भारतीय मानक

Indian Standard

IS 101 (Part 1/Sec 4) : 2024

रंग रोगन, वार्निश और संबंधित उत्पाद के लिए नमूने और परीक्षण की पद्धतियाँ

भाग 1 तरल रंग रोगन पर परीक्षण (सामान्य और भौतिक)

अनुभाग 4 ब्रशिंग परीक्षण

(चौथा पुनरीक्षण)

Methods of Sampling and Test for Paints Varnishes and Related Products

Part 1 Tests on Liquid Paints (General and Physical)

Section 4 Brushing Test

(Fourth Revision)

ICS 87.040

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI - 110002
www.bis.gov.in www.standardsbis.in

June 2024 **Price Group 5**

Paints, Varnishes and Related Products Sectional Committee, CHD 20

FOREWORD

This Indian Standard (Fourth Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Paints, Varnishes and Related Products Sectional Committee had been approved by the Chemical Division Council.

IS 101 "Methods of test for ready mixed paints and enamel", initially, was published as a unified standard in 1950. The standard was subsequently revised in 1961, 1964 and 1987. During the third revision, recognizing the need for clarity, the committee decided to restructure it by splitting into various parts based on type of tests. These parts included tests on liquid paints (general and physical), chemical examination, film formation, optical assessments, and mechanical tests on paint film formation. Each part was further subdivided into sections, addressing specific tests within those categories.

Accordingly, this (Part 1/Sec 4) was published in 1987, by superseding **6.2** of IS 101 : 1964 as third revision.

It is 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.

This standard (Part 1/Sec 4) is one of a series dealing with methods of sampling and test for paints, varnishes, and related products.

The other sections of this Indian Standard (Part 1) are:

Sec 1 Sampling

Sec 2 Preliminary examination and preparation of samples for testing

Sec 3 Preparation of panels

Sec 5 Consistency

Sec 6 Flash point

Sec 7 Mass per litres determination of density pycnometer method

Sec 8 Pigments and extenders determination of *p*H value of aqueous suspension

This fourth revision has taken to bring out the standard in the latest style and format of the Indian Standard. In addition, the relevant references of Indian standards have been updated wherever required.

The composition of the Committee, responsible for the formulation of this standard is given in Annex A.

In reporting the result of a test or analysis made in accordance with this standard, If the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'.

Indian Standard

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

PART 1 TESTS ON LIQUID PAINTS (GENERAL AND PHYSICAL)

SECTION 4 BRUSHING TEST

(Fourth Revision)

1 SCOPE

1.1 This standard 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.

1.2 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 REFERENCES

The standards given below contain provisions which, through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards:

IS No.	*Title*
IS 101	Methods of sampling and test for paints, varnishes and related products:
(Part 1)	Tests on liquid paints (general and physical),
(Sec 1) : 2023	Sampling (*fourth revision*)
(Sec 3) : 1986	Preparation of panels (*third revision*)
IS 303 : 1989	Plywood for general purposes (*fourth revision*)
IS 1303 : 1983	Glossary of terms relating to paints (*second revision*)

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 1303 shall apply.

4 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.

5 PREPARATION OF PANELS

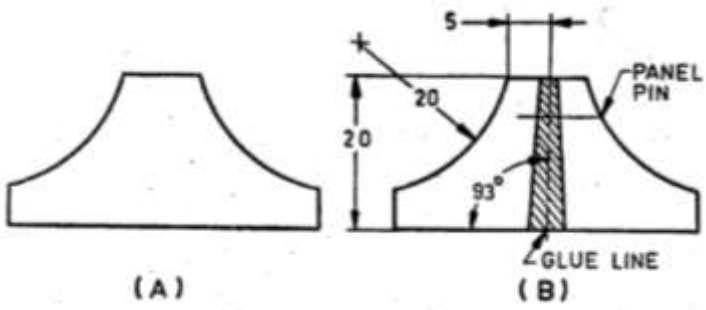
5.1 Wood Panels

Plywood (*see* IS 303) of size 1 m × 1 m × 10 mm.

