

इंटरनेट

मानक

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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

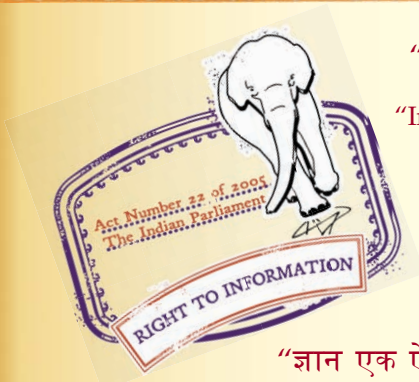
“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 2074 (1992): Ready Mixed Paint, Air Drying, Red Oxide Zinc Chrome, Priming [CHD 20: Paints, Varnishes and Related Products]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक

तैयार मिश्रित रंग रोगन, हवा से सूखने वाले, रेड आक्साइड
जिंक क्रोम वाले, पहली सतह — विशिष्ट
(दूसरा पुनरीक्षण)

Indian Standard

READY MIXED PAINT, AIR DRYING, RED
OXIDE ZINC CHROME, PRIMING —
SPECIFICATION

(Second Revision)

UDC 667.633.417.624.7 : 667.638.2 : 667.635.3

668694/3
930125

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

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Paints (Other than Industrial Paints) and Allied Products Sectional Committee had been approved by the Chemical Division Council.

This standard was first published in 1962 amalgamating IS 107 : 1952 'Ready mixed paint, brushing, red oxide-zinc chrome, priming' and IS 108 : 1952 'Ready mixed paint, spraying, red oxide-zinc chrome, priming'. In the first revision in 1979 requirements for chromic anhydride and zinc oxide content in the zinc chrome content had been included. The optional requirements for spreading capacity and spreading time had been dropped. This revision has been taken up to completely align it with Defence Specification J-347-13, Paint, RFU, Priming, Red oxide of iron, zinc chromate, universal, synthetic, brushing/spraying, issued by Ministry of Defence, by quantifying the values of wet opacity, gloss, weight per 10 litres, etc.

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 '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

READY MIXED PAINT, AIR DRYING, RED OXIDE ZINC CHROME, PRIMING — SPECIFICATION

(Second Revision)

1 SCOPE

1.1 This standard prescribes requirements, methods of sampling and test for the material commercially known as ready mixed paint, air drying, red oxide-zinc chrome priming.

1.1.1 The material is used as a primer in the painting system normally followed for enamels for metal surfaces. It is used for the protection of steelwork, both under marine and inland outdoor conditions.

2 REFERENCES

The Indian Standards listed in Annex A are the necessary adjuncts to this standard.

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 1303 : 1983 shall apply.

4 CLASSES

The material shall be supplied in brushing consistency but shall be suitable for application by spraying after thinning with petroleum hydrocarbon solvent, 145/205, low aromatic grade conforming to IS 1745 : 1978. The smell of the material shall not be objectionable during application.

5 REQUIREMENTS

5.1 Composition

The material shall consist of the ingredients mixed in the proportions, by mass, specified below:

- a) Pigment (in accordance with **5.1.1**) — 50 ± 5 percent.
- b) Driers — Remainder, in suitable proportions to produce a paint satisfying the requirements of this standard.

NOTE — For defence supplies, the material shall meet an additional requirement of non-volatile vehicle, *Min* 20 percent by mass.

5.1.1 The pigment used in the manufacture of the material shall consist of ingredients mixed in the proportions by mass, specified below. Zinc

chromate content shall be determined as prescribed in Annex B:

- a) Zinc chrome, percent by mass, *Min* (conforming to Type 2 of IS 51:1979) which shall correspond to chromic anhydride contents of minimum 6.88 percent by mass and 5.84 percent by mass of zinc oxide — 16.0

- b) Manufactured red oxides of iron (conforming to Class 2 or IS 44 : 1991)

or

Natural red oxides of iron (conforming to Class 3 of IS 44 : 1991)

or

A mixture of both which shall correspond to red oxide (as Fe_2O_3), percent by mass, *Min*; when tested as prescribed in 6 of IS 6947 (Part 2) : 1975

50

- c) Suitable extenders — remainder

5.1.2 The volatile vehicle shall be of such composition so as to satisfy the requirements of this specification.

5.1.3 The composition of the material shall be subject to lead restriction as defined in IS 1303 : 1983 and it shall not be more than one percent expressed as metallic lead, when tested as per IS 101 (Part 8/Sec 5) (*under print*).

