

भारतीय मानक मसौदा
स्याही, ड्राइंग, जलरोधक, रंगीन— विशिष्टि
(IS 788 का दूसरा पुनरीक्षण)

Draft Indian Standard
Ink, Drawing, Waterproof, Coloured — Specification
(*Second Revision of IS 788*)

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ICS 87.080

Printing Inks Stationery and Allied Products Sectional
Committee, CHD 14

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Printing Inks Stationery and Allied Products Sectional Committee, CHD 14

FOREWORD

(Formal clauses will be added later)

This standard was first published in 1955 and subsequently revised in 1971 to incorporate specific shades of colours of common use. In the original standard, the colours of the drawing ink were not specified and this requirement was subject to agreement between the purchaser and the supplier. Shade cards were provided for comparison of colour. An accelerated ageing test was incorporated and changes were made in the methods of test and sampling procedure.

In this second revision, the standard has been revised based on the technological advancements that have taken place since the last publication of the Standard. Also, reference clause has been incorporated and packing & marking clause has been updated.

Colour values of different shades have been given in the Annex A for guidance of the manufacturer and the user.

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***INK, DRAWING, WATERPROOF, COLOURED — SPECIFICATION**
(*Second Revision*)**1 SCOPE**

This standard prescribes the requirements and the methods of sampling and test for ink, drawing, waterproof, and coloured. It includes colours which are most commonly used.

2 REFERENCES

The standards given below 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 revisions, and parties to agreements based on this Indian Standard are encouraged to investigate the possibility of applying the most recent editions of the standards:

<i>IS No.</i>	<i>Title</i>
IS 789 : 2018	Ink, drawing, waterproof, black specification (<i>second revision</i>)
IS 2037 : 1986	Specification for tracing cloth (<i>first revision</i>)
IS 3064 : 2018	Hand - Made drawing paper — Specification (<i>second revision</i>)
IS 4395 : 1987	Glossary of terms relating to inks and allied industry (<i>first revision</i>)
IS 4905 : 2015/ISO 24153 : 2009	Random sampling and randomization procedures (<i>first revision</i>)

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 4395, in addition to the following, shall apply:

- a) *Drawing Paper* — Strong and close textured paper of varied qualities and surfaces used for drawing, capable of withstanding steel eraser (*see* IS 3064).
- b) *Tracing Cloth* — A very fine plane-weave cotton fabric treated in a special manner to make it suitable for use as tracing drawings (*see* IS 2037).
- c) *Tracing Paper* — Paper sufficiently transparent to allow a design to be traced through the reproduced, and purpose.

4 TYPES

The material shall be of the following two types:

Type 1 — Transparent; and

Type 2 — Opaque.

5 REQUIREMENTS**5.1 Description**

The material of Type 1 shall be a transparent solution of dye in a liquid medium. The material of Type 2 shall be a suspension of an opaque pigment (if desired, a mixture of dye and pigment may be used) in a liquid medium.

5.1.1 The material shall not have any adverse effect on the tuft of the artist's brush.

5.2 Sediment

5.2.1 Type 1 of the material shall show no settling of the pigment when kept undisturbed for two weeks.

5.2.2 Type 2 of the material shall show no appreciable settling of the pigment when kept undisturbed for 15 min after thorough shaking and mixing.

5.3 Colour

The material shall be, in addition to white, of the following colours which shall be matched visually with the standard shade cards attached at Annex A:

- i) Violet;
- ii) Prussian blue;
- iii) cobalt blue;
- iv) light green;
- v) blue green;
- vi) yellow;
- vii) orange
- viii) vermilion;
- ix) scarlet;
- x) burnt sienna; and
- xi) brown.

5.3.1 The method of preparation of test samples is prescribed in Annex B.

NOTE — For guidance, basic values of colours in terms of the trichromatic system recommended by International Commission on Illumination (CIE) have been provided in Annex C.

5.4 Waterproof Quality and Solvent Resistance

The material shall satisfy the tests prescribed in Annex D.

5.5 Opacity and Transparency

The material shall be classed as opaque or transparent on the basis of the test prescribed in Annex E.

5.6 Performance

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

5.7 Growth of Mould, Thickening and Separation of Pigments

The material, when tested according to the method prescribed in Annex G, shall not show any growth of mould, thickening or separation of pigments

5.8 Keeping Quality

The material shall pass the accelerated ageing test described in **5.8.1**.

