IS 101-1-4 (1987): Methods of sampling and test for paints, varnishes and related products, Part 1: Test on liquid paints (general and physical), Section 4: Brushing test [CHD 20: Paints, Varnishes and Related Products]

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UDC 667·612·62/·63

Indian Standard

(Reaffirmed 2004)

METHODS OF SAMPLING AND TEST FOR PAINTS, VARNISHES AND RELATED PRODUCTS

PART I TESTS ON LIQUID PAINTS (GENERAL AND PHYSICAL)

Section 4 Brushing Test

(Third Revision)

Paints and Allied Products Sectional Committee, CDC 8; Panel for Methods of Test, CDC 8 : 6 : 4 [Ref : Doc : CDC 8 (9137)]

1. Scope — Prescribes procedures for assessing the brushing and flow characteristics of paints and related materials when applied to relatively large areas of closely defined substrates. It can also be used to observe other properties like the tendency of the paint to retract from sharp edges and protrusions with consequent loss of opacity and protective power.

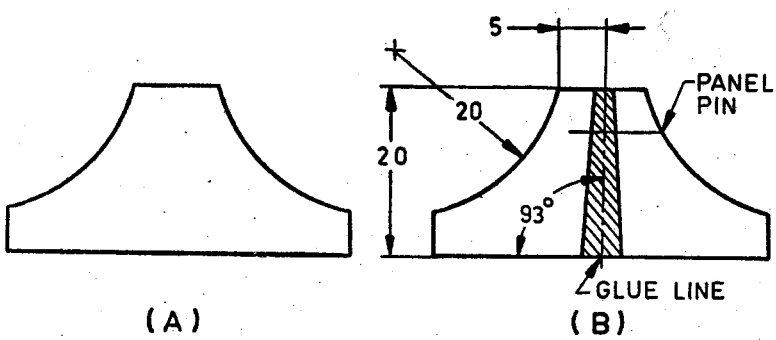
1.1 This test does not allow the determination of paint properties in any absolute or precise sense because of the subjective factor involved in evaluating results. Nevertheless when carried out by a skilled operator, and especially when used to compare the performance of a product under test of an agreed standard material, it has been found to give very useful information that is not attainable in any other way.

2. Selection of Panel for Test — The substrate material should be chosen in accord with the type of material under test and its proposed usage. Thus solvent-borne finishing paints and undercoats should be tested on filled plywood panels, filled or primed asbestos cement board or primed metal panels; wood primers on unfilled plywood panels, and water-borne paints on plasterboard, asbestos cement board, hard board or for some purposes, on unfilled plywood panels. The system used shall be that normally employed in practice. If there is any special substrate on which the material is to be used in practice or any special preparation of the substrate, when the panel used for the test should be chosen and prepared in accordance with these requirements as agreed to between the buyer and the seller.

3. Preparation of Panels

3.1 *Wood Panels* — Plywood (*see* IS : 303-1975 Specification for plywood for general purposes) of size 1 m × 1 m × 10 mm.

3.1.1 *Mouldings* — When it is desired to include a moulding, it is preferable to use a rectangular rather than a square panel. Two strips of mouldings (*see* Fig. 1A) shall be mitred at 45° at one end and fitted together as shown in Fig. 2 and 3.



All dimensions in millimetres.

