



उत्पाद मानुयल

ENAMEL, SYNTHETIC, EXTERIOR: (a) UNDERCOATING (b) FINISHING

IS 2932:2013 के अनुसार

PRODUCT MANUAL FOR

ENAMEL, SYNTHETIC, EXTERIOR: (a) UNDERCOATING (b) FINISHING

ACCORDING TO IS 2932:2013

भारतीय मानक ब्यूरो)अनुरूपता मूल्यांकन (विनियम की स्कीम-I के तहत यह उत्पाद मानुयल प्रमाणीकरणके प्रचलन मे रीति और पारदर्शिता के सुसंगता सुनिश्चित करने के लिए सभी क्षेत्रीय/शाखा कार्यालयों एवं लाइसेन्स धारियों द्वारा संदर्भ सामग्री के रूप मे उपयोग किया जाएगा। बीआईएस लाइसेन्स/प्रमाण पत्र प्राप्त करने के इच्छुक भावी आवेदकों द्वारा भी इस दस्तावेज़ का उपयोग किया जा सकता है।

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification licence/certificate.

1.	उत्पाद Product	:	IS 2932:2013
	शीर्षक Title	:	Enamel, Synthetic, Exterior: (a) Undercoating (b) Finishing
	संशोधन संख्या No. of Amendments	:	1
2.	नमुनाकरण दिशा निर्देश Sampling Guidelines:		
a)	कच्चा माल Raw material	:	Composition of the material shall comply with the requirements specified in clause 6.1

b)	समूहिकरण दिशा निर्देश Grouping guidelines	:	Please refer ANNEX – A
c)	नमूनेका परिमाण Sample Size	:	4 x 500 ml
3.	परीक्षण उपकरणों की सूची List of Test Equipment	:	Please refer ANNEX – B
4.	निरीक्षण व परीक्षण स्कीम Scheme of Inspection and Testing	:	Please refer ANNEX – C
5.	एक दिन में संभावित परीक्षण Possible tests in a day :		
	(i) Composition (ii) Condition in Container at Delivery (iii) Freedom from Coarse Particles (iv) Skin Formation (v) Thinning Properties (vi) Application Properties (vii) Lead Restriction (viii) Consistency (ix) Viscosity by Ford Cup No. 4 (x) Drying Time (Surface Dry) (xi) Finish (xii) Fineness of Grind (xiii) Flash Point (xiv) Composition (Volume Solids and Phthalic Anhydride Content of Non-volatile Vehicle) (xv) Resistance to Alkali (for finishing only)		
6.	लाइसेन्स का कार्यक्षेत्र /Scope of the Licence :		
	IS 2932:2013 के अनुसार मानक मुहर का उपयोग करने के लिए लाइसेन्स निम्नलिखित कार्यक्षेत्रके लिए प्रदान किया जाता है “Licence is granted to use Standard Mark as per IS 2932:2013 with the following scope:		
	Name of the product	Enamel, Synthetic, Exterior: (a) Undercoating (b) Finishing	
	Any other aspect required as per the Standard	Application- Undercoating and/or Finishing Colour Category/Colour Shade- As applicable	

**ANNEX A TO THE PRODUCT MANUAL
FOR ENAMEL, SYNTHETIC, EXTERIOR: (a) UNDERCOATING (b) FINISHING
AS PER IS 2932:2013**

GROUPING GUIDELINES

1. IS 2932 covers following classification of Enamel, Synthetic, Exterior-
 - (a) Based on application i.e. Undercoating or Finishing
 - (b) Based on Color Categories as specified in Table 1 of ISS
2. Each variety i.e. for application as Undercoating or for application as Finishing may be considered as one group.
3. Each Color Category per Table 1 of ISS may be considered as another group.
4. For the purpose of GoL/CSoL, following guidelines for drawl of samples may be followed-
 - For covering both varieties under the scope of licence, each variety based on application i.e. Undercoating and Finishing shall be independently tested.
 - For covering all Color Shades in a Color Category, sample of shade recommended for registration of sample in Table 1 of IS 2932 shall be independently tested for covering all Color Shades in that Color Category.
 - Sample of all Color Shades covered under the scope of licence may be drawn on rotational basis during operation of licence

