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भारतीय मानक
Indian Standard

IS 138 : 2018

तैयार मिश्रित रंग रोगन, सूचना अंकन वाले पैकेजों और पैट्रोल धारकों के लिए विशिष्टि

(चौथा पुनरीक्षण)

Ready Mixed Paint, Marking, for Packages and Petrol Containers — Specification

(Fourth Revision)

ICS 87.040

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भारतीय मानक ब्यूरो
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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 had been approved by the Chemical Division Council.

This standard was first published in 1950. It was first revised in 1969 to align fully with JSS 1003 A 'Paint, PFU, marking, ammunition, air drying, semi-glossy, finish, brushing/spraying/stencilling' and JSS 3039 'Specification for paint, PFU, marking' issued by Ministry of Defence, Government of India. In the second revision, in 1981, requirement for wet opacity and a qualitative test for detection of presence of water were included. In the third revision, in 1992, the requirements of wet opacity, mass in kg/10 l, efflux time and fineness of grind were quantified.

This is one of the few standards where restriction of lead has already been prescribed as 5 percent by mass on the separated dry mass of the pigment taken for analysis. Revision of this standard has been taken up with a view to modify limit of lead restriction in this standard. The technical Committee responsible for formulation of this standard observed that in practice most of the paints are used for household/decorative as well as in industrial/ commercial applications. Taking cognizance of the fact that lead exposure of human being, particularly children, has adverse effect on human health and also adverse impact on environment and safety, the technical Committee felt the need to introduce different levels of lead restriction in all paint standards likely to be used for household and decorative applications. It was also decided to introduce lead restriction in some of the industrial paints, as far as possible, keeping in view relevance of lead restriction with respect to application condition and service life of the paint and wherever the product corresponding to a particular specification is of such composition that it would be easy to incorporate lead restriction without creating any negative impact.

The technical committee observed that technologically it is not feasible to manufacture this product with low limit of lead. The Committee also observed that the scope of this product allows this paint to be used for industrial applications and decided to prescribe maximum permissible limit of lead as 1 000 ppm to avoid hazardous impact of lead exposure on environment and human health. Further, majority of consumers are not aware of the consequences of lead toxicity and its long term implications to human health. Therefore, in this revision, alongwith lead restriction, a suitable cautionary notice has been included in the marking clause. Reference has been given to various parts/ sections of IS 101 for the requirements given in the standard.

In this revision the requirements of Gloss at 45º has been deleted in line with other similar paint efflux time has been designated as viscosity and requirements for durability, lead restriction and accelerated storage stability have been prescribed for all purposes instead of defence supply only. The present method of test for durability by carbon arc type weathering apparatus has been substituted by a method using Xenon arc type weathering apparatus as it is found that carbon arc type weathering apparatus are no more in use.

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 shall be the same as that of the specified value in this standard.

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Indian Standard

READY MIXED PAINT, MARKING, FOR PACKAGES AND PETROL CONTAINERS — SPECIFICATION

(Fourth Revision)

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1 SCOPE

1.1 This standard prescribes requirements and methods of sampling and test for ready mixed paint, marking for packages and petrol containers, colour as required.

1.1.1 The material is used for distinctive lettering and marking of ammunition and ammunition packages and of containers and packages by brushing, spraying, or stencilling. The material is not intended for application by silk screen stencilling.

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 indicated in Annex A.

3 TERMINOLOGY

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

4 REQUIREMENTS

4.1 Composition

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

4.2 Marking Properties

The material shall be suitable for lettering and marking by brushing, spraying or stenciling after thinning to the required consistency. The marking properties of the material shall be satisfactory and shall give sharply defined outline.

4.3 Lead Restriction

The material shall not contain lead or compounds of lead or mixtures of both, calculated as metallic lead more than 1 000 ppm, when tested for restriction from lead in accordance with IS 101(Part 8/Sec 5).

