भारतीय मानक मसौदा

विद्यार्थियों के लिए वॉटर कलर — विशिष्टि

(IS 8100 का पहला पुनरीक्षण)

Draft Indian Standard

Water Colours for Students — Specification

(First Revision of IS 8100)

ICS 87.080

Printing Inks, Stationery and Allied Products Sectional Committee, CHD 14	**Last date of comments: 15th December 2024**

Printing Inks, Stationery and Allied Products Sectional Committee, CHD 14

FOREWORD

(Formal clauses will be added later)

This standard was first published in 1976. In this revision, Reference clause and Amendment no. 1 have been incorporated and Packing & Marking clause has been updated. Now, the standard has been updated based on the technological advancements that may have taken place since the last publication of the Standard.

Water colours are a range of artists colours which are semi-transparent in character. They are made in paste form which are called moist water colours and in cake form which are called semi-moist water colours. Cakes are produced by compression and contain very small proportion of water in the form of moisture, and hence they are called semi-moist. The properties and end uses of both the varieties are the same. Moist colours are worked directly from tubular containers whereas semi-moist water colours are rubbed with water to form paste.

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: 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Draft Indian Standard

WATER COLOURS FOR STUDENTS — SPECIFICATION

(*First Revision*)

1 SCOPE

This standard prescribes the requirements and the methods of sampling and test for water colours in paste form (moist water colours) for students use. It does not cover semi-moist water colours in cake form.

2 REFERENCES

The standards given below contain provisions which, through reference in this text, constitute provision 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 edition of these standards:

IS No	*Title*
IS 789 : 2018	Ink, drawing, waterproof, black — specification (*second revision*)
IS 1103 : 2024	Brushes for artists — Specification (*fourth revision*)
IS 3064 : 2018	Hand - Made drawing paper — Specification (*second revision*)
IS 3101 : 1995	Aluminum collapsible tubes — Specification (*second revision*)
IS 4395 : 1987	Glossary of terms relating to inks and allied industry (*first revision*)
IS 4905 : 2015 ISO 24153 : 2009	Random sampling and randomization procedures (*first revision*)

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 4395 shall apply.

4 REQUIREMENTS

4.1 Description

4.1.1 The material shall be in the form of a semi-viscous paste. It shall consist of a binder, a pigment or pigments with or without extenders, a hygroscopic agent, a plasticizer and a preservative.

4.1.2 The pigments shall not bleed in the vehicle and shall not be adversely affected by it

4.1.3 The pigments shall be finely ground to free them from grit and shall not separate from the vehicle.

4.2 The material shall contain not more than 10 parts per million of lead when tested in accordance with the method prescribed in Annex A.

4.3 The vehicle shall not cause flocculation of the pigment. One gram of the paste thoroughly mixed with 30 g of the vehicle and a portion when observed under a microscope of 300 power shall show no sign of pigment particles aggregating to form small scattered bunches.

4.4 Transparency

The material shall be transparent, when applied in the usual manner from deepest colour and through dilution with water to palest colour, when tested according to the method prescribed in Annex B.

4.5 Miscibility

The material shall be readily dispersible with water, shall be easily wetted and shall not crack or peel off when applied on drawing paper (*see* IS 3064). The different colours shall mix with one another to form uniform hues.

4.6 Colour

The material shall be of the following colours:

1. Purple
2. Mauve
3. Cobalt blue
4. Prussian blue
5. Turquoise blue
6. Ultramarine blue
7. Emerald green
8. Green bice
9. Olive green
10. Sap green
11. Gamboge
12. Lemon yellow
13. Yellow ochre
14. Orange
15 Crimson lake
16. Scarlet lake
17. Vermihon
18. Raw sienna
19. Burnt sienna
20. Raw umber
21. Burnt umber
22. Sepia
23. Van Dyke brown
24. Black
25. White

4.7 Performance

The material shall comply with the requirements of the test prescribed in Annex C.

4.8 Growth of Mould

When tested according to the method prescribed in Annex D, the material shall not show any growth of mould.

5 KEEPING QUALITY

The material shall not dry when stored in the original container for a minimum period of 2 years from the date of packing. It shall also satisfy the requirements of the test prescribed in Annex E.

6 PACKING AND MARKING

6.1 Packing

The material shall be packed in suitable collapsible tubes (*see* IS 3101) so as to contain 5 ml, 10 ml or 20 ml of the material. The cap of the tube shall be securely fixed.

6.2 Marking

Each tube shall be marked with the, following information

a) Name of the material;
b) Colour;
c) Net contents;
d) Date of packing;
e) Manufacturer's name and/or his recognized trade-mark, if any; and
f) Batch number to enable the lot to be traced back from records.

6.2.1 *BIS Certification Marking*

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act,* 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

7 SAMPLING

Representative samples of the material shall be drawn and adjudged as prescribed in Annex F.