**ANNEX B TO THE PRODUCT MANUAL
FOR ENAMEL, SYNTHETIC, EXTERIOR: (a) UNDERCOATING (b) FINISHING
AS PER IS 2932:2013**

LIST OF TEST EQUIPMENT

Major test equipment required to test as per the Indian Standard

Sl. No.	Tests used in with Clause Reference	Test Equipment
1	Composition, clause 6.1.1, General	For Liebermann Starch Test- Acetic anhydride, sulphuric acid, glass stoppered bottles, alcoholic potassium hydroxide, alcohol-benzene wash solution, tripod stand with iron mesh and burner, filter paper, test tubes, dropper, 250 ml round bottom flask, reflux condenser/air condenser, water bath buschner flask, separating funnel For Halphen-Hicks Test- Absolute alcohol, glacial acetic acid, petroleum hydrocarbon solvent, conical flask, separating funnel, evaporating dish, steam bath, pipette, porcelain color reaction plate, watch glass
	Composition, clause 6.1.2, Total Non-volatile Content	Centrifuge with tubes, water bath, laboratory oven, analytical balance, toluene, methyl alcohol, acetone, petroleum hydrocarbon solvent, flat bottom dish, hollow glass tube, glass rod/mechanical shaker, decanter or separating funnel,
2	Condition in Container, clause 6.2.1, At Delivery	Stirrer
	Condition in Container, clause 6.2.2, During Storage	Spatula with square ended blade (45+1 grams), 120 mm in length and 20 mm wide, nylon paint brush 25 mm, test surface, a smooth surfaced paper chart coated with suitable varnish so as to render the surface impervious and resistant to paint materials

3	Freedom from Coarse Particles& Skin Formation, clause 6.3& 6.4	Stirrer, 150-micron sieve, palette knife/stouter stirrer
4	Thinning Properties, clause 6.5	Petroleum hydrocarbon, thinner, stirrer
5	Application Properties, clause 6.6	Paint brush or sprayer
6	Durability, clause 6.7	Mild steel panels as per clause C-1.1.2 as applicable for Xenon or Carbon Arc, Ready mixed paint, air drying, red oxide-zinc phosphate, priming as per IS 12744 (Part 1), water proof emery paper no. 280/320, Accelerated Weathering Apparatus
7	Lead Restriction, clause 6.8	For Electrolysis Method- Single pan balance, muffle furnace, evaporating dish, desiccator, ammonium nitrate, copper sulphate, platinum gauze anode for electrolysis, alcohol For Molybdate Method- Beaker, drying oven, nitric acid, sulphuric acid, ethyl alcohol, paper pulp pad, ammonium acetate, acetic acid, ammonium paramolybdate, porcelain filtering crucible, ammonium nitrate, muffle furnace For Sulphide Method- Centrifuge with tubes, water bath, laboratory oven, analytical balance, toluene, methyl alcohol, acetone, petroleum hydrocarbon solvent, flat bottom dish, hollow glass tube, glass rod/mechanical shaker, decanter or separating funnel, hydrochloric acid, filter paper
8	Consistency, clause 6.9, Table 2 (i) (a)	Palette knife/metal rod, glass panels (150mmx150mm)
	Viscosity by Ford Cup No. 4 at 27 $\pm$ 2 Degree Celsius, clause 6.9, Table 2 (i) (b)	Thermometer (LC-0.1 degree celsius), stand for holding the cup provided with leveling screws, spirit level, flat glass plate/ straight edge scraper, stop watch with scale division of 0.2 seconds, 150 micron sieve and air conditioner
9	Mass, clause 6.9, Table 2 (ii)	Pyknometer, thermometer, water bath, analytical balance (0.2 mg), Chromic acid (for cleaning glass container)/ solvent which leaves no residue on evaporation (for metal container), distillation assembly/ arrangement for distilled water, tissue paper, tongs, gloves made of dry absorbent material (recommended).

10	Drying Time (a) Surface Dry (b) Hard Dry (c) Tack Free, clause 6.9, Table 2 (iii)	Silver sand, 150 & 300 micron sieve, camel hair brush, stop watch, paint brush, mild steel panels (150mmx100mmx1.25mm), Hygrometer, Conditioning chamber/ humidifier or arrangement for maintaining 60±5% RH, angle protractor, ventilated chamber For Method A of Tack Free- balance with dead weights, cotton wool For Method B of Tack Free- 50x75 mm test piece of special paper, 50 mm dia and 2.85 kg weighing steel cylinder, stop watch
11	Finish, clause 6.9, Table 2 (iv) (a)	Concrete/wooden/mild steel test panels
	Gloss 60 degrees, clause 6.9, Table 2 (iv) (b)	Glossmeter consisting of light source and lens, receptor meter, primary standards and working standards, instrument for measurement of film thickness
12	Fineness of Grind, clause 6.9, Table 2 (v)	Gauge and Scraper
13	Colour, clause 6.9, Table 2 (vi)	For Visual Comparison Method- Color matching booth and light source as per, test panels and reference standards For Spectrophotometric Method- Photo-electric Reflectometer with amber, blue and green filters along with ICI illuminant C
14	Flexibility and Adhesion clause 6.9, Table 2 (vii) (a) Scratch Hardness & (b) Bend Test	Mechanized or Hand-operated apparatus, scratching needle, Burnished tinplate or tin plate or acid chromate treated hard aluminium panels, Bend test apparatus (type 1) with 6.25 mm mandrel, 30X magnification lens, film thickness gauge
15	Flash Point, clause 6.9, Table 2 (viii)	Flash point apparatus and Air-tight containers for storing samples
16	Composition, clause 6.9, Table 2 (ix) (a) Volume Solids	Analytical balance (LC- 0.1 mg), stainless steel disc, beaker, mass per litre cup, weight box.
	(b) Phthalic Anhydride Content of Non-volatile Vehicle	Centrifuge tubes with centrifuge, water bath, air oven, analytical balance (LC- 0.1 mg), condenser and flask, desiccator, evaporating dish, G4 glass crucible, soda lime glass tube, benzene, methanol, acetone, petroleum ether, toluene, alcoholic potassium hydroxide solution, anhydrous ether, alcohol-toluene wash solution, hydrochloric acid,

