भारतीय मानक मसौदा

स्याही, नंबरिंग — विशिष्टि

(IS 11259 का पहला पुनरीक्षण)

Draft Indian Standard

Ink, Numbering — Specification

(First Revision of IS 11259)

ICS 87.080

Printing Inks, Stationery and Allied Products Sectional Committee, CHD 14	**Last date of comments: 10th 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 1985. In this revision, Reference clause has been incorporated. Also Packing and 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.

Numbering ink is used for numbering letters, bills, names, etc. with the help of a numbering machine.

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, NUMBERING — SPECIFICATION

(*First Revision)*

1 SCOPE

This standard prescribes the requirements and the methods of sampling and test for numbering ink used for numbering letters, bills, names, etc. with the help of a numbering machine.

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 Indian Standard are encouraged to investigate the possibility of applying the most recent editions of these standards.

3 TYPES

This standard prescribes two types of numbering ink as follows:

a) *Type 1* — Numbering ink of black colour.
b) *Type 2* — Numbering ink of colour other than black.

4 REQUIREMENTS

4.1 Description

The material shall consist of a dispersion of pigment with or without admixture of other pigments or dyestuff in a suitable base. The impression shall be intense and bright, shall not dry in the machine. The impressions shall adhere to the paper and shall not penetrate to the other side to such an extent as to spoil the matter printed/hand written on the other side.

4.1.1 The material shall be of uniform consistency, free from grit and shall not corrode the numbering machine.

4.1.2 The material shall be free from any objectionable odour or obnoxious smell.

4.1.3 The material shall be free flowing. It shall not ooze out from the numbering machine, when in use or not.

4.2 Pigment Content

The material, when tested by the method prescribed in Annex B, shall contain:

a) not less than 16 percent pigment by mass in case of Type 1, and
b) not less than 20 percent pigment by mass in case of Type 2.

4.3 Fineness of Dispersion

The ink shall be free from any gritty particles and shall not be coarser than 10 microns on the Hegmen scale or equivalent when tested by the method prescribed in Annex C.

4.4 Viscosity

The viscosity of the ink for the first 50 ml shall be as follows when tested at 27 °C by the method prescribed in Annex D.

a) 25 s to 30 s for Type 1, and
b) 10 s to 12 s for Type 2.

4.5 Relative Density

The relative density of the ink shall be 0.980 to 0.995 when tested at 27 °C by the method prescribed in Annex E.

4.6 Drying Time

The material shall dry within 15 s when tested by a numbering machine on man folding paper (30 g/m^2 to 34 g/m^2) and impressions shall not smudge when rubbed gently with a finger.

4.7 Keeping Quality

The material when stored under normal conditions in sealed container shall retain the properties detailed in the specification for a minimum period of 2 years from the date of manufacture.

5 PACKING

The material shall be packed in securely closed containers as agreed to between the purchaser and the manufacturer.

6 MARKING

6.1 The container shall be marked legibly with the following particulars:

a) Name and type of the material;
b) Manufacturer's name and/or his registered trade-mark, if any;
c) Mass of the material;
d) Month and year of packing; and
e) Batch number to enable the date of manufacture to be traced from records.

6.2 *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, number of samples to be tested and the criteria for conformity shall be as prescribed in Annex F.

ANNEX A

(*Clause* 2)

(LIST OF REFERRED STANDARDS)

IS No	*Title*
IS 170 : 2020	Acetone — Specification (*fifth revision*)
IS 460 (Part 1) : 2020	Test sieves — Specification Part 1 Wire cloth test sieves (*fourth revision*)
IS 517 : 2020	Specification for methanol (methyl alcohol) (*third revision*)
IS 534 : 2021	Benzene (*fifth revision*)
IS 1745 : 2018	Petroleum hydrocarbon solvents — Specification (*third revision*)
IS 5717 : 2003/ISO 3507	Laboratory glassware — Pyknometers (*second revision*)
IS 8883 (Part 1) : 2005	Methods of sampling chemical and chemical product: Part 1 general requirements and precautions (*first revision*)

ANNEX B

(*Clause* 3.2)

DETERMINATION OF PIGMENT CONTENT

B-1 Outline of the Method

The pigment content is determined by treating the material with extraction mixture and then separating it in a centrifuge and drying.