5.1.1 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 Fig. 3.

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.



All dimensions in millimetres.

FIG. 1 SECTION OF MOULDINGS

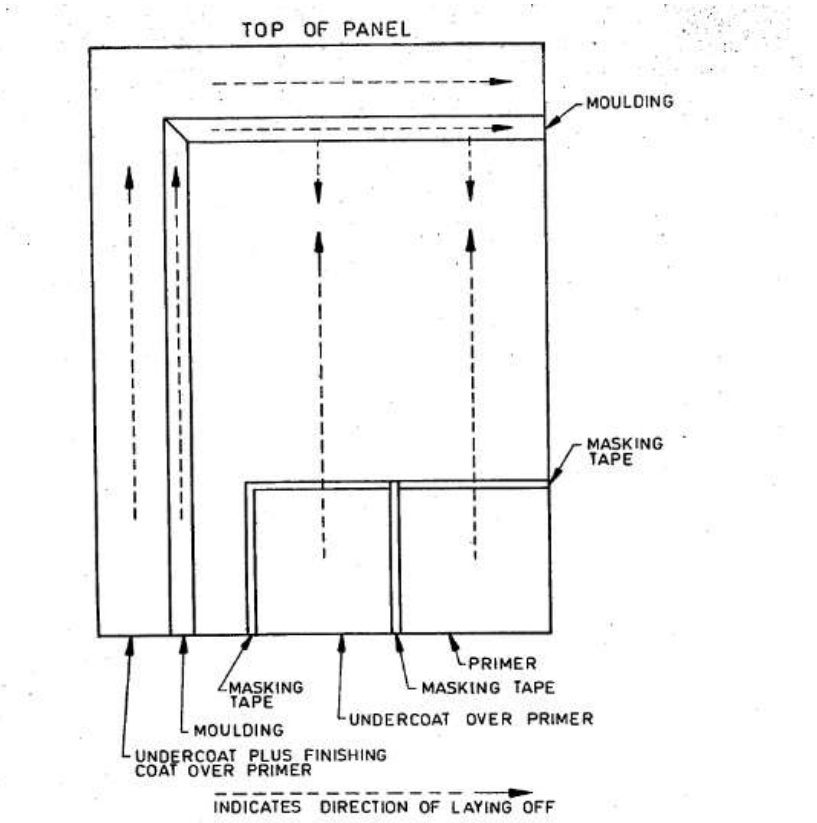


FIG. 2 ARRANGEMENT OF PANEL AND DIRECTINS OF LAYING OFF

5.1.2 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.

5.1.3 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.