		wash bottle, and general laboratory glassware
17	Resistance to Acid, 6.9, Table 2 (x)	Clean glass panel (150x100 mm), wax, vessel to place test panel with cover, sulphuric acid
18	Resistance to Alkali, 6.9, Table 2 (xi)	Clean glass panel (150x100 mm), wax, vessel to place test panel with cover, laundry soap, sodium carbonate AR grade
19	Accelerated Storage Stability Test 6.9, Table 2 (xii)	Metal container (500 ml), electrically heated oven (96±2 degree Celsius), stirrer
20	Keeping Property, clause 6.9, Table 2 (xiii)	Spatula with square ended blade (45+1 grams), 120 mm in length and 20 mm wide, nylon paint brush 25 mm, test surface, a smooth surfaced paper chart coated with suitable varnish so as to render the surface impervious and resistant to paint materials
21	Wet Opacity, clause 6.9, Table 2 (xiv)	For Black & White Chart Method- Printed and varnished 100x200 mm charts to give adjacent black and white areas readily wetted by, but impervious to solvent or water-thinned paints., film applicator, reflectometer, template/die stamp For Polyester Film Method- Untreated, colourless, transparent polyester film between 30 and 60 µm in thickness having refractive index value of between 1.64 to 1.67 and of dimensions not less than 100 x 150 mm, film applicator, reflectometer, template/die stamp, black and white glass test plates, each with a plane, polished surface, of at least 80 x 80 mm For PfundCryptometer Method- PfundCryptometer
22	Other equipment and test panels	Some tests require conditioning of samples. Hence, humidity chamber capable of maintaining relative humidity and temperature is required, test panels as specified in different parts and sections of IS 101 and clause 8.1.1 of IS 2932 and film thickness gauge are also required

The above list is indicative only and may not be treated as exhaustive.

**ANNEX C TO THE PRODUCT MANUAL
FOR ENAMEL, SYNTHETIC, EXTERIOR: (a) UNDERCOATING (b) FINISHING
AS PER IS 2932:2013**

SCHEME OF INSPECTION AND TESTING

1.LABORATORY - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

1.1 The manufacturer shall prepare a calibration plan for the test equipment.

2. TEST RECORDS –The manufacturer shall maintain test records for the tests carried out to establish conformity.

3.PACKING AND MARKING–The Standard Mark, as given in the Schedule of the license shall be printed on each container or on the label applied to the container; provided always that the material in each container on which this Mark is thus applied conforms to every requirement of the specification.

3.1 Packing and Marking shall be done as per the requirements of the standard. In addition, the following details shall be marked on labels affixed to each container:

i) Licence No. (CM/L.....)

ii) BIS website details: 'For BIS certification details please visit www.bis.gov.in'

4.CONTROL UNIT – For the purpose of sampling, enamel of same colour and same class produced during a shift at one unit and thoroughly homogenized shall constitute a control unit.

4.1 On the basis of the tests on the samples drawn from a control unit, the conformity to the various requirements of the specification shall be made as follows

i) For the purpose of registration of the sample of the material the colour categories as prescribed in clause 5 of the Standard shall be employed.

ii) A sample drawn from a control unit shall be tested for its colour by matching it with a specified IS Colour or to an agreed colour where IS colour is not specified. In case of undercoating, the colour shall be of approximate match to the finishing enamel. If it fails to conform to the requirement, the control unit from which the sample is drawn shall be considered unfit for the purpose of marking.

iii) In addition to the test as given in para (ii) above, a sample taken from every control unit shall also be tested for its consistency, drying time, finish, resistance to acid and alkali (only finishing enamel)

iv) Two samples from every control unit shall also be tested for scratch hardness, flexibility & adhesion, and mass per ten litres. If any sample fails in respect of one or more of these requirements, the control unit represented by that sample shall be considered unfit for the purpose of marking.

