Doc : CHD 20 (28841) WC
IS 101 (Part 1/Sec 3) : 20XX
September 2025

BUREAU OF INDIAN STANDARDS

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Methods of Sample and Test for Paints, Varnishes, and Related Products

Part 1 Tests on Liquid Paints (General and Physical)

Section 3 Preparation of Panels

[*Fourth Revision* of IS 101 (Part 1/Sec 3)]

भारतीय मानक मसौदा

रंग रोगन, वार्निश और संबंधित उत्पादों के लिए नमुने और परीक्षण

भाग 1 तरल पेंट पर परीक्षण (सामान्य और भौतिक)

अनुभाग 3 पैनल की तैयारी

[IS 101 (Part 1/Sec 3) का चौथा पुनरीक्षण]

(ICS 87.040)

Paint, Varnishes and Related Products Sectional Committee, CHD 20	**Last Date for Comments**: **30th November 2025**

Paints, Varnishes and Related Products Sectional Committee, CHD 20

FOREWORD

(*Formal Clause will be added later*)

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. Further, it was decided that whenever a new test method introduced, it would be integrated into the relevant part of IS 101 where it is most appropriate, ensuring that the standard remained comprehensive.

This standard prescribes procedures for the preparation, prior to painting of standard panels for use in general methods of test for paints, varnishes and related products. For many of the widely used test methods, the type of panel used and the particular way in which it is prepared for use affect the test results to a significant degree.

Consequently, it is important to standardize as carefully as possible both the panels and preparation procedure employed for these tests. It is equally desirable to reduce to a minimum the number of different standard panels required for use in a paint testing laboratory.

This fourth revision has been undertaken to align the product standards with current market demands, enhancing its acceptance and relevance. The following changes have been made:

a) Considering the health concerns associated with asbestos materials, the asbestos panel has been replaced with a cement/gypsum panel.
b) References of Indian standards have been updated wherever required.
c) Amendment no. 1 has been duly incorporated.

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

Sec 1 Sampling

Sec 2 Preliminary examination and preparation of samples for testing

Sec 4 Brushing test

Sec 5 Consistency

Sec 6 Flash point

Sec 7 Mass per litres determination of density Pycnometer method

Sec 8 Pigments and extenders determination of pH value of aqueous suspension

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*)'.

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Draft Indian Standard

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

PART 1 TESTS ON LIQUID PAINTS (GENERAL AND PHYSICAL)

Section 3 Preparation of Panels

(*Fourth Revision*)

1 SCOPE

1.1 This standard prescribes procedures for the preparation, prior to painting of standard panels for use in general methods of test for paints, varnishes and related products.

1.2 This standard covers the following types of standard panels:

a) Steel panels;
b) Tin plate panels;
c) Aluminium panels;
d) Glass panels;
e) Wood panels; and
f) Cement/ gypsum panels.

2 REFERENCES

The standards listed in Annex A contain provisions which through reference in this text, constitute provisions of and necessary adjuncts to 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 the standards indicated in Annex A.

3 TERMINOLOGY

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

4 STEEL PANELS

4.1 Steel panels used for general testing shall be of mild steel, fully finished of deep drawing quality (*see* IS 513) including any other suitable grade of steels left to end user as decided by them of required dimension fulfilling the needs.

4.1.1 Before use, wipe the mild steel panels free from excess oil, roughly degrease with petroleum hydrocarbon solvent conforming to IS 1745 or xylene and burnish uniformly with IS Grit No. 180 emery cloth conforming to IS 715. Burnish lightly with petroleum hydrocarbon solvent conforming to IS 1745 to avoid embedding emery in the surface. The burnishing operation by the use of power tools shall be as follows:

a) Straight across the panel, in a direction parallel to anyone side;
b) Perpendicular to first direction and until all signs of original burnishing have been obliterated; and
c) With a circular motion of diameter approximately 75 mm, until a pattern consisting of circular burnishing marks superimposed one upon another is produced.

Remove the traces of emery dust by wiping with a linen rag.

4.1.2 Degrease the panel by swabbing two or three times with a linen rag, soaked in suitable hydrocarbon solvent. Final swabbing shall be done with a clean rag soaked in clean hydrocarbon solvent. Dry the panels slightly to remove traces of condensed 'moisture, allow to return to room temperature and then paint without delay. The prepared surfaces should not be touched by hand or otherwise between degreasing and painting.

