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मानक

IS 133 (2004): Enamel, Interior : (a) Undercoating (b) Finishing [CHD 20: Paints, Varnishes and Related Products]

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ENAMEL, INTERIOR: (a) UNDERCOATING (b) FINISHING — SPECIFICATION

(Fourth Revision)

ICS 25.220.50

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BUREAU OF INDIAN STANDARDS MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG NEW DELHI 110002

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 and had been approved by the Chemical Division Council.

This standard was first published in 1950 and subsequently revised in 1965, 1975 and 1993 respectively.

In this revision requirement for total non-volatile content is specified. Maximum drying time for surface dry and hard dry have been modified. A clause on condition in container has been incorporated. Also, changes made in this standard through various amendments have been amalgamated in this revised edition.

Through Annex F, a testing programme has been added in this revision, for the guidance of purchasers.

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

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with 1S 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

ENAMEL, INTERIOR: (a) UNDERCOATING (b) FINISHING — SPECIFICATION

(Fourth Revision)

1 SCOPE

1.1 This standard prescribes requirements and methods of sampling and test for enamel, interior, undercoating and finishing, colour as required.

1.2 The material is used for protection and decoration of interior surfaces and is normally applied as a painting system comprising an appropriate primer followed by the undercoating and the finishing enamel.

2 REFERENCES

The standards listed in Annex A contain provisions which, through reference in this text, constitute provisions 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 the standards given in Annex A.

3 TERMINOLOGY

3.1 For the purpose of this standard, the definitions given in IS 1303 and that given below shall apply.

3.1.1 Registered Sample

Sample supplied in advance by a prospective supplier and registered by the approved testing authorities after testing it to all the requirements of this standard. A complete record of its performance shall be kept in respect of all tests.

4 TYPES

The material shall be supplied in brushing consistency but shall be suitable for application by brushing without appreciable drag recommended consistency is 50-60 and air spraying recommended consistency is 35-40 after thinning with a suitable thinner as agreed to between the purchaser and the supplier.

5 REQUIREMENTS

5.1 Composition

The material shall be of such a composition as to satisfy the requirements of this standard.

5.2 Total Non-volatile Content

The total non-volatile matter, which includes pigment, extenders and vehicle solids, shall not deviate by more than ± 5 percent by mass from the recorded data of registered sample. This applies to both undercoating and finishing enamels.

5.3 Condition in Container

5.3.1 At Delivery

At the time of delivery the paint shall be in such a condition that manual stirring readily produces a uniform product.

5.3.2 During Storage

During the 12 months storage period, the rating for degree of settling shall not drop to 0, when tested as per IS 101 (Part 6/ Sec 2).

5.4 Freedom from Coarse Particles

The paint shall be free from coarse aggregates, suspended particles of gel and foreign matter, when tested as per IS 101 (Part 1/ Sec 2).

5.5 Skin Formation

The undercoat or finishing paint shall show no skin formation, when examined visually at the time of delivery.

5.6 Thinning Properties

The undercoat/finishing paint shall be capable of being readily mixed with the thinner (*see* IS 14314) or suitable thinner to a maximum of 20 percent by volume to achieve the recommended viscosity range.

5.7 Freedom from Yellowing

Enamel, interior, finishing, white, shall not show a greater degree of yellowing than the approved sample when tested as prescribed in Annex B.

5.8 Lead Restricted Material

5.8.1 The material intended for defence purposes shall, in addition to the requirements stipulated in **5.1** to **5.9** also be tested for restriction from lead in accordance with IS 101 (Part 8/Sec 5) as except for green, yellow and red colours.

1

5.8.2 When thus tested the material shall not contain lead or compounds of lead or mixtures of both, calculated as lead monoxide (PbO), exceeding 5 percent by mass.

5.9 The material shall also comply with the requirements given in Table 1.

5.10 The manufacturer(s) may be permitted to mark their product "synthetic" according to this specification, it contains minimum 10 percent by mass of phthalic anhydride content on non-volatile vehicle when tested as prescribed in **11** of IS 354 (Part 2).

6 PACKING AND MARKING

6.1 Packing

Unless otherwise agreed to between the purchaser and the supplier, the enamel shall be packed in metal containers conforming to IS 1407 or IS 2552.