5.LEVELS OF CONTROL - The tests as indicated in column 1 of Table 1 and the levels of control in column 3 of Table 1, shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

3.1 All the production which conforms to the Indian Standards and covered by the licence should be marked with Standard Mark.

6.REJECTIONS— Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016. Any rejected material which is potentially re-salable be sheared or cut or deformed in such a manner that it cannot be used for any other purpose except re-melting. A separate record shall be maintained giving information on quantity and cast number/coil number/control unit number, as applicable, relating to all such rejections/defective/sub-standard material of the production not conforming to the requirements of the Specification and the method of its disposal. Such material shall in no case be stored together with that conforming to the Specification. The Standard Mark (if already applied) on rejected material should be defaced.

IS 2932:2013
Enamel, Synthetic, Exterior: (A) Undercoating (B) Finishing

TABLE 1 LEVELS OF CONTROL
(Para 5.0 of the scheme of testing and Inspection)

Clause	Requirement	Test method Reference	Test equipment requirement R: required (or) S: Sub-contracting permitted	No. of Samples	Frequency	Remarks
6.1 6.1.1	Composition i) General	IS 101(Part9/Sec2)	R	One	Each Control Unit	-----
6.1.2	ii) Total Non-Volatile Content	IS 101(Part8/Sec2)	R	One	Each Control Unit	-----
6.2 6.2.1	Condition in Container a) At delivery	IS 2932:2013	R	One	Each Control Unit	-----
6.2.2	During Storage	IS 101 (Part 6/Sec2)	R	One	Once in six months	-----

6.3	Freedom from coarse particles	IS 101(Part1/Sec2)	R	One	Each Control Unit	-----
6.4	Skin Formation	IS 101(Part1/Sec 2)	R	One	Each Control Unit	-----
6.5	Thinning properties	IS 2923:2013	R	One	Each Control Unit	-----
6.6	Application properties	IS 2923:2013	R	One	Each Control Unit	-----
6.7	Durability (By accelerated weathering apparatus)	Annex C of IS 2932:2013	S	One	Once in a 6 months/subject to the change in composition	-----
6.8	Lead restriction	IS 101(Part8/Sec5)	R	One	Each Control Unit	-----
6.9 & Table 2 of IS 2932 : 2013	i) a) Consistency	IS 101(Part1/Sec5)	R	One	Each Control Unit	-----
	b) Viscosity	IS 101(Part1/Sec5)	R	One	Each Control Unit	-----
	ii) Mass	IS 101(Part1/Sec7)	R	One	Each Control Unit	-----
	iii) Drying time a) Surface dry b) Hard dry c) Tack dry	IS 101(Part3/Sec1)	R	One	Each Control Unit	-----
	iv) a) Finish	IS 101(Part3/Sec 4)	R	One	Each Control Unit	-----
	b) Gloss	IS 101(Part4/Sec4)	R	One	Each Control Unit	-----
	v) Fineness of Grind	IS 101(Part3/Sec 5)	R	One	Each Control Unit	-----

	vi) Colour	IS 101(Part 4/Sec 2)	R	One	Each Control Unit	-----
	vii) Flexibility and adhesion	IS 101(Part 5/Sec 2)	R	Two	Each Control Unit	-----
	a) Scratch Hardness					
	b) Bend Test	IS 101(Part 5/Sec 2)	R	Two	Each Control Unit	-----
	viii) Flash Point	IS 101(Part 1/Sec 6)	R	One	Each consignment of thinner received	-----
	ix) Composition	IS 101(Part 8/Sec 6)	R	One	Each Control Unit	-----
	(a) Volume solids					
	(b) Phthalic Anhydride	IS 101(Part 8/Sec 4)	R	One	Each Control Unit	-----
	x) Resistance to Acid	Annex E of IS 2932:2013	R	One	Each Control Unit	-----
	xi) Resistance to Alkali	Annex F of IS 2932:2013	R	One	Each Control Unit	-----
	xii) Accelerated storage stability	Annex G of IS 2932:2013	R	One	Each 10 th Control Unit	-----
	xiii) Keeping Properties	IS 101(Part 6/Sec 2)	R	One	Each 10 th Control Unit	-----

	xiv) Wet Opacity (To be read with clause 5 and table 1 of IS:2932	IS 101(Part4/Sec 1)	R	One	Each Control Unit	-----
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Note-1: Whether test equipment is required or sub-contracting is permitted in column 4 shall be decided by the Bureau and shall be mandatory. Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau

Note-2: Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification to the Head BO.