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

5 PACKING AND MARKING

5.1 Packing

Unless otherwise agreed between the purchaser and the supplier, the paint shall be packed in metal containers conforming to IS 1407 or IS 2552. The packing is subject to the provisions of the law in force in the country at that time.

5.2 Marking

5.2.1 Each container shall be marked with the following:

a) Name of the material;

b) Indication of the source of manufacture;

c) Volume of the material;

d) Batch No. or lot No. in code or otherwise;

e) Month and year of manufacture;

f) Colour/shade of the material; and

g) A cautionary note as below:

1) Keep out of reach of children.
2) Dried film of this paint may be harmful if eaten or chewed.
3) This product may be harmful if swallowed or inhaled.

5.2.2 *BIS Certification Marking*

The container may also be marked with the Standard Mark.

5.2.2.1 The use of the Standard Mark is governed by the provisions of *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 the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

5.3 The material when intended for defence purposes, packing and marking shall be in accordance with IS 5661.

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Table 1 Requirements for Ready Mixed Paint, Marking, for Packages and Petrol Containers
(*Clauses* 4.4 *and* 7.1)

Sl. No.	Characteristic	Requirement	Methods of Test, Ref to: Annex of this Standard	Methods of Test, Ref to: IS 101
(1)	(2)	(3)	(4)	(5)
i)	Drying time, h, *Max*			(Part 3/Sec 1)
	a) Hard dry	2		
	b) Tack free	4		
ii)	a) Consistency	Smooth, uniform and suitable for brushing or spraying	B	
	b) viscosity by ford cup No. 4 at 27 ± 2ºC	Between 80s to 120s		(Part l/Sec 5)
iii)	Mass, in kg/10 l, *Min*	11.0		(Part l/Sec 7)
iv)	Finish	Smooth semi-glossy or matt		(Part l/Sec 4)
v)	Colour	Approximate match to the colour specified in IS 5 or to the approved sample where IS Colour is not specified		(Part l/Sec 2)
vi)	Fastness to light (100 h)	Passes the test if there shall be no appreciable colour change observed		(Part 4/Sec 3)
vii)	Wet opacity m^2/10 litre, *Min*	White, yellow and Red – 90 Others – 200		(Part 4/Sec 1)
viii)	Gloss 60º, *Max*	10		(Part 4/Sec 4)
ix)	Fineness of grind, microns, *Max*	50		(Part 3/Sec 5)
x)	Water content (if water is suspected to be present), percent by mass, *Max*[1)]	0.5		(Part 2/Sec 1)
xi)	Pressure test after 4 h air-drying	To pass the test		**5** of (Part 5/Sec 1
xii)	Flexibility and adhesion			
	a) Bend test with Type 1 apparatus and 6.25 dia mandrel	No visible damage or detachment of film		**2** of (Part 5/Sec 2
	b) Scratch harness at a load of (1 000g)	No such scratch as to show the bare metal		**3** of (Part 5/Sec 2
xiii)	Resistance to liquid		C	
	a) lubricating oil	To pass the test		
	b) petroleum hydrocarbon solvent	To pass the test		
	c) Resistance to water	To pass the test	D	
xiv)	Flash point	Not below 30ºC		(Part 1/Sec 6)
xv)	Durability	To pass the test	E	
xvi)	Accelerated storage stability	To pass the test	F	
xvii)	Calcium compounds (as $CaCO_3$), percent by mass on dry pigment, *Max*	10		App. A of IS 63
xviii)	Keeping properties	Not less than one year from the date of manufacturing		(Part 6/Sec 2)

[1)] Test the presence of water qualitatively by heating about 20 ml of the stirred and thoroughly mixed material in a metal dish. Presence of water, if any, is indicated by a cracking noise

6 SAMPLING

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

6.2 Preparation of Test Samples

6.2.1 *For Drying Time*

Prepare mild steel panel of sizes 150 mm × 100 mm × 1.25 mm as prescribed in **2** of IS 101 (Part 1/Sec 3). Apply the paint uniformly on each side of the panel by brushing/spraying 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). Prepared test panel then subjected to the test as specified in IS 101 (Part 3/Sec 1) as soon as possible.