5.8.1 Accelerated Ageing Test

Keep the ink, in sealed bottles, in an air-oven at a temperature of 55 °C for a period of one month. After this period it shall not show any sign of deterioration.

6 PACKING AND MARKING

6.1 Packing

The material shall be packed in glass containers of 15 ml or 30 ml capacity or any other packing as agreed to between the purchaser and the supplier. It shall be furnished with a quill pen securely fixed to the cork sealing the phial, so as to reach the bottom of the phial. The cork shall be of plastic top which may be easily manipulated.

6.2 Marking

Each container shall be legibly marked with the following information:

- a) Name and type of the material;
- b) Colour;
- c) Volume in ml;
- d) Name of the manufacturer and/or recognized trade-mark, if any; and
- e) Lot number in code or otherwise to enable the batch and date of manufacture to be traced 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.

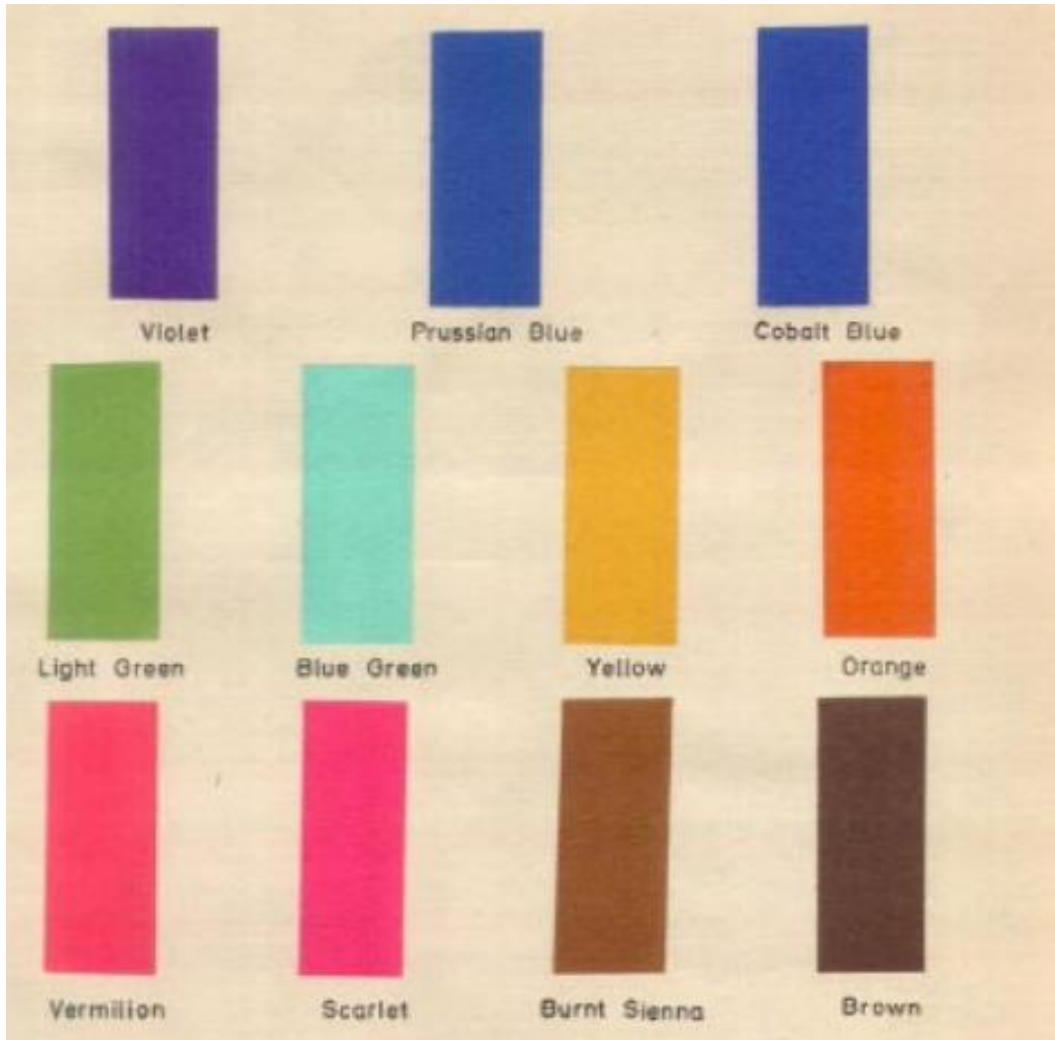
7 SAMPLING

The method of drawing representative samples of the material from a lot, the number of tests to be performed and the criteria of conformity of the material to the requirements of this standard shall be as prescribed in Annex H.