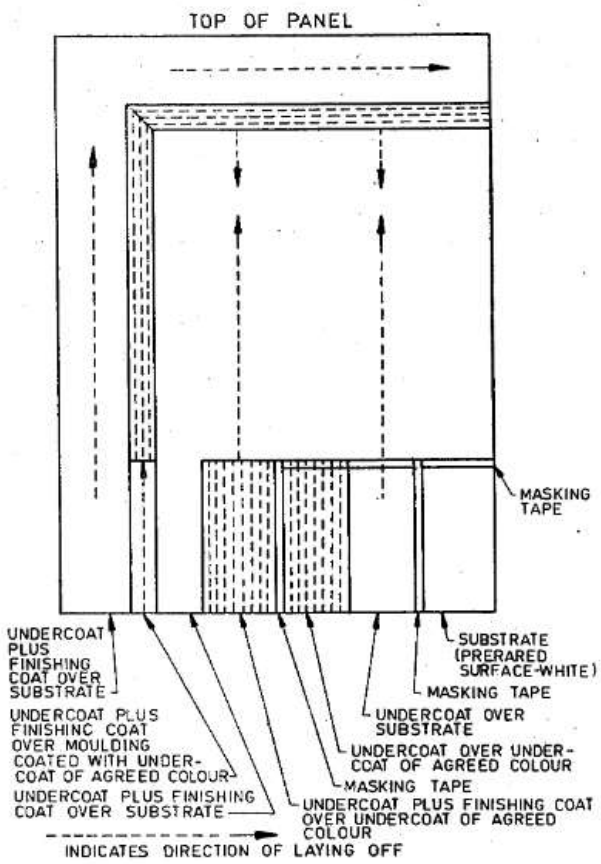


FIG. 3 ARRANGEMENT OF PANEL AND DIRECTIONS OF LAYING OFF

5.2 Steel Panels

Steel panels of size 1.0 m × 1.0 m × 1.25 mm as specified in IS 101 (Part 1/Sec 3).

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 5.2.

5.3 Plastered Board Panels

Good quality gypsum plasterboard not less than 1.0 m × 1.0 m x 9 mm in dimensions. The face used for painting is the face designed to receive decoration directly. No initial preparation is needed before painting.

5.4 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.

5.5 Asbestos-Cement Board

Double-processed asbestos-cement board may be used and requires no initial preparation before painting.

6 SAMPLING

A representative sample of the product under test shall be obtained as prescribed in IS 101 (Part l/ Sec1).

7 PROCEDURE FOR PAINTING

7.1 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.

7.2 Solvent-Borne Paints

7.2.1 *Testing Single Paints*

7.2.1.1 *Primers*

Primers shall be tested on appropriate panels prepared in accordance with 5. 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 7.1 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.

7.2.1.2 *Undercoats*

Undercoats shall be tested over a primer on plywood, steel panels or asbestos-cement panels prepared as described in 5 and 7.2.1.1 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 other-wise specified, allow the pane Is 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 7.2.1.1. 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.

7.2.1.3 *Finishing paints*

Finishing paints shall be tested on panels prepared as described in 7.2.1.2 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 7.2.1.2, 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 7.2.1.2.

Apply the approved sample of finishing paint and the test sample to separate panels in the manner described in 7.2.1.2. Note any difference in application properties of the prints. 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 7.2.2.

7.2.2 *Testing Painting Systems*

Each coat of a paint system shall be applied in accordance with procedure laid down in 7.2.1, 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.

7.2.2.1 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 7.2.1.2 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.

7.2.2.2 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 mm × 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 7.2.1.2 and 7.2.1.3 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.

7.3 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 5. 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 mm × 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.

8 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.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Paints, Varnishes and Related Products Sectional Committee, CHD 20

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Organization	*Representative(s)*
In Personal Capacity (*Flat 1303, Blooming Heights, Pacific Enclave, Powai, Mumbai - 400076*)	DR B. P. MALLIK
In Personal Capacity *(2, Block Mann Street, Kolkata - 700013*)	DR SUNIL KUMAR SAHA
Directorate General, BIS	AJAY KUMAR LAL SCIENTIST 'F'/SENIOR DIRECTOR AND HEAD (CHEMICAL) [REPRESENTING DIRECTOR GENERAL (*Ex-officio*)]

Member Secretary
SHRI PUSHPENDRA KUMAR
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CHEMICAL, BIS

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.in.

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BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *Website*: www.bis.gov.in

Regional Offices: *Telephones*

Central : 601/A, Konnectus Tower -1, 6th Floor, DMRC Building, Bhavbhuti Marg, New Delhi 110002 { 2323 7617

Eastern : 8th Floor, Plot No 7/7 & 7/8, CP Block, Sector V, Salt Lake, Kolkata, West Bengal 700091 { 2367 0012 2320 9474

Northern : Plot No. 4-A, Sector 27-B, Madhya Marg, Chandigarh 160019 { 265 9930

Southern : C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113 { 2254 1442 2254 1216

Western : Manakalya, 4th Floor, NTH Complex (W Sector), F-10, MIDC, Andheri (East), Mumbai 400093 { 283 25838

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