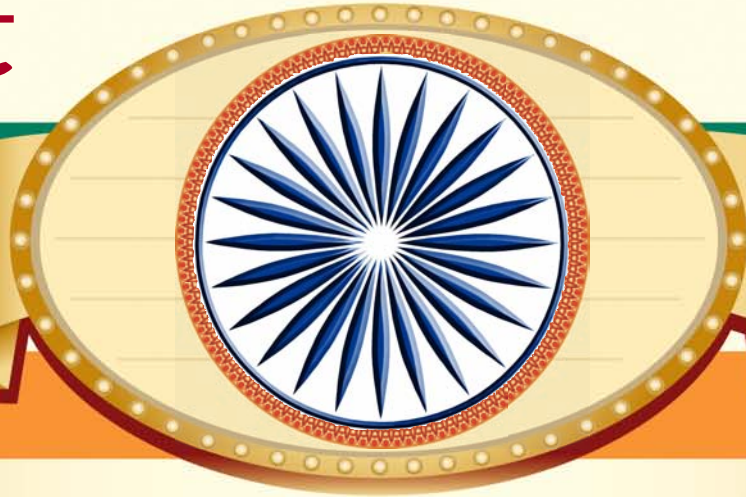


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मानक



Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

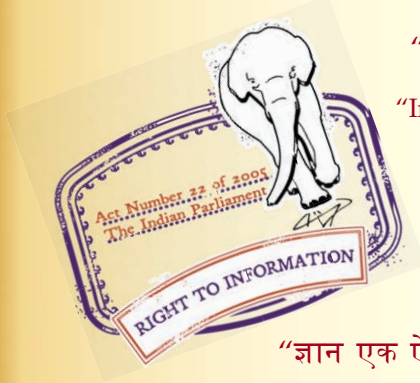
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“Step Out From the Old to the New”

IS 6948 (1973): Ready mixed paint, undercoat, synthetic for ships [CHD 20: Paints, Varnishes and Related Products]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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IS : 6948 - 1973

Indian Standard

**SPECIFICATION FOR
READY MIXED PAINT, UNDERCOAT,
SYNTHETIC FOR SHIPS**

(First Reprint MAY 1982)

UDC 667.638.46 : 629.12.011



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

Alterations

AMENDMENT NO. 2 OCTOBER 1988
TO
IS : 6948 - 1973 READY MIXED PAINT,
UNDERCOAT, SYNTHETIC FOR SHIPS

(*Page 4, clause 3.4*) — Delete.

[*Page 6, Table 1, Sl No. (ix)*] — Add the following new requirement after Sl No. (ix):

(1)	(2)	(3)	(4)
x)	Wet opacity	Between —10 percent and +20 percent of the approved sample	10

(CDC 8)

Printed at New India Printing Press, Khurja, India



AMENDMENT NO. 1 AUGUST 1982

TO

**IS : 6948 - 1973 SPECIFICATION FOR READY
MIXED PAINT, UNDERCOAT, SYNTHETIC
FOR SHIPS**

Alterations

(Page 4, clause 3.1) :

a) *Item (a), lines 2 and 3* — Substitute 'titanium dioxide rutile (conforming to IS : 9788-1981‡), minimum 37.5 percent titanium dioxide, anatase (conforming to IS : 411-1981 §)' for 'antimony oxide (conforming to IS : 38-1950‡), minimum 37.5 percent titanium dioxide (conforming to IS : 411-1968§)'.

b) *Item (c), line 1* — Substitute 'IS : 1745-1978||' for 'IS : 1745-1966||'.

c) *Item (c), line 2* — Substitute 'Type 1 of IS : 385-1979¶' for 'IS : 385-1962¶'.

(Page 4, foot-notes with '‡', '§', '||' and '¶' marks) — Substitute the following for existing footnotes:

'‡Specification for titanium dioxide, rutile for paints.