NOTE — For steel and aluminium panels intended for heavy-duty, high-solids or solvent-free protective coatings applied by airless spray, panel preparation in accordance with ISO 12944-4 may be used.

5 TINPLATE PANELS

5.1 Material

The panel shall be of tinned steel plate made by the cold reduction process. The steel substance shall have a nominal thickness of 0.3 mm and the tin coating shall be equivalent to a mass of 24.0 g/m^2.

5.2 Preparation by Solvent Cleaning

It is not necessary for tinplate panels to be specially protected in storage before use in the same way as steel panels; nevertheless, the surface of the panels may be contaminated with lubricants during processing. It is therefore recommended that the panels should be cleaned before use by the procedure specified in **5.3** for steel panels.

5.3 Preparation by Abrasion (Burnishing)

Burnished tinplate panels are recommended where a more uniform test surface IS required that IS produced by solvent cleaning. The burnishing operation shall be carried out as for steel panels (*see* **4.1.1**) except that it shall be done much more lightly to avoid embedding abrasive in the surface and completely removing the tin coating in some places. It is therefore recommended to use a good quality, fine silicon carbide paper, for example, one with an abrasive grain size corresponding to 320 silicon carbide grit.

5.3.1 The burnishing operation shall be continued until the whole of the surface of the panel is covered by a pattern of circular burnishing marks superimposed one upon another and the original surface pattern is no longer visible to the naked eye.

5.3.2 The burnished panels shall be cleaned thoroughly before use according to the procedure specified in **4.1.2** to ensure that all loose grit, tin particles and other contaminants are removed. Care shall be taken to ensure that the surface of the finally cleaned panel is not touched by hand or otherwise contaminated. If the paint coating cannot be applied immediately, the cleaned panels shall be stored for a few days only in a desiccator until required.

6 ALUMINIUM PANELS

6.1 Material

Aluminium panels intended for general testing (in contrast to aluminium or aluminium alloy panels required for testing to particular applications and uses) shall be of sheet or strip complying with the chemical composition (99 percent purity). Either soft (annealed) or hard materials shall be used. as specified for the particular test method. The hard aluminium shall have a tensile strength of at least 150 N/mm^2 and the soft aluminium a tensile strength not greater than 105 N/mm^2. The thickness and other dimensions of the panel shall be as specified in the test method or otherwise agreed. The sheet and strip shall not show any cracks when a test piece of the metal 20 mm wide and of convenient length, cut with the longer axis transverse to the direction of rolling and with the longer edges carefully rounded and smoothed longitudinally, if bent through 180˚ flat upon itself in the case of soft aluminium, or through 180˚ on a cylindrical former of radius equal to the thickness of the sheet in the case of hard aluminium.

6.2 Preparation by Solvent Cleaning

Where clean panels are required without further preparation, the cleaning procedure used shall be that specified in **4.1.2** for steel panels.

6.3 Preparation by Abrasion (Burnishing)

Where burnished panels are required, the procedure shall be essentially as specified in **4.1.1** for steel panels, except that the abrasive used shall be calcined alumina conforming to the following specification:

Particles greater than 63 μm 10 percent maximum

Particles less than 20 μm 70 percent minimum

Particles less than 10 μm 60 percent minimum

6.3.1 The sequence of burnishing operations shall be as specified in **4.1.1** but the abrasive shall be wetted with mineral solvent for paint (white spirit) and applied to the panel surface on a pad of soft cloth or other suitable material.

6.3.2 The burnishing operation shall be continued until the whole of the surface of the panel is covered by a pattern of circular burnishing marks superimposed one upon another and the original surface pattern is no longer visible to the naked eye.

6.3.3 The burnished panels shall be cleaned thoroughly before use according to the procedure specified in **4.1.2**, to ensure that all loose grit, aluminium particles and other contaminants are removed. Care shall be taken to ensure that the surface of the finally cleaned panel is not touched by hand or otherwise contaminated. Aluminium panels shall only be prepared immediately prior to painting because if stored an oxide film is liable to form on the surface.