6.2 Marking

6.2.1 Each container shall be marked with the following:

- a) Name of the material and indication whether undercoating or finishing;
- b) Indication of the source of manufacture;
- c) A statement "synthetic", if the material contains phthalic anhydride as prescribed under 5.10;
- d) Volume of the material;
- e) Batch number or Lot number in code or otherwise;
- f) Month and year of manufacture; and
- g) Colour/ shade of the material.

6.2.2 BIS Certification Marking

The product may also be marked with the Standard Mark.

6.2.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

6.3 Other details of packing and marking shall be in accordance with the instructions given by the purchaser.

6.4 The material, when intended for defence purposes, shall be packed and marked in accordance with IS 5661.

7 SAMPLING

7.1 Preparation of Test Samples

7.1.1 For Registration

The sample shall be submitted in three different containers each containing not less than 500 ml of the material.

7.1.2 Bulk Supply Sample

Representative samples of the materials shall be drawn and treated as prescribed in IS 101 (Part 1/Sec 1).

7.2 Criteria for Conformity

A lot shall be declared as conforming to the requirements of this standard, if the test results of the composite sample satisfy the requirements given in 5.

8 TEST METHODS

8.1 Test shall be conducted according to the methods prescribed in various parts and sections of IS 101 and various annexes to this standard. Reference to the relevant clauses of these standards are given in col 5 of Table 1, and to various annexes in **5.1** to **5.10**.

8.2 Quality of Reagents

Unless specified otherwise, pure chemicals and distilled water (*see* IS 1070) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

8.3 For match against Indian Standard Colours, IS 5 shall be used.

9 GENERAL PROVISIONS

9.1 Supply

Unless otherwise agreed by the purchaser, the paint supplied shall not differ significantly from the registered sample in either composition or performance.

9.2 Vendor's Certificate

9.2.1 When required by the purchaser, the vendor shall certify that each batch of the paint supplied has been manufactured to the same formula as the registered sample and/or that it has been indicated by test to be not inferior to the approved sample. Alternatively, the vendor may give following information and may declare compliance with registered sample:

- a) Description of paint,
- b) Vendor's product reference,
- c) Batch identification,
- d) Quantity in lot, and
- e) Date of manufacture.

9.2.2 A certificate/declaration may relate to more than one batch.

Table 1 Requirements for Enamel, Interior: (a) Undercoating (b) Finishing (Clause 5.9)

SI No.	Characteristic	Requirements		Methods of Test, Ref to	
		Undercoating	Finishing	IS 101	Annex
(1) i)	(2) Viscosity by ford cup No. 4 at 27 ± 2°C	(3)	$\frac{(4)}{$	(5) (Part 1/Sec 5)	(6)
ii)	Mass, in kg/10 litres, <i>Min</i>	12.0	8.5	(Part 1/Sec 7)	_
iii)	Drying time, h, <i>Max</i> : a) Surface dry b) Hard dry c) Tack free	2 8 24	4 12 24	(Part 3/Sec 1)	_
iv)	a) Finish	Smooth and matt to egg shell gloss	Smooth and glossy	(Part 3/Sec 4)	_
	b) Gloss, 60°	0-20	Above 71	(Part 4/Sec 4)	—
v)	Fineness of grind, microns, Max	50	15	(Part 3/Sec 5)	
vi)	Colour	Off white to light grey or to any other colour	Close match to the specified IS colour or to an agreed colour	(Part 4/Sec 2)	_
vii)	Wet opacity (see Note)	← Between -1 percent of th	0 percent and +20	(Part 4/Sec 1)	—
viii)	Fastness to light (for finishing only) with panel exposed for 100 h	—	Shall pass the test	(Part 4/Sec 3)	
ix)	Resistance to water (for finishing only)		Shall pass the test	—	Annex D
x)	Water content (if suspected to be present), percent by mass, Max	0.5	0.5	(Part 2/Sec 1)	
xi)	Scratch hardness after 48 h air drying (1 000 g Weight)	• No such so the	cratch as to show ————————————————————————————————————	(Part 5/Sec 1)	—
xii)	Flexibility and adhesion	 No visible da of th 48 h air drying 	mage or detachment —> e film after: 96 h air drying	(Part 5/Sec 2)	_
xiii)	Flash point	• Not b	elow 30°C	(Part 1/Sec 6)	—
xiv)	Volume solids, percent, Min	35	30	(Part 8/Sec 6)	—
xv)	Accelerated storage stability test, at 60°C, 96 h	Shall pass the test Annex E			
xvi)	Keeping properties	← Not less than one year from the → (Part 6/Sec 2) — date of manufacturing			

9.3 Tests

9.3.1 The frequency and procedure to establish compliance of the paint material with this specification may vary depending on the agreement between the purchaser and the supplier.