6.2.2 *For Flexibility and Adhesion Test*

For both bend test and scratch hardness test prepare separate burnished tin plate panels, rectangular, of sizes 100 mm × 50 mm × 0.3 mm as prescribed in **3** of IS 101 (Part 1/Sec 3). Apply one coat of material uniformly by brushing/spraying on the panels as 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). The coated test panels shall be dried for 24 h for both the tests and then shall be conditioned at a temperature of 27 ± 2°C and relative humidity of 65 ± 5 per cent for a minimum time of 16 h. Prepared test panels the subjected to the test as prescribed in **2** and **3** of IS 101 (Part 5/Sec 2) for bend test and scratch hardness test respectively.

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6.3 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 prescribed under **4.**

7 TEST METHODS

7.1 The tests shall be conducted as per the methods referred in **4.1** to **4.3** and col 4 and col 5 of Table 1.

7.2 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.

ANNEX A
(*Clause* 2)
LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
5 : 2007	Colours for ready mixed paints and enamels (*sixth revision)*
101	Methods of sampling and test for paints, varnish and related products:
Part 1	Test on liquid paints (general and physical),
Sec 1 : 1986	Sampling (*third revision*)
Sec 2 : 1987	Preliminary examination and preparation of samples for testing (*third revision*)
Sec 3 : 1986	Preparation of panels (*third revision*)
Sec 6 : 1987	Flash point (*third revision*)
Sec 7 : 1987	Mass per 10 litres (*third revision*)
Part 3	Tests on paint film formation,
Sec 1 : 1986	Drying time (*third revision*)
Sec 4 : 1987	Finish (*third revision*)
Sec 5 : 1987	Fineness of grind (*third revision*)
Part 4	Optical tests on paint films,
Sec 1 : 1988	Opacity
Sec 2 : 1989	Colour (*third revision*)
Part 5	Mechanical test on paint films,
Sec 1 : 1988	Hardness tests (*third revision*)
Sec 2 : 1988	Flexibility and adhesion (*third revision*)
Part 6	Durability tests on paint films,
Sec 1 : 1988	Resistance to humidity under conditions of condensation (*third revision*)
Sec 2 : 1989	Keeping properties (*third revision*)
Part 8 Sec 5 : 1993	Tests for pigments and other solids— Section 5: Lead restriction test
1070 : 1992	Reagent grade water (*third revision*)
1303 : 1983	Glossary of terms relating to paints (*second revision*)
1407 : 1980	Round paint tins (*second revision*)
1745 : 1978	Petroleum hydrocarbon solvent (*second revision*)
2552 : 1989	Steel drums (galvanized and ungalvanized) (*third revision*)
5661 : 1970	Code of practice for packing and marking of packages of paints, enamels, varnishes and allied products

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ANNEX B

[*Table* 1, *Sl No*. (ii) (a)]

CONSISTENCY

B-1 APPARATUS

B-1.1 Palette Knife or Metal Rod

B-1.2 Panels

B-1.2.1 Unless specified otherwise, Glass panels of size 150 mm × 100 mm shall be prepared as prescribed in **5** of IS 101 (Part 1/Sec 3).

B-2 PROCEDURE

B-2.1 Insert a clean metal rod or palette knife into the original container and examine the nature of settling.

B-2.2 Observations

The material shall not cake hard inside the container and shall be in such a condition that stirring easily produces a smooth uniform paint suitable for brushing on glass panels.

ANNEX C

[*Table* 1, *Sl No.* (xiii)]

TEST FOR RESISTANCE TO PETROLEUM HYDRO CARBON SOLVENT AND LUBRICATING OIL

C-0 GENERAL

C-0.1 Outline of the Method

The painted panels, after specified drying period, is dipped in lubricated oil and solvent separately at specified temperature and time. On completion of the specified time periods, the panels are subjected for visual examination.