B-2 PROCEDURE

B-2.1 Pigment Content

Weigh accurately 15 g to 20 g of the well mixed material into a weighed centrifuge tube. Add 20 ml to 30 ml of appropriate extraction mixture mentioned below and mix thoroughly using a glass rod:

a) Benzene — 5 parts by volume
(*see* IS 534)
Methyl alcohol — 4 parts by volume
(*see* IS 517)
Acetone — 1 part by volume
(*see* IS 170)

} dehydrated over sodium sulphate

This solvent mixture ensures maximum retention of pigment but does not fully extract resins and bodied oils.

b) A mixture of equal parts of benzene and petroleum hydrocarbon solvent 145/205 low aromatic (*see* IS 1745). This is a good solvent for resins and bodied oils, but extra fine pigments do not settle well in this mixture.
c) A suitable mixture of solvents (a) and (b) above. This is recommended for material containing resins and bodied oils.

After mixing, rinse-the glass rod thoroughly with the extraction mixture in the centrifuge tube. Fill the tube and place it in the container of the centrifuge, counterbalance the container of the opposite arm and whirl at a minimum speed of 3 000 rev/min, until maximum separation is affected. Decant the liquid and repeat the process twice or more, if required. Keep all the extracted liquid in a weighed 250 ml conical flask. Place the tube containing the

pigment on the top of the air-oven for half an hour for the solvents to escape and then inside the oven maintained at (100 ± 2) °C and weigh after drying to constant mass.

ANNEX C

(*Clause* 4.3)

DETERMINATION OF FINENESS OF DISPERSION

C-1 GENERAL

C-1 Fineness of dispersion is measured on a grind gauge consisting of a block of hardened steel into which has been machined a shallow groove varying in depth from zero at one end to 0.102 mm at the other. A sample of ink is placed at the deep end and is drawn down towards the shallow end by a steel scraper. Observation of any scratches in the ink film, and where they occur in terms of distance along the gauge, gives a measure of the degree of dispersion of the ink sample.

C-2 APPARATUS

C-2.1 Gauge

A hardened steel block approximately 180 mm in length, 63.5 mm in width and 12.5 mm in thickness. The top surface of the block shall be ground smooth and flat, and shall contain a groove 133.4 mm in length and 12.5 mm in width, centred in the top of the block. The groove shall be tapered uniformly in depth lengthwise from 0.102 mm at one end to zero depth at the other, calibrated with a scale number in accordance with its depth as given in Table 1.

` NOTE — The apparatus may also be of a double channel type for comparing another sample.

Table 1 Relationship Between Depth of Tapered Groove and Scale for Fineness of Grinding

(*Clause* C-2.1)

SI No.	Distance From Zero End	Depth	Hegman Scale
	mm	microns	
(1)	(2)	(3)	(4)
i)	133.350	102	well for sample
ii)	127.000	102	0
iii)	111.125	89	1
iv)	95.250	76	2
v)	79.375	64	3
vi)	63.500	51	4
vii)	47.625	38	5
viii)	31.730	25	6
ix)	15.875	13	7
x)	0	0	8

C-2.2 Scraper

A double-edged steel blade 87.5 mm long, 37.5 mm wide and 6.8 mm thick. The two edges along the length shall be rounded to a radius of approximately 0.25 mm.