FIG. 1 SECTION OF MOULDINGS

Adopted 30 April 1987

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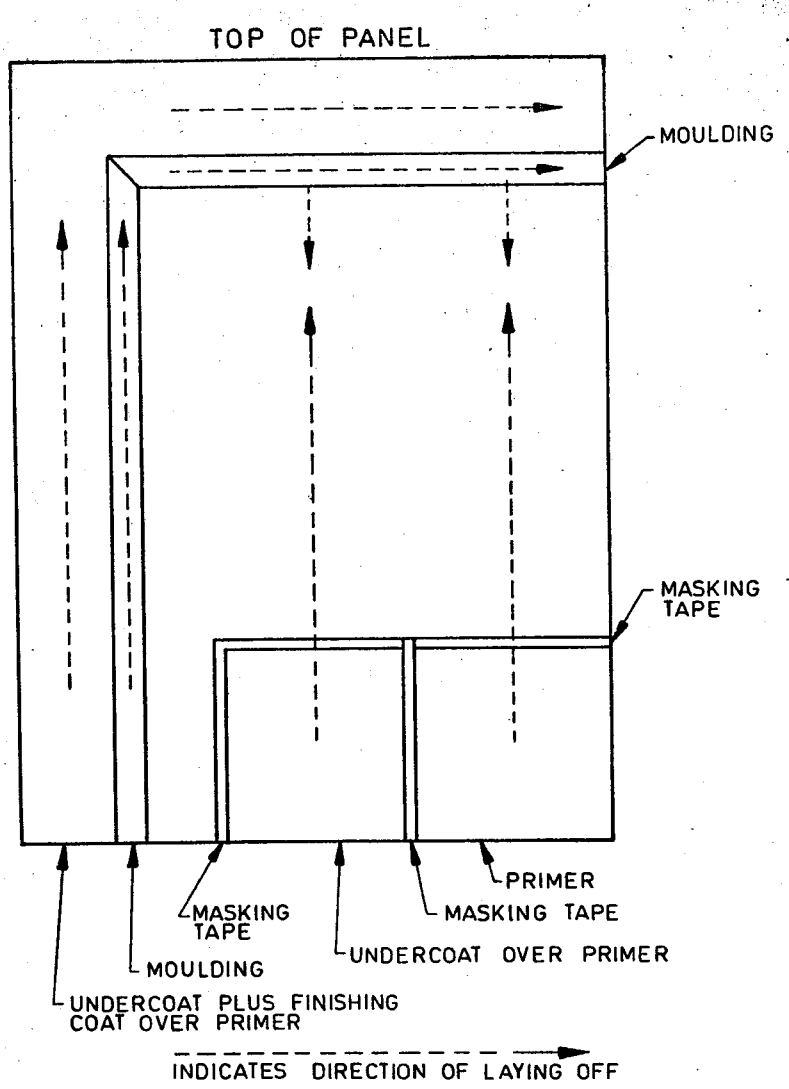

FIG. 2 ARRANGEMENT OF PANEL AND DIRECTIONS OF LAYING OFF

If the mouldings as shown in Fig 1A is not obtainable, it is permitted to nail, glue together two strips of half mouldings as shown in Fig. 1B. The strips of moulding should be fixed to the panel by nailing or glueing so that they are 150 mm from, and parallel to the edges of the panel. Other mouldings may be used as agreed to between the buyer and the seller.

3.1.2 Rub down the face of the panel and the moulding, if any, with glass paper known as Grade No. 0 until a smooth surface is obtained, taking care not to round the sharp edges of the moulding. If the panel is required for testing an undercoat or finish only, it is permitted to fill it by applying a suitable high build surface to the front of the panel and the moulding. After allowing this to dry for at least 24 h, the panel should be rubbed down with Grade No. 0 glass paper until a smooth surface is obtained.

3.1.3 For testing of paints other than primers, panels used for earlier tests may be reused, provided the surface has been wet abraded with a good quality waterproof silicon carbide paper, with an abrasive grain size corresponding to that known as 220 silicon carbide grit, until the gloss of the previous test paint has been entirely removed and smooth surface free from brushmarks has been obtained and, if necessary, a coat of suitable undercoat has been applied over the flatted surface and allowed to dry for 24 h, than wet abraded as above. Comparison of paints should be carried out only on similarly treated surfaces. Where recovered panels have mouldings, these should be renewed, if the sharp edges have become rounded. When coated plywood panels are to be wet abraded, it is a useful precaution to coat the back and edges of the panel with one or more coats of a suitable paint to prevent water entering the panel and causing the ply to lift.