§Specification for titanium dioxide, anatase for paints (*second revision*).

||Specification for petroleum hydrocarbon solvents (*second revision*).

¶Specification for mixed liquid driers for paints (*second revision*).'

(Page 5, clause 3.5, line 3) — Substitute 'IS : 104-1979*' for 'IS : 104-1962*'.

(Page 5, foot-note with '*' mark) - Substitute '(*second revision*)' for '(*revised*)'.

(Page 7, clause 6.2, line 2) — Substitute 'IS : 1070-1977†' for 'IS : 1070-1960†'.

(Page 7, foot-note with '†' mark) — Substitute the following for the existing foot-note:

'†Specification for water for general laboratory use (*second revision*).'

[Page 8, clause A-2.2 (a), line 2] — Substitute 'IS : 104-1979†' for 'IS : 104-1962†'.

(Page 8, foot-note with '†' mark) — Substitute '(*second revision*)' for '(*revised*)'.

(CDC 8)

Indian Standard

SPECIFICATION FOR READY MIXED PAINT, UNDERCOAT, SYNTHETIC FOR SHIPS

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(Continued on page 2)

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(Continued from page 1)

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Indian Standard
SPECIFICATION FOR
READY MIXED PAINT, UNDERCOAT,
SYNTHETIC FOR SHIPS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 15 March 1973, after the draft finalized by the Paints and Allied Products Sectional Committee had been approved by the Chemical Division Council.

0.2 An undercoat is applied to a surface after priming, filling, etc, or after the preparation of a previously painted surface and before the application of a finishing coat. It should possess good hiding power and a colour leading up to that of the finishing coat, and should otherwise be suitable for use with the other paints in the system.

0.3 This standard intends to achieve the alignment of JSS 3010 'Specification for paint, PFU, undercoat, synthetic, for weather work' issued by the Department of Standardization, Ministry of Defence, Government of India.

0.4 The Sectional Committee responsible for the preparation of this standard was of the opinion that for an undercoat high pigment concentration and use of scarce pigments like rutile titanium dioxide and antimony oxide was not necessary. The Committee is, therefore, investigating to evolve a material specification based on performance instead of composition, and for the interim period it was decided to publish this standard to cater the needs of Indian Navy and Merchant shippings.

0.5 This standard contains clause **3.4** which calls for agreement between the purchaser and the supplier.

0.6 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 IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes requirements and methods of sampling and test for ready mixed paint, synthetic, undercoating for ships. The material

*Rules for rounding off numerical values (*revised*).

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is used in the painting system adopted for the exterior hulls above water and weathervvork areas of ships.

2. TERMINOLOGY

2.1 For the purpose of this standard definitions given under **2** of IS : 101-1964* and IS : 1303-1963† shall apply.

3. REQUIREMENTS

3.1 Composition — The material shall be manufactured with the ingredients, mixed in suitable proportions, specified below:

- a) *Pigments* — The pigments shall consist of minimum 37.5 percent antimony oxide (conforming to IS : 38-1950‡), minimum 37.5 percent titanium dioxide (conforming to IS : 411-1968§) and the remainder being suitable extenders.
- b) *Varnish Medium* — It shall consist of a drying oil modified alkyd resin or phenolic alkyd of the long oil type.
- c) Petroleum hydrocarbon solvents (conforming to IS: 1745-1966||) and driers (conforming to IS : 385-1962¶) shall be added in suitable proportions.

3.2 Water Content — If water is suspected, the material shall not contain water more than 0.5 percent when tested as prescribed in **14** of IS: 101-1964*.

3.3 Mass in kg/10 Litres — The mass in kg/10 litres of the material shall be within ± 3 percent of the approved sample when tested as prescribed in **25** of IS : 101-1964*.