C-3 PROCEDURE

C-3.1 This consists of the following steps:

a) Place the gauge on a flat, nonslippery surface and wipe it clean immediately before the test.
b) Place the material to be tested in the deep end of the groove so that it overflows the groove slightly. Care shall be taken to see that the sample is free of air bubbles.
c) Using both hands, hold the blade perpendicular to the block surface and at right angles to the length of the groove, draw the material down the length of the groove with a uniform deliberate motion. Use sufficient pressure to clean the level face of the gauge.
d) Immediately read the fineness as follows:

    1) View the gauge from the side so that the line of vision is at right angles to the longer dimension of the groove.
    2) Hold the gauge in light that will make the pattern readily visible.
    3) For actual reading, make the angle between the face of the gauge and the line of vision not more than 30 °C not less than 20 °C.
    4) Interpret the pattern and designate dispersion in microns or scale number, ignoring the few isolated and irregularly spaced particles towards the deep end of the groove.

Using a fresh sample of the material each time, obtain three readings in the like manner. The first drawdown and reading is preliminary in order to establish proper conditions and to locate fineness pattern. With this known, the second and third readings can be made with a minimum time lapse between completion of drawdown and actual reading. No reading shall be considered for reporting fineness when the time lapse exceeds 10 seconds.

C-3.2 Care of Gauge

a) The gauge shall be immediately cleaned after each reading. Use a solvent and a soft cloth. Keep the gauge covered at all times when not in use. Gauges that lie idle for extended periods of time shall be protected from rust.
b) Do not allow any hard materials to come in contact with the gauge surface or scraper in any manner that might result in scarring or nicking. Tapping or scratching with other metallic surfaces shall be avoided.
c) The scraper edge may be rendered unsatisfactory for use by wear of the contact edge or by warpage.

    NOTE - Wear or warpage of the scraper may be noted by facing the edge of the scraper down on the smooth level face of the gauge and then inspecting the contact edge by means of a strong light, placed behind the gauge. Rocking the scraper forward or backward will reveal poor contact due to wear or warpage. shows that the scraper has been damaged, it shall not be used.