C-1 PREPARATION OF TEST PANELS

C-1.1 Prepare two sets of tin plate panels as prescribed in **6.2.2** except the additional drying for 24 h.

C-2 REAGENTS

C-2.1 Lubricating Oil, Mineral lubricating oil having a viscosity of 18.0 cSt or having a time of flow of approximately 80 s for 50 ml in a No. 1 Redwood Viscometer.

C-2.2 Petroleum Hydrocarbon Solvent, Solvent 145/205 (low aromatic grade) conforming to IS 1745.

C-3 PROCEDURE

C-3.1 Follow the procedure as prescribed in **4** of IS 101 (Part 7/Sec 2). Immerse one prepared panel in lubricating oil (*see* **C-2.1**) at 50°C for 2 h. Take out the panel from the oil and remove any residual lubricating oil from the surface by dabbing with a suitable absorbent paper or cloth or a pad of cotton wool and examine the test piece after a recovery period of 30 min at room temperature.

C-3.2 Follow the procedure as prescribed in **4** of IS 101 (Part 7/Sec 2). Immerse one prepared panel in petroleum hydrocarbon solvent (*see* **C-2.2**) at room temperature for 1 min. Take out the panel from petroleum solvent and allow the panel to stand in a vertical position for 5 min at room temperature and then swab it vigorously for about 5 s with a cotton wool swab soaked in petroleum hydrocarbon solvent.

C-4 OBSERVATIONS

The sample shall be treated as passing if there is no blistering, flaking and corrosion. The material shall be deemed to have passed the test if the film shall not show signs of disintegration, permanent injury or change of colour to a greater extent. The loss of gloss shall not be more than 50 per cent of the original gloss.

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ANNEX D

[*Table* 1, *Sl No.*(xiii) (c)]

TEST FOR RESISTANCE TO WATER

D-0 GENERAL

D-0.1 Outline of the Method

This method gives an indication of the results likely to be obtained when painted articles are stored under conditions where prolonged condensation may be produced but not an extremely corrosive atmosphere.

D-1 MATERIALS

D-1.1 Test Panels

Glass panel of size 150 mm × 50 mm. Prepare the panel as prescribed in **5** of IS 101(Part 1/Sec 3).

D-2 PROCEDURE

D-2.1 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 24 h. Then follow the procedure as prescribed in **4.1.1, 4.2** and **5** of IS 101 (Part 7/Sec 1). Immerse the panel in the tank at room temperature for 48 h. Remove the panels from water and allow to dry for 4 h and examine it after this period.

D-3 OBSERVATIONS

The paint shall be deemed to have passed the test, if the painted panel shall be free from blisters, peeling or flaking and undue change in colour. Gloss retention shall not be less than 60 per cent of the original gloss. Loss of adhesion walone shall not be considered a cause of rejection.

ANNEX E

[*Table* 1, *Sl No.* (xv)]

TEST FOR DURABILITY

E-0 OUTLINE OF THE METHOD

The same painted panels are subjected to cycles, consisting of exposure in accelerated weathering apparatus for 28 h followed by 2 h refrigeration at 0°C to –5°C and finally subjecting to 2 h salt spray. The condition of the paint film after 5 cycles is examined for deterioration.

E-1 APPARATUS

E-1.1 Accelerated Weathering Apparatus — An artificial weathering apparatus of the Xenon arc type for uniform and controlled exposure to the effects of heat, light and water

E-1.2 Refrigeration Device — Thermostatically controlled refrigerator suitable to be operated between 0°C to –5°C.

E-1.3 Salt Spray Apparatus — The apparatus shall be as illustrated in **4.3** of IS 101(Part 6/Sec 1).