5.2 The material shall be suitable for use with oleoresinous synthetic and nitrocellulose-based undercoats, surfacers, fillers and putties.

5.3 Freedom from Objectionable Impurities

Thinner containing chlorinated compounds or other substances which are injurious to operators during or after application shall not be used.

5.4 Compatibility with Thinner

The material shall be suitable for thinning with thinners used for synthetic paints (see IS 1872 : 1961).

5.5 Relative Consistency

The efflux time from a full No. 4 Ford Cup at $27 \pm 2^\circ\text{C}$ when determined as prescribed in IS 101 (Part 1/Sec 5) : 1989, shall be not less than 80 and not more than 120 seconds.

5.6 Resistance to Salt Spray

When tested as prescribed in 4 of IS 101 (Part 6/ Sec 1) : 1988 for a period of 96 hours continuously, the paint film shall show no signs of breakdown and the underlying metal shall be free from corrosion.

5.7 Resistance to Natural or Artificial Sea Water (Applicable for Marine Paints Only)

When tested as prescribed in Annex C, the panel prepared from the material shall show no damage, blistering or flaking of the paint film, or underfilm corrosion.

5.8 The material shall also conform to the requirements given in Table 1 when tested

according to the methods given in col 4 of the table.

5.9 Water Content

If water is suspected to be present in the material, it shall not exceed 0.5 percent when tested as prescribed in IS 101 (Part 2/Sec 1) : 1988.

6 SAMPLING

6.1 Representative samples of the material shall be drawn as prescribed in IS 101 (Part 1/Sec 1) : 1986.

6.2 Criteria for Conformity

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 5.

7 TESTS

7.1 Tests shall be conducted as per the method referred to in col 4 and 5 of Table 1 and in 5.1 to 5.9.

Table 1 Requirements for Ready Mixed Paint, Air Drying, Red Oxide, Zinc Chrome, Priming (Clause 5.8)

Sl No.	Characteristic	Requirements	Method of Test, Ref to	
			IS 101 (4)	Annex (5)
(1)	(2)	(3)		
i)	Drying time:			
	a) Surface dry	Not more than 2 hours	(Part 3/Sec 1) : 1986	—
	b) Hard dry	Not more than 12 hours		
ii)	Consistency	Smooth and uniform	(Part 1/Sec 5) : 1989	—
iii)	a) Finish	Smooth, matt to egg shell gloss	(Part 3/Sec 4) : 1987	—
	b) Fineness of grind microns, <i>Max</i>	50	(Part 3/Sec 5) : 1987	—
	c) Gloss values, specular		(Part 4/Sec 4) : 1988	—
	45°	Not more than 30 units		
	60°	Not more than 20 units		
iv)	Colour	That of red oxide	(Part 4/Sec 2) : 1989	—
v)	Mass in kg/10 litres, <i>Min</i>	13.5	(Part 1/Sec 7) : 1986	—
vi)	Scratch hardness after 48 hours air-drying	No scratch as to show the bare metal	(Part 5/Sec 1) : 1988	—
vii)	Volume solids	45 ± 5	—	D
viii)	Flexibility and adhesion after 48 hours air-drying	No damage, detachment or cracking of the film	(Part 5/Sec 2) : 1988	—
ix)	Protection against corrosion under conditions of condensation	No signs of corrosion	(Part 6/Sec 1) : 1988	—
x)	Flash point	Not below 30°C	(Part 1/Sec 6) : 1987	—
xi)	Accelerated storage stability	To pass the test	—	E
xii)	Keeping properties	Not less than 12 months	(Part 6/Sec 2) : 1989	—

7.2 Quality of Reagents

Unless otherwise specified, pure chemicals and distilled water (*see* 1070 : 1992) shall be employed in tests.

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

8 PACKING AND MARKING

8.1 Packing

Unless otherwise agreed to between the purchaser and the supplier, the paint shall be

packed in metal containers conforming to IS 1407 : 1980 or IS 2552 : 1989.

8.2 Marking

The containers shall be marked with the following:

- Name of the material,
- Volume of the material,
- Indication of the source of manufacture,
- Batch No. or lot No. [in code or otherwise, and
- Month and year of manufacture.