3.4 Optional Requirements — In addition, if agreed to between the purchaser and the supplier, the spreading capacity, spreading time and wet opacity shall be determined in accordance with relevant methods of test as given in IS: 101-1964* and the results recorded on the sample offered for approval against the specification. In the case of supplies offered against approved sample of this specification, these characteristics shall be within 90 percent of the approved sample.

*Methods of test for ready mixed paints and enamels (*second revision*).

†Glossary of terms relating to paints (*revised*).

‡Specification for antimony oxide for paints.

§Specification for titanium dioxide for paints (*first revision*).

||Specification for petroleum hydrocarbon solvents (*first revision*).

¶Specification for liquid driers for paints (*revised*).

3.5 Compatibility with Finishing — A single coat of the material when applied to a steel panel primed with zinc chrome primer (conforming to IS : 104-1962*) and a coat of finishing (conforming to IS : 6951-1973†), shall not cause lifting or appreciable softening of the undercoats when examined immediately after application of the material.

3.6 Durability

3.6.1 Registered Sample

3.6.1.1 When prepared and tested as prescribed under **A-3**, a general breakdown of the film prepared from the registered sample of the material shall not occur in less than 12 months.

3.6.1.2 A film of the registered sample shall be prepared and tested, as prescribed under **A-4**, in an accelerated weathering apparatus for a period of 15 days and a complete record of its performance shall be maintained.

NOTE — As a precaution against inadvertent accidents, it is recommended that the outdoor exposure test (*see A-3*) and the accelerated weathering test (*see A-4*) are carried out in duplicate.

3.6.2 Sample from Bulk Supply — A film of the material prepared from a representative sample from bulk supply as described in Appendix A and tested in the accelerated weathering apparatus (*see A-4*) shall be not materially different in performance as compared with the record of the film of the registered sample. The film shall be examined daily for a period of 15 days.

3.7 The material shall also conform to the requirements prescribed in Table 1.

4. PACKING AND MARKING

4.1 Packing — The material shall be packed in steel containers or as agreed to between the manufacturer and the purchaser.

4.2 Marking — The containers shall be marked with the following:

- a) Name of the material;
- b) Manufacturer's name and trade-mark, if any;
- c) Month and year of manufacture;
- d) Volume of the contents; and
- e) Batch or lot No. in code or otherwise.

*Specification for ready mixed paint, brushing, zinc chromic, priming (revised).

†Specification for ready mixed paint, finishing, exterior, for ships.

TABLE 1 REQUIREMENTS FOR READY MIXED PAINT, UNDERCOAT, SYNTHETIC FOR SHIPS

(Clause 3.7)

SL No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST (REF TO CL No. IN IS : 101-1964*)
(1)	(2)	(3)	(4)
i)	Drying time:		
	a) Surface dry	Not more than 6 hours	7.1, 7.2 and 7.3
	b) Hard dry	Not more than 18 hours	
ii)	Consistency	Smooth and uniform and suitable for brushing or spraying when thinned suitably	7.4
iii)	Finish	Smooth and egg-shell gloss/matt	7.5
iv)	Colour	Approximate match to ISC No. 631 Light grey, No. 632 Dark admiralty grey and white	11
v)	Scratch hardness	No visible scratch as to show the bare metal	15.1
vi)	Flexibility and adhesion after 48 hours	No damage or detachment of the film	16
vii)	Flash point, <i>Min</i>	30°C	24
viii)	Lead compounds (as Pb) percent by mass, <i>Max</i>	0.3	29
ix)	Keeping quality	Not less than 12 months	31

*Methods of test for ready mixed paints and enamels (*second revision*).

4.2.1 The containers may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors) may be obtained from the Indian Standards Institution.

5. SAMPLING

5.1 The representative samples of the material shall be drawn as prescribed in 3 of IS : 101-1964*.

6. TEST METHODS

6.1 The tests shall be conducted as prescribed in IS: 101-1964* and Appendix A. References to relevant clauses of IS : 101-1964* are given in col 4 of Table 1 and 3.2 to 3.4 and to the Appendix in 3.6.