9.3.2 The kind of testing programme as indicated in Annex F, may be taken for guidance, where thought appropriate.

ANNEX A

(Clause 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	Title	IS No.	Title
5 : 1994	Colours for ready mixed paints and enamels (fourth revision)	(Part 4/Sec 2) : 1989	Optical tests, Section 2 Colour (third revision)
101	Methods of sampling and test for paints, varnishes and related products:	(Part 4/Sec 3) : 1988	Optical tests, Section 3 Light fast- ness test (<i>third revision</i>)
(Part 1/Sec 1): 1986	Test on liquid paints (general and physical), Section 1 Sampling (third	(Part 4/Sec 4) : 1988	Optical tests, Section 4 Gloss (third revision)
(Part 1/Sec 2) ·	revision)	(Part 5/Sec 1): 1988	Mechanical tests on paint films, Sec- tion 1 Hardness tests (<i>third revision</i>)
(1 alt 1/500 2) . 1987	physical), Section 2 Preliminary examination and preparation of samples for testing (<i>third revision</i>)	(Part 5/Sec 2) : 1988	Mechanical tests on paint films, Sec- tion 2 Flexibility and adhesion (<i>third revision</i>)
(Part 1/Sec 3) : 1986	Test on liquid paints (general and physical), Section 3 Preparation of panels (<i>third revision</i>)	(Part 6/Sec 2) : 1989	Durability tests on paint films, Sec- tion 2 Keeping properties (<i>third revision</i>)
(Part 1/Sec 5) : 1989	Test on liquid paints (general and physical), Section 5 Consistency (<i>third revision</i>)	(Part 8/Sec 5) 1993	Tests for pigments and other solids, Section 5 Lead restriction test (<i>third revision</i>)
(Part 1/Sec 6) : 1987	Test on liquid paints (general and physical), Section 6 Flash point	(Part 8/Sec 6) : 1993	Tests for pigments and other solids, Section 6 Volume solids
	(third revision)	354 (Part 2) : 1986	Methods of sampling and test for resins for paints: Part 2 Special test
(Part 1/Sec 7) : 1987	Test on liquid paints (general and physical), Section 7 Mass per 10 litres (third ravision)	1700	methods for alkyd resins (second revision)
(Part 2/Sec 1)	Test on liquid points (shemical	1070 : 1992	Reagent grade water (third revision)
(1 aft 2/Sec 1) . 1988	examination), Section 1 Water con- tent (<i>third revision</i>)	1303 : 1983	Glossary of terms relating to paints (second revision)
(Part 3/Sec 1) ·	Tests on paint film formation. Sec-	1407 : 1980	Round paint tins (second revision)
1986	tion 1 Drying time (<i>third revision</i>)	2552 : 1989	Steel drums (galvanized and ungal- vanized) (<i>third revision</i>)
(Part 3/Sec 4) : 1987	Tests on paint film formation, Sec- tion 4 Finish (<i>third revision</i>)	5661 : 1970	Code of practice for packing and marking of packages of paints
(Part 3/Sec 5) : 1987	Tests on paint film formation, Sec- tion 5 Fineness of grind (<i>third</i> ravision)		enamels, varnishes and allied products
(Part 4/Sec 1) : 1988	Optical tests, Section 1 Opacity (third revision)	14314 : 1 995	Thinner general purposes for syn- thetic paints and varnishes — Specification

ANNEX B

(Clause 5.7)

TEST FOR FREEDOM FROM YELLOWING

B-1 Procedure

B-1.1 Apply two normal coats of the material in accordance with IS 101 (Part 1/Sec 3) by brushing on 150 mm \times 150 mm mild steel panel. Allow the first coat to dry for 12 h, slightly rub down the surface and

then apply the second coat. Place the panel after 24 h in complete darkness for a period of 7 days.

B-1.2 Compare with freshly prepared and cured, for not less than 24 h and more than 48 h, panel.