6.4 Preparation by Acid Chromating — Where aluminium panels are prepared by acid chromating for general testing (in contrast to those required for testing to particular applications and uses), it is recommended that the following procedure shall be used.

6.4.1 Clean the panels as specified in **4.1.2** until, after allowing the solvents to evaporate, it can be uniformly wetted with water and immerse them for 20 min at (55 ± 5) ℃ in an acid chromate solution contained in a glass or polyethylene vessel. The solution shall be prepared as follows:

Dissolve 100 g of analytical reagent quality potassium or sodium dichromate in 1 000 ml of distilled water and add slowly, while stirring, 170 ml of analytical reagent quality sulphuric acid (1.84 g/ml) [*see* IS 266].

(**SAFETY WARNING**: When preparing and using acid chromate solutions, the operator shall wear safety goggles and rubber gloves.)

6.4.2 Remove the panels from the solution and wash them thoroughly and as rapidly as possible in cold and then in hot distilled water (or demineralized water of specific resistance of at least 10^5 ohm cm). Allow the panels to dry and then coat them as soon as possible with the paint. Care shall be taken to ensure that the prepared surface is not touched by hand or otherwise contaminated before painting.

Note — The chromate solution will become exhausted with use and shall be renewed when necessary.

7 GLASS PANELS

7.1 Material — The panels shall be of float or polished plate glass. The thickness and other dimensions of the panels shall be specified in the test method or otherwise agreed.

7.2 Preparation by Solvent Cleaning — The panels shall be cleaned by the procedure specified in **4.1.2** for steel panels.

7.3 Preparation by Detergent Cleaning — The panels shall be washed thoroughly in a warm, aqueous, non-ionic detergent solution and then rinsed thoroughly with warm distilled water (or demineralized water of specific resistance of at least 10^5 ohm cm).

The cleaned panels shall be dried by evaporation of 1 the final washing water and may be slightly warmed to remove any traces of condensed moisture. Care shall be taken to ensure that the prepared surface is not touched by hand or otherwise to prevent contamination before painting.

8 WOOD PANELS

8.1 Unless specified otherwise in the material specification, panels shall be made from teak wood/ MDF (*Tectona grandis* Lin. f., fam. *Verbenaceae)* and shall be 200 mm × 100 mm × 100 mm in size.

8.2 Wood panels shall be unused, flat grained and of even texture, and shall be free from knots, shakes, cracks and blemishes. The wood shall be well-seasoned and its moisture content shall not exceed 12 percent. The panel surface should be smooth and shall be rubbed with IS Grit No. 180 emery cloth conforming to IS 715. All surface dust shall be removed before painting by wiping with a clean and dry linen rag.

9 CEMENT/ GYPSUM PANELS

9.1 Concrete Panels — Of size 150 mm × 150 mm × 125 mm prepared as follows:

Cement (*see* IS 26)	450 g
Aggregates (*see* IS 383)	450 g
Sand (*see* IS 650)	900 g
Water	180 g

Cast the mix into a mould 30 cm × 30 cm × 12.5 cm in size, suitably partitioned to give four panels. Trowel cut the top surface of the block after compacting and levelling with a wooden float, taking care that all the material

remain in the mould. The blocks are allowed to harden in air for 24 h and then cured in water for 14 days. They are ready for use after this, and shall be stored in a place free from chemical fumes.

ANNEX A

(*Clause* 2)

LIST OF REFERRED STANDARDS

IS/ISO No.	*Title*
IS 266 : 2024	Sulphuric acid — Specification (*fourth revision*)
IS 269 : 2015	Ordinary portland cement — Specification (*sixth revision*)
IS 383 : 2016	Coarse and fine aggregate for concrete — Specification (*third revision*)
IS 513 : 2016	Cold reduced low carbon steel sheets and strips (*sixth revision*)
IS 650 : 1991	Standard sand for testing cement — Specification (*second revision*)
IS 715 : 2002	Coated abrasives (*fourth revision*)
IS 1303 : 2024	Paints - glossary of terms (*third revision*)
IS 1745 : 2018	Petroleum hydrocarbon solvents — Specification (*third revision*)
ISO 12944-4: 2017	Paints and varnishes — Corrosion protection of steel structures by protective paint systems Part 4 Types of surface and surface preparation