ANNEX A

(*Clause 2*)

LIST OF REFERRED INDIAN STANDARDS

IS No.	Title	IS No.	Title
44 : 1991	Iron oxide pigments for paints (<i>second revision</i>)	Sec 4) : 1988	Section 4 Gloss (<i>third revision</i>)
51 : 1979	Zinc chrome for paints (<i>third revision</i>)	(Part 5/ Sec 1) : 1988	Part 5 Mechanical tests on paint films, Section 1 Hardness test (<i>third revision</i>)
101	Methods of sampling and tests for paints, varnishes and related products	Sec 2) : 1988	Section 2 Flexibility and adhesion (<i>third revision</i>)
(Part 1/ Sec 1) : 1986	Part 1 Tests on liquid paints (general and physical), Section 1 Sampling (<i>third revision</i>)	(Part 6/ Sec 1) : 1988	Part 6 Durability tests on paint films, Section 1 Durability under conditions of condensation (<i>third revision</i>)
Sec 3) : 1986	Section 3 Preparation of panels (<i>third revision</i>)	Sec 2) : 1989	Section 2 Keeping properties (<i>third revision</i>)
Sec 5) : 1989	Section 5 Consistency (<i>third revision</i>)	(Part 8/Sec 5)	Part 8 Tests for pigments and other solids, Section 5 Lead restriction test (<i>under print</i>)
Sec 6) : 1987	Section 6 Flash point (<i>third revision</i>)	1070 : 1992	Reagent grade water — Specification (<i>third revision</i>)
Sec 7) : 1986	Section 7 Mass per ten litres (<i>third revision</i>)	1303 : 1983	Glossary of terms relating to paints (<i>second revision</i>)
(Part 2/ Sec 1) : 1988	Part 2 Preliminary examination and preparation of samples for testing, Section 1 Water content (<i>third revision</i>)	1407 : 1980	Round paint tins (<i>second revision</i>)
(Part 3/ Sec 1) : 1986	Part 3 Test on paint film formation, Section 1 Drying time (<i>third revision</i>)	1745 : 1978	Petroleum hydrocarbon solvents (<i>second revision</i>)
Sec 4) : 1987	Section 4 Finish (<i>third revision</i>)	1872 : 1961	Thinner for synthetic paints and varnishes for aircrafts
Sec 5) : 1987	Section 5 Fineness of grind (<i>third revision</i>)	2552 : 1989	Steel drums (galvanized and ungalvanized) (<i>third revision</i>)
(Part 4/ Sec 1) : 1988	Part 4 Optical tests on paint films, Section 1 Opacity (<i>third revision</i>)	6947 (Part 2) : 1975	Methods of estimation of composite pigments in oil pastes, ready mixed paints and enamels : Part 2 Estimation of zinc chromes, ferric oxide and aluminium
Sec 2) : 1989	Section 2 Colour (<i>third revision</i>)		

ANNEX B

(Clause 5.1.1)

DETERMINATION OF CHROMIC ANHYDRIDE AND ZINC OXIDE

B-0 OUTLINE OF THE METHOD

B-0.1 Chromic anhydride is determined by titrating the iodine liberated from potassium iodide with standard sodium thiosulphate solution. Zinc oxide is determined in the same solution by titrating the iodine subsequently liberated on addition of potassium ferricyanide, with standard sodium thiosulphate solution.

B-1 REAGENTS

B-1.1 Dilute Sulphuric Acid — approximately 7 N.

B-1.2 Potassium Iodide Solution — freshly prepared, 10 percent.

B-1.3 Standard Sodium Thiosulphate — 0.1 N.

B-1.4 Starch Solution — 0.5 percent.

B-1.5 Potassium Ferricyanide Solution

M/10, prepared in cold water, filtered rapidly and kept in a dark bottle. The solution can be suitably used for seven days if kept in dark when not in use.

B-1.6 Ammonium Bifluoride (NH₄) HF₂ — solid.

B-1.7 Sodium Hydroxide Solution — 10 percent (approx).

B-2 PROCEDURE

B-2.1 Weigh accurately about 1 g of the pigment in a 250-ml beaker and add about 100 ml of sodium hydroxide solution. Stir well by rubbing with a glass rod and boil slowly for 5 minutes over a wire gauze. Place the beaker, covered with a clock-glass on a water-bath for about half an hour. Filter over filter paper (Whatman No. 42) in a 500-ml conical flask. Wash well with hot water until the residue is free from chromate. Cool the filtrate in ice water and neutralize it with dilute sulphuric acid. Add 30 ml of dilute sulphuric acid after neutralization and cool. Then estimate chromic anhydride and zinc oxide content as given in B-2.2, B-2.3 and B-2.4.