ANNEX C

(*Table* 1, *Note*) WET OPACITY VALUES, m²/ 10 1, *Min*

Sl	Value	Colour	
No.			
(1)	(2)	(3)	
i)	350	Black	
ii)	250	Azure blue	
iii)	290	Dark admiralty grey	
iv)	150	Middle brunswick green	
v)	90	Signal red	
vi)	100	Golden yellow	
vii)	80	Pale cream	
viii)	200	Light admiralty grey and sea green	
ix)	150	Blue sky	
x)	110	White	

ANNEX D

[Table 1, Sl No. (ix)]

TEST FOR RESISTANCE TO WATER

D-1 PROCEDURE

D-1.1 Apply a coat of material on glass panels as prescribed in **5** of IS 101 (Part 1/Sec 3) to give a dry film mass commensurate with the mass per 10 litre as specified in Table 1 of IS 101 (Part 3/Sec 4). Allow the panel to air dry in a horizontal position for 48 h. Immerse the panel in distilled water (*see* IS 1070)

at room temperature for 48 h. Remove the panels from water and examine it after 4 h.

D-1.2 The paint shall be free from blisters, peeling or flaking and no undue change in colour. Gloss retention shall not be less than 60 percent of the gloss of unimmersed portion.

ANNEX E

[*Table* 1, *Sl No.* (xv)] ACCELERATED STORAGE STABILITY TEST

E-1 PROCEDURE

E-1.1 Store the paint sample in a closed 500 ml container and kept it at 60°C for 96 h.

E-1.2 After the test, paint shall not gel, liver, curdle or change in efflux time by more than 20 percent of the original value and there shall be no evidence of seeding. The paint shall meet the drying time requirements and shall produce dry film, that is, uniform in appearance and free from streaking, mottling and seeding. Further, for finishing paint, change in gloss value shall not be more than 5 units from that of original value.

NOTE — Keep the paint sample in the oven and gradually increase the temperature to 60° C.

ANNEX F

(Foreword and Clause 9.3.2)

TESTING PROGRAMME

F-1 When a purchaser orders for supply of paint (conforming to this standard) in lots to be delivered, over a period of time, it is assumed that not all of the tests specified shall be carried out on samples representing of each lot or consignment. The extent and frequency of the tests may vary depending on many factors and on choice of purchaser. The following programme of tests is, however, may be useful for the guidance of purchasers, particularly in relation to vendor's certification. It may also provide a useful tool to establish a testing programme when an inspecting agency acting on behalf of a purchaser, is required to examine lots of products for compliance to this standard.

F-1.1 Programme 1

Following tests to be made on first lot and on every subsequent lot:

- a) Non-volatile content,
- b) Mass/10 litre,
- c) Condition in container,
- d) Fineness of grind,
- e) Thinning properties,

- f) Drying time,
- g) Colour,
- h) Gloss,
- j) Finish, and
- k) Viscosity.

F-1.2 Programme 2

Following tests to be made on first lot and subsequently as and when agreed upon:

- a) Flexibility and adhesion, and
- b) Scratch resistance.

F-1.3 Programme 3

Following tests to be made on first lot alone:

- a) Durability;
- b) Keeping qualities;
- c) Volume solids, percent;
- d) Flash point;
- e) Resistance to natural or artificial sea water; and
- f) Resistance to intermittent salt spray.

ANNEX G

(Foreword) COMMITTEE COMPOSITION

Paints, Varnishes and Related Products Sectional Committee, CHD 20

Organization In personal capacity (14, Orion, Oomer Park Bhulabhai Desai Road, Mumbai 400026) Addisons Paint & Chemicals Ltd, Chennai Akzo Nobel Coatings India Ltd, Bangalore Asian Paints (India) Ltd, Mumbai

Berger Paints India Ltd, Howrah

Bharat Heavy Electricals Ltd, Tiruchirapalli Central Building Research Institute, Roorkee

Central Public Works Depertment, New Delhi

Colour-Chem Limited, Thane Consumer Unity & Turst Society (CUTS), Jaipur Continental Coatings Pvt Ltd, Chennai Directorate General of Supplies & Disposals, New Delhi Engineers India Ltd, New Delhi Goodlass Nerolac Paints Ltd, Mumbai Hindustan Shipyard Ltd, Visakhapatnam

ICI (India) Ltd, Gurgaon Indian Institute of Chem Technology, Hyderabad Indian Institute of Technology, Mumbai Indian Paints Association, Kolkata

Indian Small Scale Paint Association, Mumbai Maruti Udyog Ltd, Gurgaon Ministry of Defence (DGQA), Kanpur

Ministry of Environment & Forest, New Delhi Ministry of Industry, New Delhi

National Test House (ER), Kolkata

Office of the Devlopment Comissioner(SSI), New Delhi

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