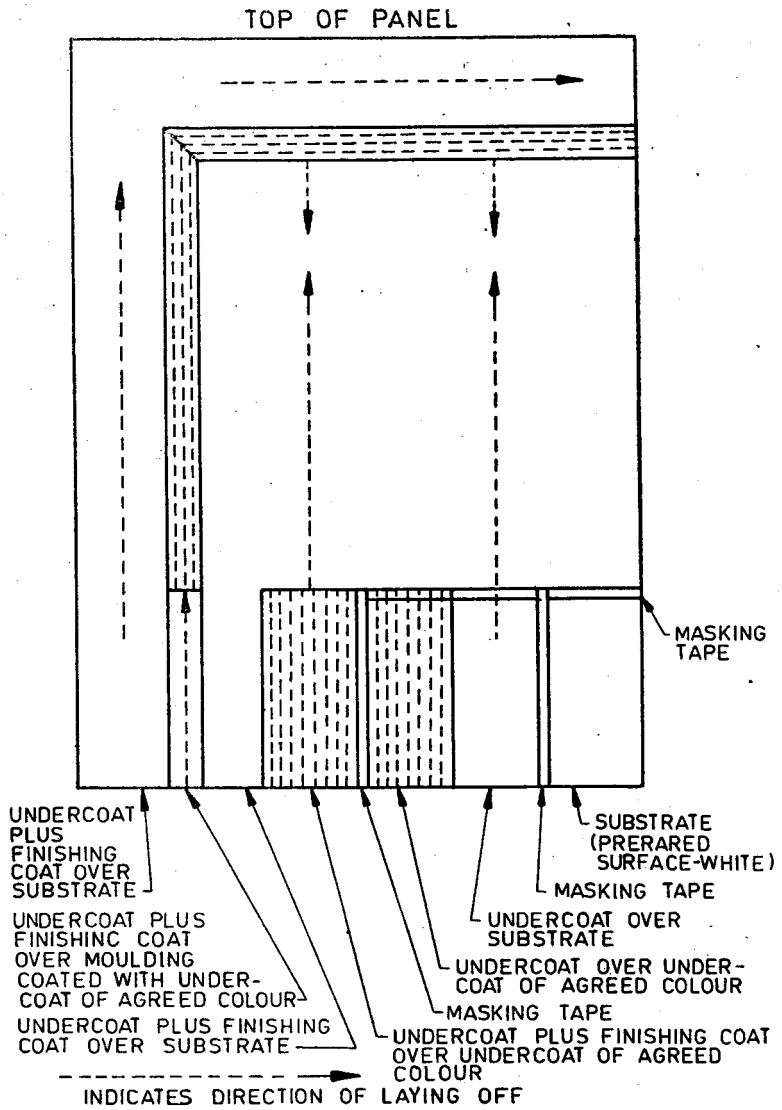

FIG. 3 ARRANGEMENT OF PANEL AND DIRECTIONS OF LAYING OFF

3.2 *Steel Panels* — Steel panels of size 1·0 m × 1·0 m × 1·25 mm as specified in IS:101 (Part 1/ Sec 3)-1985 'Methods of sampling and test for paints, varnishes and related products: Part 1 Tests on liquid paints (general and physical), Sec 3 Preparation of panels'.

3.2.1 If steel panels used earlier are to be reused, the entire paint coating may be removed using a suitable paint remover and the panel prepared as prescribed in **3.2**.

3.3 *Plastered Board Panels* — Good quality gypsum plasterboard not less than 1·0 m × 1·0 m × 9 mm in dimensions. The face used for painting is the face designed to receive decoration directly. No initial preparation is needed before painting.

3.4 *Hard Board Panels* — Of size 1·0 mm × 1·0 m × 5 mm. The face used for painting is the smooth one. No initial preparation is needed before painting.

3.5 *Asbestos-Cement Board* — Double-processed asbestos-cement board may be used and requires no initial preparation before painting.

4. Sampling — A representative sample of the product under test shall be obtained as prescribed in IS:101 (Part 1/Sec 1)-1981 'Methods of sampling and test for paints, varnishes and related products: Part 1 Tests on liquid paints (general and physical), Sec 1 Sampling (*third revision*)'.

5. Procedure for Painting

5.1 Wherever possible, a paint of similar type to the paint under test shall be agreed between the buyer and the seller as an approved sample for comparison purposes. The approved sample shall be applied first before the test paint or series of paints to similarly prepared panels. All paints shall be applied as full coat using similar procedure and similar brushes.

5.2 *Solvent-borne Paints*

5.2.1 *Testing single paints*

5.2.1.1 *Primers* — Primers shall be tested on appropriate panels prepared in accordance with **3**. One panel shall be prepared for each primer under test and one panel similarly for the approved sample. Place the panel in a near vertical position with the larger dimensions upright when appropriate. Remove any dust from the surface with a soft lint-free cloth or tack rag. Apply the approved sample to the test surface as described in **5.1** using appropriate brushes. Lay off in the direction as shown in Fig 2. Repeat the procedure with each primer under test, using clean brushes identical in type and size with those used for the approved sample. Note any difference in application properties. Allow the primers to dry for 24 h, unless otherwise specified, with the panels in vertical position. Examine the primer on the panels and mouldings, if any, and compare the primer under test with the approved sample for freedom from brush marks, sagging and flowing away from the edges of the moulding and for any other defects.

5.2.1.2 *Undercoats* — Undercoats shall be tested over a primer on plywood, steel panels or asbestos-cement panels prepared as described in **3** and **5.2.1.1** or on filled or recovered plywood or steel panels. Wet abrade each primer, using a good quality waterproof silicon carbide paper with an abrasive grain size corresponding to that known as 220 silicon carbide grit, until similarly smooth surfaces free from brush marking or other defects are obtained. Wash the panels thoroughly with clean water, remove surplus water with a soft lint-free cloth or a sponge and wash leather; and unless otherwise specified, allow the panels to dry for not less than 24 h and not more than 48 h before use. Prepare one panel for each undercoat under test and one panel similarly for the approved sample for comparison. On each panel leave unpainted or preferably mark off an area approximately 300 mm × 300 mm at the bottom corner remote from the mouldings, if any. Apply the approved sample and test sample to separate panels as described in **5.2.1.1**. Note any difference in application properties of the undercoat. Allow to dry for not less than 24 h and then remove the marking. Examine the undercoats in the panels and mouldings, if any, and compare the test sample with approved sample for freedom from brush marking, sagging and flowing away from the edges of the moulding and for any other defects.