B-2.2 Transfer the solution to a 500-ml iodine flask containing 100 ml of water and 20 ml of dilute sulphuric acid. Add 30 ml of potassium iodide solution and allow to stand for 5 minutes. Titrate the liberated iodine with standard sodium thiosulphate solution after

adding 5 ml of starch solution as indicator. Note the volume of sodium thiosulphate solution used in the titration V_1 .

B-2.3 After the titration for chromic anhydride, add ammonia solution dropwise until the litmus test paper first turns blue. (An excess of ammonia solution, more than 3 to 4 drops, should not be added as it is essential that the blue litmus should turn red with ammonium bifluoride to be added subsequently.) Cool and add 2 to 3 g of ammonium bifluoride and sufficient water to make volume approximately 250 ml. (Sometime traces of iodine liberated during neutralization can be cleared by one or two drops of sodium thiosulphate solution.) Add $V_1/3$ ml of potassium ferricyanide solution. Stir and allow to stand for about 2 minutes. Titrate the liberated iodine with standard thiosulphate solution. After the end point, the colour of the test solution will be bright pale greenish-yellow. Note the volume of sodium thiosulphate solution used in the second titration (V_2). If V_2 is less than 6 ml, the titration is to be repeated with the addition of ($V_2 + 2$) ml of potassium ferricyanide solution in place of $V_1/3$ ml.

B-2.4 If V_2 is less than 2 ml, the titration is to be repeated, starting from the extracted pigment, with the addition of 5 ml of potassium ferricyanide solution.

B-3 CALCULATION

B-3.1 Chromic anhydride
(CrO₃), percent
by mass
$$= \frac{3.334 \times V_1 \times N}{M}$$

where

V_1 = volume, in ml, of sodium thiosulphate solution used in the first titration;

N = normality of sodium thiosulphate solution used; and

M = mass, in g, of the material taken for the titration.

B-3.2 Zinc oxide (ZnO),
percent by mass
$$= \frac{12.45 \times V_2 \times N}{M}$$

where

V_2 = volume, in ml, of sodium thiosulphate solution used in the second titration; and

N and M have the same legend as B-3.1.

ANNEX C

(Clause 5.7)

TEST FOR RESISTANCE TO SEA WATER

C-1 APPARATUS

C-1.1 A small container capable of holding sufficient sea water for the immersion of 75 mm of the panel.

C-2 REAGENT

C-2.1 The natural sea water should be taken for not less than one foot below the surface by a method which does not contaminate from the surface layer. In areas where there is pronounced tidal action, the water should be taken near full flood and should, initially, have a salinity of not less than 30 and a pH of not less than 8.0.

C-2.2 If natural uncontaminated sea water is not available, a synthetic sea water to the following formulation may be used:

Sodium chloride	26.5 g
Magnesium chloride	2.4 g
Magnesium sulphate	3.3 g

Calcium chloride	1.1 g
Potassium chloride	0.73 g
Sodium bicarbonate	0.2 g
Sodium bromide	0.28 g
Water, distilled	1 000 ml

C-3 PROCEDURE

C-3.1 Prepare a panel of 150 mm × 50 mm × 1.25 mm mild steel plate as described in IS 101 (Part 1/Sec 3) : 1986. After seven days of application, immerse 75 mm of the panel in the reagent, for a period of seven days, at a constant temperature.

C-3.2 Reporting

At the end of the specified time of immersion remove the panel and immediately swab it vigorously with a cotton-wool swab soaked in the paint remover. Examine the panels for signs of corrosion.

ANNEX D

[Table 1, Sl No. (vii)]

DETERMINATION OF VOLUME SOLIDS

D-0 GENERAL

This method is intended to provide a measure of the volume of dry coating obtainable from a given volume of liquid coating. This volume is considered to be the most equitable means of comparing the coverage and the wet film thickness of the given paint.

D-1 APPARATUS

D-1.1 Analytical Balance — sensitive to 0.1 mg.

D-1.2 Stainless Steel Disc

60 mm diameter and 0.70 mm thickness with a small hole 2 to 3 mm from the edge. A fine wire such as chromel is attached through the hole for suspending the disc in a liquid.

D-1.3 Weight Box

D-1.4 Beaker — 1 litre.

D-1.5 Mass per Litre Cup

D-1.6 Hot Air Oven — capable to maintain $105 \pm 2^\circ\text{C}$.