ANNEX A

(*Clause* 4.2)

DETERMINATION OF LEAD

A-1 APPARATUS

A-1.1 Separating Funnel — of 500 ml capacity.

A-1.2 Nessler Tube — of 50 ml capacity.

A-2 REAGENTS

A-2.1 Dilute Nitric Acid — lead-free, approximately 4 N.

A-2.2 Ammonium Acetate Solution — lead-free, 10 percent (*m/v*).

A-2.3 Citric Acid Solution — lead-free, 0.5 g per ml**.**

A-2.4 Ammonia — Concentrated, of redistilled quality.

A-2.5 Potassium Cyanide Solution — 10 percent (*m/v*).

A-2.6 Standard Lead Solution

Dissolve 0.40 g of lead nitrate [Pb $(NO_3)_2$] in water containing 2 ml or 3 ml of concentrated nitric acid and make up the volume to 1 000 ml with water. Transfer 10 ml of this solution to a volumetric flask, add 2 ml or 3 ml of concentrated nitric acid and dilute with water to 1 000 ml. One milliliter of this solution contains 2.5 μg of lead (as Pb). The diluted solution shall be freshly prepared.

A-2.7 Dithizone Solution

Dissolve 0.01 g of dithizone in 100 ml of carbon tetrachloride, shaking intermittently for 1 hour. Allow to stand overnight and shake once again before using. This shall be kept in a cool and dark place. This gives a 0.01 percent solution. Filter, if necessary. Dilute 10 ml of this solution to 100 ml with carbon tetrachloride in a 100 ml volumetric flask. This shall be prepared fresh before determination. This gives a solution of 0.001 percent

NOTE 1 — Carbon tetrachloride used should be further purified. One liter of carbon tetrachloride is extracted with two portions of 25 ml of dilute ammonium hydroxide and then kept over 100 g of activated carbon. Before use, it is decanted and distilled at about 80 °C over a little fresh lime.

NOTE 2 — sometimes dithizone solid and its 0.01 percent solution deteriorate on storage. The 0.01 percent solution should, therefore, be tested before further dilution, by shaking 2 ml of the solution with 5 ml of 1 percent ammonium hydroxide. If the organic layer is only faintly yellow under these conditions the solution may be used. If it is deeply coloured it shall be discarded and fresh solution be prepared. The solution as well as the reagent should be stored in a refrigerator and exposure to sunlight should be avoided during analytical work. To increase the stability of 0 01 percent solution, it should be covered with a thin aqueous layer saturated with sulphur dioxide.

A-3 PROCEDURE

Treat about 20 g of the material accurately weighed, with dilute nitric acid in a porcelain basin. The quantity of the acid used is immaterial provided it is sufficient to extract the soluble matter; but avoid too great an excess since it has to be evaporated off. Allow the basin to stand on a boiling water-bath for at least 3 hours. In case a large quantity of insoluble residue is left, heat the basin on a water-bath overnight. Decant off the supernatant liquid through a quantitative filter paper and extract the insoluble residue again on a boiling water-bath for one hour with dilute nitric acid. Filter through the same filter paper and wash the residue on the filter paper thoroughly with hot water. Treat the residue on the filter paper with 10 ml of ammonium acetate solution, filter and wash again with hot water. Collect the filtrates and washings in a 500 ml separating funnel. Add about 2 ml of citric acid and make the solution ammoniacal with *p*H between 8 5 to 10 (bluish-green to blue towards a drop of thymol blue), after neutralizing and adding 5 ml of 10 percent potassium cyanide solution. Extract the lead with successive 20 ml portions of dithizone reagent. Drain the organic layers into a Nessler tube and stir well.

Take several aliquots of the standard lead-solution into a series of separating funnels, and develop the colour as in the case of sample. Extract the organic coloured layers into a series of Nessler tubes. Compare the colour developed from the sample solution with those of the standard solutions. Note the volume of the standard with which the colour of the test solution matches. If the colour of the test solution is intermediate between two standard solutions then repeat the experiment by taking more number of standard solutions in that range and arrive at exact colour matching.

A-4 CALCULATION

$$\text{Lead (as Pb), ppm} = \frac{V \times f}{M} \times 10^6$$

where

V = volume in ml of standard lead solution matching with the test solution,
f = mass in g of lead equivalent to 1 ml of standard lead solution, and
M = mass in g of the material taken for the test.

ANNEX B

(*Clause* 4.4)

TEST FOR TRANSPARENCY

B-1 PROCEDURE

B-1.1 Draw with an artists brush filled with sable or squirrel tail hair conforming to size **A-6** of IS 1103 a stripe 10 mm wide and 50 mm in length with drawing ink, waterproof, black (conforming to IS 789) on white drawing paper (*see* IS 3064). Lift with a wetted brush the required quantity of coloured material and draw a stripe 20 mm wide over the black stripe.

B-1.1.1 If the black stripe shows clearly through the coloured stripe the material shall be classed as transparent and shall be deemed to conform to the requirement of this test.