E-2 TEST PANELS

E-2.1 The panels shall be of mild steel or tinned mild steel plate preferably of sizes 60 mm × 40 mm × 1.25 mm and shall be prepared as prescribed in **2** of IS 101(Part l/ Sec 3). However, panels may be of any other sizes suitable for accommodating in the test apparatus.

E-2.2 Preparation of Panels

Apply one coat of paint of a contrast colour (*see* IS 168 or IS 8982) uniformly and allow it to air dry for 48 h at room temperature. Apply one coat of the paint to this standard by brushing/spraying on this air dried panel. Allow to dry this painted panel in vertical position for further 24 h in a well ventilated room free from draughts and dust for 24 h. Then expose the panel to the test cycles specified in **E-4.1** to **E-4.4**.

E-3 TEST CONDITIONS

E-3.1 Commonly used cycles and test conditions for Xenon arc apparatus are given below:

- Black panel temperature 63 ± 3° C
- Continuous exposure in light for 102 min and intermittent exposure to water spray for 18/20

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min light and spray.

– Irradiance 0.55 W/m^2/nm

However, any other cycle may be used if mutually agreed upon between the purchaser and the supplier.

NOTES

1 As a precaution against inadvertent accidents, it is recommended that the accelerated weathering test is carried out in duplicate.

2 For details of method of tests for xenon arc apparatus follow **5** of IS 101(Part/Sec 5).

E-4 PROCEDURE

E-4.1 In Weathering Apparatus

The test panels so prepared then placed in the apparatus and exposed for a period of 28 h under the test conditions as prescribed in **E-3.1.** At the end of test period, note the conditions of the paint film of the tested panel. The painted panel shall show no signs of permanent softening/blistering/chalking/signs of corrosion.

E-4.2 Refrigeration

Subject the same panels after the exposure in accelerated weathering apparatus to refrigeration for 2 hours at temperature of 0°C to –5°C.

E-4.3 In Salt Spray Apparatus

E-4.3.1 *Preparation of Spray Solution*

The spray solution shall have the following composition:

Salt	*Mass*
Calcium sulphate	1.3 g
Magnesium chloride	2.6 g
Magnesium sulphate	1.7 g
Sodium chloride	21.4 g

Add distilled water to make up to one litre

E-4.3.2 Suspend the same panels, after the accelerated weathering test and refrigeration, in the cabinet and expose it for 2 h to a baffled spray of the salt spray solution.

E-4.4 The above cycle shall commence with exposure to accelerated weathering and end with salt spray and shall be carried out 5 times. The painted panels, thereafter, are examined

E-5 OBSERVATIONS

Remove the panels and examine for any sign of deterioration and fading. The material shall be deemed to have passed the test if no deterioration of film and fading is noticed. A portion of paint films removed with suitable paint remover and exposed metal surface is examined for signs of corrosion. Neglecting the stains, if any**,** there shall not be any pitting on the surface.

ANNEX F

[*Table* 1, *Sl No.* (xvi)]

TEST FOR ACCELERATED STORAGE STABILITY

F-0 OUTLINE OF THE METHOD

The material is subjected to higher temperature and then tested for drying time, viscosity and gloss value.

F-1 PROCEDURE

F-l.1 Fill 250 ml of the paint sample in a clean, dry 500 ml metal container (*see* IS 1407) leaving usual spillage and seal the lid tightly to avoid leakage of volatile paint thinners. Keep the container at 60 ± 2°C for 96 h in an electrically heated oven. Take out the sample container and allow it to cool at room temperature for 24 h thereafter. The sample is subsequently examined for the appearance of the material. The material then shall be tested for drying time, viscosity and gloss value.

F-2 OBSERVATIONS

The paint shall be deemed to have passed this test, if it is found to be free from lumps, skins, settling. The paint shall not gel, liver, curdle or increase in viscosity by more than 20 percent, 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 and mottling. Further the 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 60°C.

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