ANNEX A

(Clause 5.3)

STANDARD SHADE CARD FOR WATERPROOF DRAWING INKS



ANNEX B

(Clause 5.3.1)

PREPARATION OF TEST SAMPLES

B-1 PROCEDURE

Cut a strip of 150 mm × 40 mm from a filter paper of 80 g/m² and dip in the ink to a depth of 60 mm. After immersion for about half a minute, withdraw the strip from the ink and allow it to dry in air. Colour shall be matched visually on a portion at a distance of 25 mm above the bottom edge of the test strip.

ANNEX C

(Clause 5.3.1, Note)

COLOUR VALUES OF INK, DRAWING, WATERPROOF, COLOURED

SL No.	Drawing Ink Colour	CIE Units		
		<i>x</i>	<i>y</i>	<i>Z</i>
(1)	(2)	(3)	(4)	(5)
i)	Violet	0.406	0.273	0.321
ii)	Prussian blue	0.321	0.316	0.363
iii)	Cobalt blue	0.299	0.271	0.430
iv)	Light green	0.418	0.475	0.107
v)	Blue green	0.307	0.414	0.279
vi)	Yellow	0.528	0.437	0.035
vii)	Orange	0.584	0.389	0.027
viii)	Vermilion	0.609	0.352	0.039
ix)	Scarlet	0.593	0.358	0.049
x)	Burnt sienna	0.512	0.412	0.076
xi)	Brown	0.488	0.410	0.102

ANNEX D*(Clause 5.4)***TEST FOR WATERPROOF QUALITY AND SOLVENT RESISTANCE****D-1 PROCEDURE**

D-1.1 The test shall be carried out with a clean line pen.

D-1.2 Draw a few lines (0.5 mm thick, 5 mm apart and 150 mm long) or figures or both on the matt side of (a) cellulose acetate transparent medium for tracing drawings, (b) drawing paper, (c) tracing cloth, and (d) tracing paper. Mark off the drawing into two equal parts, allow to dry for 12 h and then subject to the tests given in **D-1.2.1** to **D-1.2.3**. Make the tests on sections selected from each one of the two equal parts.

D-1.2.1 Place four drops of water and spread them over the drawing for a length of about 25 mm applying no rubbing or friction. Allow the drawing to dry normally. There shall be no spreading of ink nor shall it show more than a faint stain.

D-1.2.2 Soak the drawing for a length of about 25 mm with water by a sponge and then blot it with a clean piece of blotting paper. There shall be no stain on the blotting paper.

D-1.2.3 Place four drops of petrol, benzene or carbon tetrachloride and spread them over the drawing which has been allowed to dry for a further period of 12 h, to a length of about 25 mm applying no rubbing or friction. Repeat the operation if necessary to keep the surface wet for at least 5 min. There shall be no spreading of ink or reduction of colour.

ANNEX E*(Clause 5.5)***TEST FOR OPACITY AND TRANSPARENCY****E-1 PROCEDURE**

E-1.1 Draw lines 3 mm wide or figures with black waterproof drawing ink (conforming to IS 789) on white drawing paper. Then draw with a brush, stripes 10 mm wide with the material over the black lines or figures

E-1.1.1 If the black lines or figures show clearly through the coloured stripes the material shall be classed as transparent ink; if the coloured stripes substantially obliterate the black lines or figures the material shall be classed as opaque ink.

ANNEX F*(Clause 5.6)***TEST FOR PERFORMANCE****F-1 PROCEDURE**

F-1.1 The test shall be carried out with a clean line pen.

F-1.2 Set the pen (preferably with an opening of approximately 0.08 mm) and fill it with sufficient ink to draw a few lines or figures or both (preferably more than 5 lines, each about 150 mm long and about 5 mm apart) on the matt side of (a) drawing paper, (b) tracing cloth, (c) tracing paper, and (d) cellulose acetate transparent medium for tracing drawings. The ink shall be considered unserviceable if it is not possible to draw sharp and well defined edges, without special effort to promote the flow of the ink.

F-1.3 Draw on the matt side of a drawing paper, tracing cloth, tracing paper and cellulose acetate transparent medium for tracing drawings, five lines or figures (preferably 0.1 mm thick, 150 mm long and 5 mm apart) and also similar set of lines or figures (preferably 0.5 mm thick). The lines shall be clean, unbroken, of uniform width, and free from bleeding or feathering. There shall be no noticeable difference in intensity or shade of colour between the fine and coarse lines.