B-1.1.2 Dilute the material with equal volume of water and repeat the above test.

ANNEX C

(*Clause* 4.7)

TEST FOR PERFORMANCE

C-1 PROCEDURE

C-1.1 Paint the colour in the usual manner on a white drawing paper (*see* IS 3064) 50 mm wide and 100 mm long. The amount of paint taken up by the brush can be adjusted to yield full chroma and uniform transparency in a single coat. Cut this paper in three equal strips breadthwise and use one strip as control and other two strips for test in **C-1.1.1** and **C-1.2**.

C-1.1.1 Ten minutes after the paint has been drawn on the drawing paper, rub one of the strips with the dry finger tips and then with an eraser. There shall be no blurring or smudging and no tendency to flake off when compared with the control strip.

C-1.2 Ultra Violet Ray Exposure

Place the third strip containing the coloured band at a distance of 25 cm from an ultra-violet lamp normal to the rays, and expose for a total period of 36 h. The material shall be considered to satisfy the requirement of the test if all colours show no appreciable evidence of fading when compared with the control strip.

C-1.2.1 The ultraviolet lamp shall be of 125 watts and of long wave UV region chiefly as 3655 Å.

ANNEX D

(*Clause* 4.8)

TEST FOR GROWTH OF MOULD

D-1 PROCEDURE

Transfer 5 g of the material into a 50 ml beaker, dilute it with equal volume of water, stir it uniformly with glass rod. Inoculate with a mixture of spores of (a) *Asperigillus niger*, (b) *Pullularia pullulans*, and (c) *Penicillium pinophilum*. Keep in a moist chamber for two weeks at (37 ± 1) °C. After the expiry of this period the material shall not show any growth of mould or separation of pigments.

ANNEX E

(*Clause* 5.1)

TEST FOR KEEPING QUALITY

E-1 PROCEDURE

Keep the material stored in the original collapsible tube in an air oven for two weeks at (50 ± 1) °C. After the expiry of this period the material shall not dry to a hard mass.

ANNEX F

(*Clause* 7.1)

SAMPLING OF WATER COLOURS FOR STUDENTS

F-1 GENERAL REQUIREMENTS OF SAMPLING

F-1.1 In drawing, preparing, storing and handling test samples, the precautions and directions given in **F-1.2** to **F-1.8** shall be observed.

F-1.2 Samples shall not be taken in an exposed place.

F-1.3 The sampling instrument shall be clean and dry when used.

F-1.4 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples, from adventitious contamination.

F-1.5 The samples shall be filled in clean, dry air-tight glass containers on which the material has no action.

F-1.6 The sample containers shall be of such a size that they are almost completely filled by the sample.

F-1.7 Each sample container shall be sealed air-tight with a stopper after filling, and marked with full particulars of the material as given in **6.2** and the date of sampling.

F-1.8 Samples shall be stored in such a manner that the temperature of the material does not vary unduly from the normal temperature.

F-2. SCALE OF SAMPLING

F-2.1 Lot

All the tubes of the same size in a single consignment from the same batch of manufacture shall constitute a lot.

F-2.1.1 Samples shall be tested from each lot for ascertaining the conformity of the material to the requirements of the specification.

F-2.2 The number (*n*) of tubes to be chosen from a lot shall depend on the size of the lot (*N*) and shall be in accordance with Table 1.

Table 1 Scale of Sampling

(*Clause* F-2.2)

SI No.	Lot Size *N*	No. of Tubes to be Selected *n*
(1)	(2)	(3)
i)	Up to 15	2
ii)	16 to 50	3
iii)	51 to 150	5
iv)	151 and above	8

F-2.3 These tubes shall be chosen at random from the lot and to ensure randomness of selection, random number tables shall be used (*see* IS 4905).

F-3. TEST SAMPLES AND REFEREE SAMPLES

F-3.1 From each of the tubes three test samples shall be drawn, the quantity of each sample being sufficient to conduct all the tests specified in **4.3** to **4.8**. All the test samples thus obtained shall be transferred to sample containers (*see* **F-1.5**) and marked with all the details of sampling (*see* **F-1.7**). These samples shall then be separated into three identical sets of test samples in such a way that each set has a test sample representing each tube selected (*see* **F-2.2**). One of these three sets shall be for the purchaser, another for the supplier, and the third for the referee.

F-3.2 Referee Sample

Referee sample shall consist of the set of test samples (*see* **F-5**) marked for this purpose and shall bear the seals of both the purchaser and the supplier and shall be kept at a place agreed to between the two.

F-4 NUMBER OF TESTS

Test for all the requirements of the specification given in **4.3** to **4.8** shall be conducted on each of the samples in a set.

F-5 CRITERIA FOR CONFORMITY

A lot shall be declared as conforming to the requirements of the specification if each of the test result satisfies all the relevant requirements of the specification individually.