D-2 PROCEDURE

D-2.1 Dry the disc in an oven at 105°C for 10 minutes and cool. Weigh the disc in air. Let it be W_1 grams.

D-2.2 Suspend the disc in water and weigh again. Let it be W_2 grams.

D-2.3 Calculate the volume of the disc V as follows:

$$V = \frac{W_1 - W_2}{d}$$

where

d = density of the water at room temperature.

D-2.4 Determine the weight of non-volatile content of the liquid coating material by drying a known amount of paint at 105°C for 3 hours. Let it be W grams.

D-2.5 Determine the specific gravity of the paint to the nearest 0.001 g/ml by using mass per litre cup. Let it be p .

D-2.6 Dip the disc in the paint sample for 10 minutes and take out the disc. Allow the excess coating material to drain off. Blot the coating material off the bottom edge of the disc so that beads or drops do not dry on the bottom edge of the disc. Dry the disc at 105°C for 3 hours and cool. Weigh the coated disc in air. Let it be W_3 grams.

D-2.7 Suspend the coated disc in water and weigh again. Let it be W_4 grams.

D-2.8 Calculate the volume of the coated disc V_1 as follows:

$$V_1 = \frac{W_3 - W_4}{d}$$

where

d = density of the water at room temperature.

D-2.9 Calculate the volume of the dried coating as follows:

$$\text{Volume of dried coating, } (V_d) = V_1 - V$$

D-2.10 Calculate the volume of wet coating as follows:

$$V_w = \frac{W_3 - W_1}{W \times P}$$

where

W = grams of non-volatile matter in 1 g of wet coating.

D-2.11 Calculate the percent volume solids of the paints as follows:

$$\text{Volume solid, percent by mass} = \frac{V_1 - V}{V_w} \times 100$$

OR

$$= \frac{V_d}{V_w} \times 100$$

D-2.12 The percent volume solids of a paint is related to the covering capacity and wet film thickness in the following manner:

$$\text{a) Theoretical coverage (m}^2\text{/l)} = \frac{\text{Percent Volume Solids}}{\text{Dry film thickness (microns)}} \times 10$$

$$\text{b) Wet film thickness (microns)} = \frac{\text{Dry film thickness (microns)}}{\text{Percent Volume Solids}} \times 100$$

ANNEX E

[Table 1, Sl No. (xi)]

METHOD FOR ACCELERATED STORAGE STABILITY TEST

E-1 PROCEDURE

Store the paint sample in a closed 500-ml container and keep at 60°C for 96 hours. After the test paint shall not gel, liver, curdle or increase in efflux time by more than 20 percent, and

there shall be no evidence of seeding. The paint shall meet the drying time requirement and shall produce dry film that is uniform in appearance and free from streaking, mottling and seediness. Further, the change in gloss value from the original shall not be more than 5 units.

Standard Mark

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 Standard 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 BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

**AMENDMENT NO. 1 JUNE 1997
TO
IS 2074 : 1992 READY MIXED PAINT, AIR DRYING,
RED OXIDE ZINC CHROME, PRIMING —
SPECIFICATION**

(Second Revision)

[Page 2, Table 1, Sl No. (iii)(c), col 2] — Substitute the following for existing matter:

‘Gloss values, specular 60°

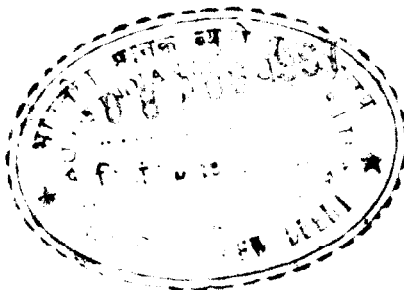
[Page 2, Table 1, Sl No. (iii) (c), col 3] — Substitute the following for the existing matter:

‘Not more than 40 units’

[Page 2, Table 1, Sl No. (vi), col 4] — Substitute ‘(Part 5/Sec 2)’ for ‘(Part 5/Sec 1)’.

[Page 2, Table 1, Sl No. (vii), col 2] — Insert ‘%’ after the word ‘solids’.

(CHD 020)



AMENDMENT NO. 2 APRIL 2006
TO
IS 2074 : 1992 SPECIFICATION FOR READY
MIXED PAINT, AIR DRYING, RED OXIDE ZINC
CHROME, PRIMING — SPECIFICATION

(Second Revision)

(Page 2, clause 5.9) — Delete the clause.

(CHD 20)