6.2 Quality of Reagents — Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1960†) shall be employed in tests.

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

7. CRITERIA FOR CONFORMITY

7.1 A lot shall be declared as conforming to the requirements of this standard if the test results of composite sample satisfy the requirements prescribed under 3.

APPENDIX A

(*Clause 3.6*)

DETERMINATION OF DURABILITY

A-0. GENERAL

A-0.1 Outline of the Method — The durability of the material is determined by ascertaining actual behaviour of suitably prepared test panels in normal outdoor exposure test for a specified period and evaluating the results of this exposure by a suitable method of rating for various characteristics film of the material. Apart from this the material is also evaluated by an accelerated weathering test wherein a prepared panel is subjected to controlled exposure of heat, light and water in an artificial weathering apparatus.

A-1. TEST PANELS

A-1.1 The panels shall be mild steel plate, 1.6 mm thick and free from surface defects. Panels for the outdoor exposure test shall be 300 × 300 mm in size and for the accelerated weathering test 150 × 75 mm.

*Methods of test for ready mixed paints and enamels (*second revision*).

†Specification for water, distilled quality (*revised*).

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The panels shall be cleaned as prescribed under 5.2.1 of IS : 101-1964* and the back and edges of the panels shall be protected with two coats of a suitable paint.

A-2. PREPARATION OF TEST PANELS

A-2.1 In the painting procedure outlined under A-2.2, the air-drying of the films shall be done at room temperature as defined under 2.9 of IS : 101-1964* and at relative humidity of not more than 70 percent.

A-2.2 The surface of the test panels to be exposed shall be prepared as follows:

- a) Apply one coat of ready mixed paint, zinc chrome priming (conforming to IS : 104-1962†).
- b) Rub the panel lightly with waterproof emery paper No. 220/240. Apply by appropriate method (brushing /spraying) one coat of the undercoat conforming to this standard and allow to air-dry for 24 hours.
- c) Rub wet with waterproof emery paper No. 220/240, wash and wipe off water, apply by appropriate method (brushing/spraying) one coat of the finishing conforming to IS : 6951-1973‡ when the surface is dry, and allow to air-dry for 48 hours.
- d) Rub wet with waterproof emery paper No. 320, wash and wipe off water, apply by appropriate method (brushing/spraying) a second coat of the finishing conforming to IS : 6951-1973‡ when the surface is dry, and allow to air-dry for 7 days before subjecting to the exposure test.

A-3. NORMAL OUTDOOR EXPOSURE TEST

A-3.0 Subject the samples for registration and the tender samples, if supplied, to normal outdoor exposure test in the manner described under A-3.1.

A-3.1 Expose in open the test panels, prepared in the manner prescribed under A-1 and A-2 in duplicate in a vertical position facing south. Commence the exposure not earlier than the third week of January and not later than the first week of April.

*Methods of test for ready mixed paints and enamels (*second revision*).

†Specification for ready mixed paint, brushing, zinc chrome, priming (*revised*).

‡Specification for ready mixed paint, finishing, exterior, for ships.

A-3.1.1 Examine the condition of the exposed films at monthly intervals for gloss retention and at bimonthly intervals for the other characteristics given below:

- a) Colour,
- b) Checking and cracking,
- c) Chalking, and
- d) Spotting.

A-3.1.2 For the above examination, wash the right hand half of the surface of the two test panels by pouring water and then wiping with a soft cloth or chamois leather (*see* IS: 1017-1966*). Adequate time for cooling of the panels to room temperature shall be allowed prior to washing. Examine the same half of the test panels at each examination. As an aid in the examination, a magnifying glass may be used, but the evaluation shall be based on an assessment with the unaided eye. At the end of the stipulated period for durability test, examine the two halves of the test panels. The sample shall be considered satisfactory if the material surface underneath as well as condition of the film in both the halves, the one washed periodically and the one washed only for the final examination is satisfactory by the method of evaluation described under **A-3.2**. Stray film failure due to extraneous causes other than climatic shall be ignored.