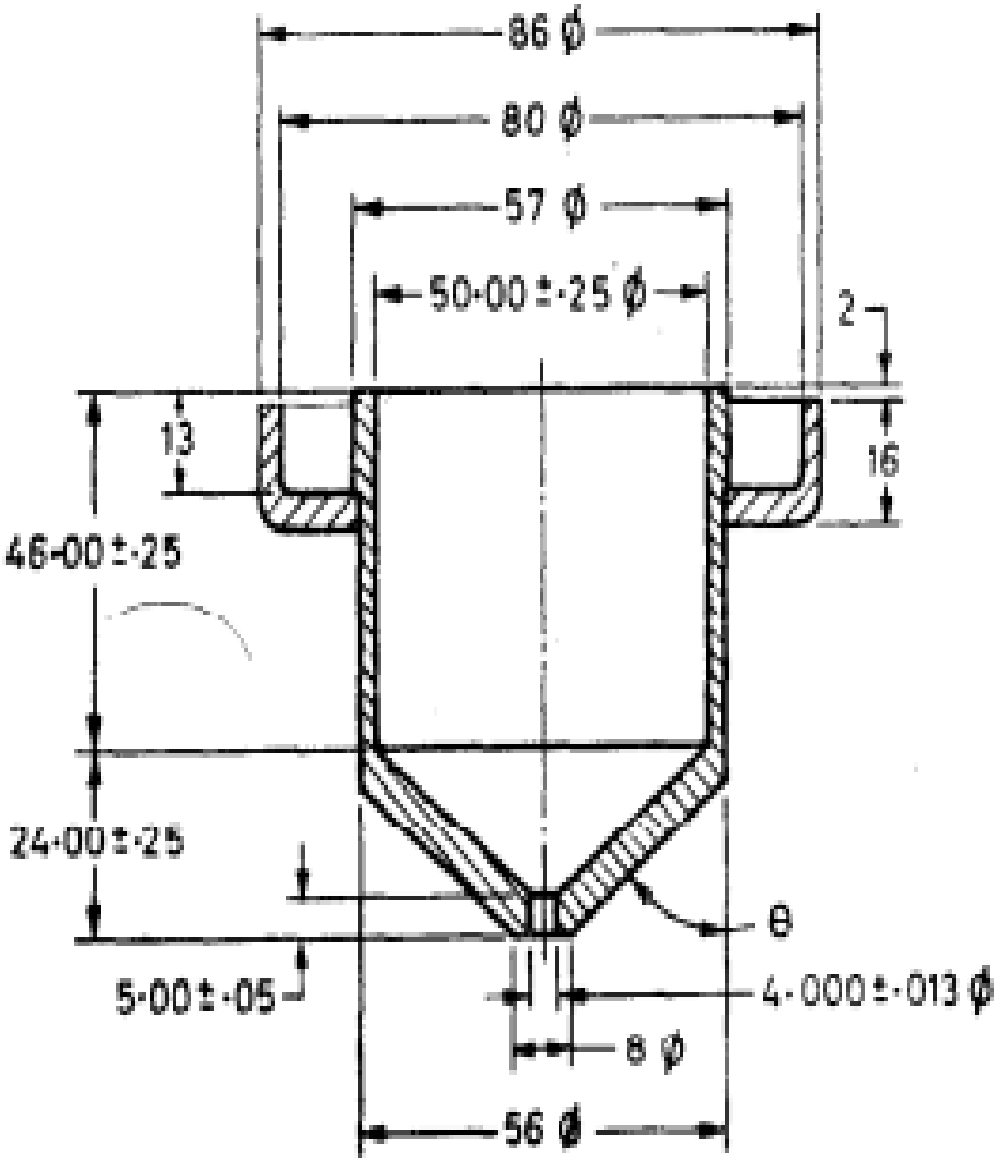
ANNEX D

(*Clause* 4.4)

DETERMINATION OF VISCOSITY

D-1 APPARATUS

a) The flow cup shall be essentially of the form and dimensions as shown in Fig. 1.



All dimensions in millimetres.

FIG. 1 FLOW CUP

b) *Material of Construction*

c) A cup made of any non-ferrous material is suitable. This may be plated. The finish shall be smooth. The jet may be either bored directly or constructed separately of stainless steel and force fitted. Care is essential in order to avoid damage to the lower apex of the cup. A protective skirt which does not interfere with the flow may be provided

d) The following additional apparatus shall also be required in carrying out the test:
   1) A thermometer accurate to within 0.5 °C;
   2) A stop-watch or stop-clock;
   3) A suitable stand provided with levelling screws;
   4) A spirit level; and
   5) A straight-edged scrapper for the top of the cup.

D-2 PROCEDURE

D-2.1 Place the flow cup on the stand in a place free from draughts, preferably with the air temperature within the range of (27 ± 2) °C and level by using of a spirit level placed on the rim.

a) Strain the sample into a clean container and adjust the temperature to meet the requirements as specified in **D-2.1**(c). A 150-micron IS Sieve [*see* IS 460 Part 1] or finer, is suitable. This and the following operations shall be carried out with minimum delay to avoid loss of solvent.
b) With the orifice closed by the finger, fill the cup with the bubble free sample until it just begins to overflow into the gallery, pouring slowly to minimize the formation of air bubbles. If' bubbles are present, allow them to rise and then remove them from the surface.
c) Check that the temperature of the material in the cup is within 0.5 °C of the test temperature. The cup may be at a temperature different from that of the sample and it is recommended that a minute or so be allowed to elapse before checking the temperature.
d) Place the scraper on the rim of the cap and draw it firmly across until the excess of the sample has flowed into the gallery. Place the receiver under the cup. Remove the finger and simultaneously start the stop-watch. Watch the steam of liquid flowing from the orifice. At the first evidence of a break of the stream into droplets, stop the stop-watch. The time taken is recorded in seconds as time of flow in the flow cup.

ANNEX E

(*Clause* 4.5)

DETERMINATION OF RELATIVE DENSITY

E-1 DEFINITION

E-1.1 For the purpose of this standard, the relative density of the material is the ratio of the mass of a given volume of the material to that of an equal volume of distilled water, the temperature of both the material and the water being 27 °C.