Note — The object of marking a portion of the panels is to provide a check, when assessment is carried out, that the substrates on which the paints are applied are comparable.

5.2.1.3 *Finishing paints* — Finishing paints shall be tested on panels prepared as described in **5.2.1.2** except that the primer shall be completely covered using an undercoat as agreed to between the buyer and the seller. Before application of the finishing coat, wet abrade the plain areas of the panels in the same manner as described for primers in **5.2.1.2**, except that the silicon carbide paper used for flatting should not have an abrasive grit size coarser than 280 grade. On each panel leave unpainted or preferably mark off 300 mm × 300 mm of the undercoat in the manner described in **5.2.1.2**. Apply the approved sample of finishing paint and the test sample to separate panels in the manner described in **5.2.1.2**. Note any difference in application properties of the paints. After allowing the paints to dry for 24 h, or such other period as may be specified, with the panels in vertical position, remove the marks and compare the finishing paint under test with the approved sample for freedom from brush marking, sagging, flowing away from the edges of the moulding, wrinkling, floating and any other defects. While finishing coats shall be treated as finishing system in accordance with **5.2.2**.

5.2.2 *Testing painting systems* — Each coat of a paint system shall be applied in accordance with procedure laid down in **5.2.1**, comparison of application properties being made between the paint under test and the approved sample at each stage where the wet abrading processes between coats are not carried out in practice, omit these processes in carrying out this test. When wet abrasion is not carried out, lightly divide the plain areas of the panel 24 h after the application of the undercoat using dry silicon carbide paper 400 grade. Then wipe over the panel with a soft lint-free cloth or tack rag.

5.2.2.1 When a paint systems comprising primer, undercoat and finish including white paints are to be tested, an area approximately 300 mm × 300 mm of the primer shall be marked off as in **5.2.1.2** and an area approximately 300 mm × 300 mm of the undercoat shall be marked off along the lower edge of the panel adjacent to the marked off primer.

5.2.2.2 When white paint system of undercoat and finish are to be tested, the surfacer used in the preparation of new panels or recovered panels shall also be white.

On each panel, mark off an area of approximately 0·05 m^2 in the form of a rectangle 300 mm in height and 150 mm in width at the bottom corner of the panel remote from the mouldings to provide the necessary contrast before the application of the undercoats, coat all of the moulding except for a 300 mm length and a patch approximately 300 × 300 mm, situated at the bottom of the panel with the outer edge parallel to and 300 mm from the right hand edge of each panel, with suitable, undercoat, to simulate the colour of an agreed priming paint. After 24 h air drying, this coloured patch may, if necessary, be wet abraded using silicon carbide paper with an abrasive grit size not coarser than 280 grade, in order to remove excessive brush marks and then allowed to dry. Apply the undercoat and finishing coat according to **5.2.1.2** and **5.2.1.3** except that the area of undercoat to be marked off shall be 0·1 m^2 at the bottom of the panel adjoining the marked off portion of the substrate in the form of a square. In the assessment of the white systems, particular attention shall be paid to the opacity of the undercoat and the system when viewed either over the primer or the coloured patch as appropriate. The flowing away of white paints from the edges of the moulding can be more easily observed over a coloured moulding.

5.3 *Water Borne Paints* — The material shall be thinned in accordance with manufacturers' instructions and tested on unfilled plywood, plasterboard, hard board or asbestos-cement board panels, prepared as described in **3**. Place one of the panels firmly in a near vertical position using an appropriate brush, coat the panel with a normal sealing coat of the approved sample paint. Repeat the procedure on a similarly prepared panel with paint under test; noting any difference in application properties. With panels in vertical position allow the paint to dry for 24 h or such other period as may be specified. At the end of this period, mark approximately 300 × 300 mm on each panel and using an appropriate brush apply a second coat of the respective paints, making no attempt to lay off in one direction. Note any differences in application properties. With the panels in vertical position, allow the second coat to dry for 24 hours or such other periods as may be specified. Remove the masks from the panels at the end of this period. Compare the panels, with the sealing coats and the finishing coats for brush marks, sagging, cissing and any other defects.

6. Test Report — The test report shall include the following:

a) A reference to this standard;

b) Type and identification of the product under test;

c) Type of brush used;

d) Date; and

e) Observations made.

EXPLANATORY NOTE

This is one of a series of standards dealing with the sampling and a testing of paints, varnishes and related products. This standard supersedes **6.2** of IS: 101-1964 'Methods of test for RMP and enamels (*second revision*)'. In the preparation of this standard considerable assistance has been derived from ISO TR 3172 Paints and varnishes — Large scale brushing test, issued by International Organization for Standardization (ISO).

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