A-3.2 Method of Rating — The film of an unexposed test panel shall be rated with the following basic values for the respective characteristics:

a) Possessing high gloss	25
b) Possessing correct colour	25
c) Freedom from chalking and cracking	35
d) Freedom from chalking	10
e) Freedom from spotting	5

100

NOTE — The initial rating of film may be 100 or less according to the condition of gloss and colour, the rating for freedom from checking and cracking, chalking and spotting being always the maximum in the case of unexposed films.

A-3.3 Evaluation of Exposed Films — In recording the condition of exposed films at each examination, express the observed relative values of different characteristics in percentages of the basic value allotted to each characteristic under **A-3.2**. The allotment of performance value should be multiples of 10. For arriving at an assessment, multiply the basic value for each characteristic (*see* **A-3.2**) by the percentage awarded for the

*Specification for chamois leather (*first revision*).

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performance in the test and divide the product so obtained by 100 to obtain the percentage award for the observed value of each characteristic. Take the sum total of these resulting values as the overall assessment.

A-3.3.1 Table 2 is intended to serve as an example for the assessment of the film of the metcrial after exposure.

TABLE 2 ASSESSMENT OF A FILM OF THE MATERIAL AFTER EXPOSURE

SL No.	CHARACTERISTIC	BASIC VALUE	PERFORMANCE VALUE	ASSESSMENT VALUE
(1)	(2)	(3)	(4)	(5)
		percent	percent	percent
i)	Possessing high gloss	25	50	12.5
ii)	Possessing correct colour	25	60	15.0
iii)	Freedom from checking and cracking	35	60	21.0
iv)	Freedom from chalking	10	20	2.0
v)	Freedom from spotting	5	80	4.0
				<hr/> 54.5 <hr/>

NOTE— Other characteristics being found satisfactory, the samples shall not be rejected on the ground of gloss retention being lower than 25 percent, but the gloss retention figure shall be reported.

A-3.4 Results of Exposure — Reckon the period for the general break-down of the exposed film from the date of commencement of exposure to the time when the overall assessment falls below 50 percent or when the performance value of any one characteristic falls below 25 percent of the basic value adopted for that characteristic. In Table 2, although the overall assessment is 54.5 percent, yet the film is to be regarded as having generally broken down, because the performance value of chalking has fallen below 25 percent of its basic value.

A-3.5 Protection Against Corrosion — After the exposure of the film is discontinued, examine for corrosion of the metal surface of the panel underneath by removing film at 5 different places, one in the centre and one each at 4 different places near the 4 corners about 50 mm away from either edge. The paint film shall be removed by solvent type paint remover. When the film is softened by the paint remover, it shall be removed by gently rubbing with cotton swab or waste jute taking care to remove adhering film of primer and/or undercoating. After removal of the film, the exposed metal shall be covered by thick mineral oil or vaseline. Localized corrosion and/or rust spots shall not constitute a cause of failure. To satisfy the requirements of this standard, the metal surface shall be otherwise free from corrosion.

A-4. ACCELERATED WEATHERING TEST

A-4.1 Accelerated Weathering Apparatus — An artificial weathering apparatus of the carbon arc type for uniform and controlled exposure to the effects of heat, light and water.

A-4.2 Samples for registration shall be tested in duplicate in a suitable accelerated weathering apparatus (*see A-4.1*) and samples drawn from bulk supply shall be tested in a similar manner. The test panels shall be prepared as described under **A-2.2**. The requirements of this test shall be taken to have been satisfied if the performance in respect of all the characteristics is similar to the recorded results of the film of the registered sample.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	1 N = 1 kg.m/s ²
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m ²
Frequency	hertz	Hz	1 Hz = 1 c/s (s ⁻¹)
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m ²

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