E-2 APPARATUS

E-2.1 Hubbard Relative Density Bottle (Modified) — *see* Type 6 of IS 5717.

E-3 PROCEDURE

E-3.1 Clean, dry and weigh the bottle and the stopper. Fill with water at a temperature of about 25 °C, introduce the stopper and keep in a water bath at 27 °C for 15 min. Wipe off all surplus water from the surface with a soft, clean and dry cloth and weigh again. Empty the bottle, clean and dry and repeat the operations after filling it with the material.

E-4 CALCULATION

E-4.1 Relative density at 27°C $= \frac{M_2 - M}{M_1 - M}$

where

M_2 = mass in g of the relative density bottle filled with the material;
M = mass in g of the dry relative density bottle; and
M_1 = mass in g of the relative density bottle filled with distilled water.

ANNEX F

(*Clause* 7)

METHOD OF SAMPLING INK, NUMBERING

F-1 GENERAL REQUIREMENTS OF SAMPLING

F-1.1 Drawing, preparing, storing and handling of test samples, shall be done in accordance with IS 8883 (Part 1)

F-1.2 The sampling apparatus shall be clean and dry when used.

F-1.3 Precautions shall be taken to protect the samples, the material being sampled, the sampling apparatus and the containers for samples from adventitious contamination.

F-1.4 The samples shall be kept in clean, dry airtight glass or other suitable containers on which the material has no action.

F-1.5 The sample containers shall be of such a size that they are almost completely filled by the sample.

F-1.6 Each sample container shall be sealed airtight with a stopper after filling, and marked with full details of sampling, the date of sampling and the month and year of manufacture of the material.

F-1.7 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 All the tubes in a single consignment of the material drawn from a single batch of manufacture shall constitute a lot. If a consignment is declared or known to consist of different batches of manufacture, the tubes belonging to the same batch shall be grouped together and each such group shall constitute a separate lot.

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

F-2.2 The number of tubes to be chosen from the lot shall depend on the size of the lot and shall be in accordance with Table 2.

F-2.3 These tubes shall be chosen at random from the lot and in order to ensure the randomness of selection, a random number table shall be used. For guidance and use of random number table, IS 4905 may be referred.

Table 2 Number of Tubes to be Selected for Sampling

(*Clause* F-2.2, F-3.1.1)

SI No.	Lot Size	No. of Containers to be Chosen
	(N)	(*n*)
(1)	(2)	(3)
i)	Up to 15	3
ii)	16 to 50	4
iii)	51 to 100	5
iv)	101 and above	7

May be referred. In the absence of random number table, the following procedure may be adopted:

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

F-3 TEST SAMPLES AND REFEREE SAMPLE

F-3.1 Preparation of Test Samples

F-3.1.1 Take a small portion of the material from each container selected (*see* Table 2), thoroughly mix the material before drawing from the same container. Out of these portions, a small but equal quantity shall be taken for each selected container and shall be well mixed up together so as to form a composite sample of quantity sufficient to make triplicate determination for all the characteristics to be tested on the composite sample. This composite sample shall be divided into three equal parts, one for the purchaser, another for the supplier and the third for the referee.

F-3.2 Referee Sample

F-3.2.1 Referee sample shall consist of the composite sample (*see* **F-3.1.1**) and marked for the purpose and shall bear the seals of the purchaser and the supplier. This shall be kept at a place agreed to between the purchaser and the supplier and shall be used in case of a dispute between the two.

F-4 NUMBER OF TESTS

Tests for the determination of all characteristics mentioned in **4** shall be conducted on the composite sample.

F-5 CRITERIA FOR CONFORMITY

F-5.1 A lot shall be declared as conforming to the specification if it satisfies the requirements for each of the characteristics mentioned in this specification.

F-5.2 If the requirements for any of the characteristics are not met, the lot shall be declared to have not satisfied the requirements of the specification and shall be rejected.