F-1.3.1 Four minutes after the lines or figures have been drawn, rub them with finger tips previously washed with ethyl ether. There shall be no blurring or smudging. They shall also be free from a tendency to flake off.

F-1.3.2 Cut the paper and the cloth upon which the test under **F-1.3** has been made into six strips at right angles to the lines drawn thereon. Keep one strip each of drawing paper, tracing cloth, tracing paper and cellulose acetate transparent medium away from light and fumes for comparison with the tests under **F-1.3.2.1**.

F-1.3.2.1 Expose one strip each of the drawing paper, tracing cloth, tracing paper and cellulose acetate transparent medium placed at a distance of about 250 mm from an ultraviolet lamp, normal to the rays, for a total period of 36 h at room temperature. The lamp shall be of 125 watts, and long wave UV region chiefly at 3 655 Å. All colours with the exception of green and violet shall show no evidence of fading when compared with the original strips. Green and violet shall show no fading after exposure for 24 h when placed at a distance of 250 mm.

F-1.4 Erase with an eraser, a reasonable length of a line, say, 25 mm in length and 0.5 mm in thickness, drawn on the matt side of the tracing cloth and tracing paper.

F-1.4.1 The ink shall be regarded as not acceptable, if it is not possible to secure complete erasure without leaving any stain.

ANNEX G

(Clause 5.7)

TEST FOR GROWTH OF MOULD, THICKENING SEPARATION OF PIGMENTS

G-1 PROCEDURE

G-1.1 Transfer 5 ml of the material into a 50 ml beaker and inoculate with a mixture of spores of (a) *Aspergillus niger*, (b) *Pullularia pullulans*, and (c) *Penicillium pinophilum*. Keep in a moist chamber for two weeks at 37 °C ± 1 °C. After the expiry of this period, the ink shall not show any growth of mould, thickening or separation of pigments.

ANNEX H

(Clause 7)

H-1 GENERAL REQUIREMENTS OF SAMPLING

H-1.1 In drawing, preparing, storing and handling test samples, the following precautions and directions shall be observed.

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

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

H-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.

H-1.5 To draw a representative sample, the contents of each bottle selected for sampling shall be thoroughly mixed.

H-1.6 The samples shall be filled in clean, dry, air-tight glass containers on which the material has no action.

H-1.7 The sample containers shall be of such a size that they are almost completely filled by the sample.

H-1.8 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.

H-1.9 Samples shall be stored in such a manner that the temperature of the material does not vary unduly from the normal temperature.

H-2 SCALE OF SAMPLING

H-2.1 Lot

All the bottles of the same size in a single consignment containing ink of one type and from the same batch of manufacture shall constitute a lot.

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

H-2.2 The number (n) of bottles to be chosen from a lot shall depend on the size of the lot, and shall be in accordance with Table 1.

Table 1 Scale of Sampling

(Clause H-2.2)

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

H-2.3 These bottles shall be chosen at random from the lot and to ensure randomness of selection, random number tables shall be used (*see* also IS 4905). In case such tables are not available, following procedure may be adopted:

Starting from any bottle count them as 1, 2, 3, etc., . . ., up to r and so on, in one order. Every r^{th} bottle thus counted shall be withdrawn to give a sample for test, where r is the integral part of N/n (N being the lot size and n the number of bottles to be chosen from the lot).

H-3 TEST SAMPLES AND REFEREE SAMPLES

H-3.1 Before drawing the samples, the material in the bottles chosen (*see* **H-2.2**), shall be thoroughly mixed by shaking or stirring or rolling. Samples shall then be drawn with the help of a suitable sampling instrument.

H-3.2 From each of the bottles three test samples shall be drawn, the volume of each sample being sufficient to conduct all the tests specified in **5.1** to **5.8**. All the test samples thus obtained shall be transferred to sample containers (*see* **H-1.6**) and marked with all the details of sampling (*see* **H-1.8**). 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 bottle selected (*see* **H-2.2**). One of these three sets shall be for the purchaser, one for the supplier and the third for the referee.

H-3.3 Referee Sample

Referee sample shall consist of the set of test samples (*see* **H-3.2**) 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

H-4 NUMBER OF TESTS

Tests for all the requirements of the specification, given in **5.1** to **5.8**, shall be conducted on each of the samples in a set.

H-5 CRITERU 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.