x 150 mm unless different size is specified in the test method.

H.1.2 Preparation of the panel

Apply a coat of varnish to glass panel at spreading rate of 12.3 m²/L to 14.3 m²/L and allow a wet edge time of 5 minutes. Age the first coat for 6 hours and apply a second coat at same film thickness.

H.2 Procedure

Immerse the panels in distilled water maintained at 25 ± 2 °C for,

- | | |
|--------------------|-----------|
| a) Type I varnish | 24 hours |
| b) Type II varnish | 168 hours |

H.3 Report

Examine films immediately after removal from water and again after relevant recovery period under test conditions for compliance with clause **5.14**.

**Annex I
(normative)**

Resistance to solvent for type II varnish

I.1 Reagent

I.1.1 Methyl iso-butyl ketone

I.2 Material

I.2.1 Cotton wool.

I.2.2 Clear glass panels of thickness approximately 6mm and superficial size 70 mm x 150 mm unless different size is specified in the test method.

I.3 Procedure

Prepare and age glass panel in accordance to annex F. Soak a swab of cotton wool in methyl iso-butyl ketone, place it upon the film, cover the swab with a watch glass, and leave it in position for 15 minutes at 25 ± 2 °C.

I.4 Report

Inspect the varnish film immediately after removal of the swab again after 4 hour recovery period under standard test conditions for compliance with the requirements of **5.15**.

Annex J
(normative)

Heat resistance of type II varnish

J.1 Apparatus

J.1.1 Panels

J.1.1.1 Clear glass panels specified in annex F, but at least 150 mm in superficial size.

J.1.1.2 Container, a suitable 500mL tin plate container (with a lid) of diameter approximately 90mm.

J.2 Procedure

J.2.1 Draw down a 100 mm wide film of the varnish as described in **F.1.3** and allow it to age for 48 hours.

J.2.2 Fill the container with boiling water, replace the lid and immediately place the container in the varnish film.

J.2.3 Allow the container to remain undisturbed on the film until the water has cooled to room temperature.

J.3 Report

Remove the container and note whether the varnish film adheres to the container and whether the container has produced a mark on the surface of the film.

**Annex H
(normative)**

Chemical resistance of type II varnish

H.1 Reagents

H.1.1 Ethanol, one volume mixed with one volume of distilled water.

H.1.2 Acetic acid solution, five volumes mixed with 95 volumes of distilled water.

H.1.3 Sodium hydroxide solution, 5 g in 95 mL of distilled water.

H.1.4 Beverage, a coca-cola type beverage.

H.2 Procedure

H.2.1 Prepare and age 4 glass panel in accordance with annex F.

H.2.2 Place the panels in a horizontal position and, using a separate panel for each reagent, form small pool of the reagent on the film and cover with a watch glass.

H.2.3 Allow the reagent to remain in contact with the film at 25 ± 2 °C for the relevant period of time below.

H.2.3.1 Alcohol : 16 hours

H.2.3.2 Acid, sodium hydroxide 6 hours

H.2.3.3 Beverage 16 hours

H.3 Report

H.3.1 At the end of the exposure period, wipe off reagent, wash the panel with mild soap under running water (using a soft sponge),and the gently wipe with a piece of chamos leather. Inspect each panel immediately and again after 2 hours of recovery period under standard test condition for compliance with requirements in **4.16**.

H.3.2 After 24 hours recovery period under standard test conditions, test the exposed portions of the film for compliance with clause **5.10.2**.