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भारतीय मानक मसौदा

चिकित्सा प्रयोगशाला हेतु कांच का सामान – ओस्टवाल्ड-फोलिन स्वरूप विंदुक– विशिष्टि

(*IS 5155 का पहला पुनरीक्षण)*

Draft Indian Standard

Medical Laboratory Glassware – Ostwald-Folin Type Pipettes – Specification

(*First Revision of IS 5515*)

ICS 11.040.55

Medical Laboratory Instruments Sectional Committee, MHD 10

Last date for comments: **03 Nov 2024**

FOREWORD

(Formal clauses will be added later)

This Indian Standard was originally published in 1969 with the title 'Specification for pipettes, Ostwald-Folin type'. This revision has been brought out to align it with the recent developments, to update the cross-references to the latest editions and to bring the standard in line with the latest style and format of Indian Standards.

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*)'

Draft Indian Standard

Medical Laboratory Glassware – Ostwald-Folin Type Pipettes - Specification

1 SCOPE

This Indian Standard prescribes the requirements and the methods of test for Ostwald-Folin type pipettes. These are one-mark bulb pipettes calibrated for delivery or for content and used in pathological work.

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 revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards.

Indian Standard	*Title*
IS 1382 : 1981	Glossary of terms relating to glass and glassware (First Revision)
IS 2303 (Part 1/Sec 2) : 2021	Grading glass for alkalinity part 1 hydrolytic resistance of glass grains section 2 determination and classification of hydrolytic resistance at 121 ^{o}C
IS 4426: 1992	Methods of sampling Laboratory glassware (First Revision)

3 MATERIALS

3.1 The pipettes shall be made from clear, neutral, heat-resistant glass tubing (for definitions see IS 1382 : 1981). The glass shall 'pass the alkalinity test prescribed in IS 2303 (Part 1/Sec 2) : 2021 for Type 1 glass.

4 TYPES

4.1 The pipettes shall be of the following two types:

Type 1 - Pipettes adjusted for delivery with the last drop blown out by the method described in Appendix A.

Type 2 - Pipettes adjusted for content.

5 CAPACITY

5.1 The pipettes shall be of nominal capacity 0.2, 0.5, 1, 2 and 3 ml.

5.1.1 Type 2 – Capacity is defined as the volume of water at 27ºC, expressed in millilitres delivered by the pipette at 27°C when emptied from the graduation line to the jet and the last drop blown out as described in Appendix B.

5.1.2 Type 2 – The capacity is defined as the volume of water at 27ºC, expressed in millilitres contained by the pipette at 27°C when filled from jet to the graduation line as described in Appendix B.

5.1.3 Tolerances on Capacity – The tolerances on capacity shall be as given in Table 1.

TABLE 1 TOLERANCES ON CAPACITY

NOMINAL CAPACITY, ml	0.2	0.5	1	2	3
Tolerance ± ml	0.003	0.004	0.005	0.006	0.010

5.2 The shapes and dimensions of the pipettes shall be as given in Table 2, and Fig. 1. It is recommended that pipettes should also comply with the dimensions given in Table 3.

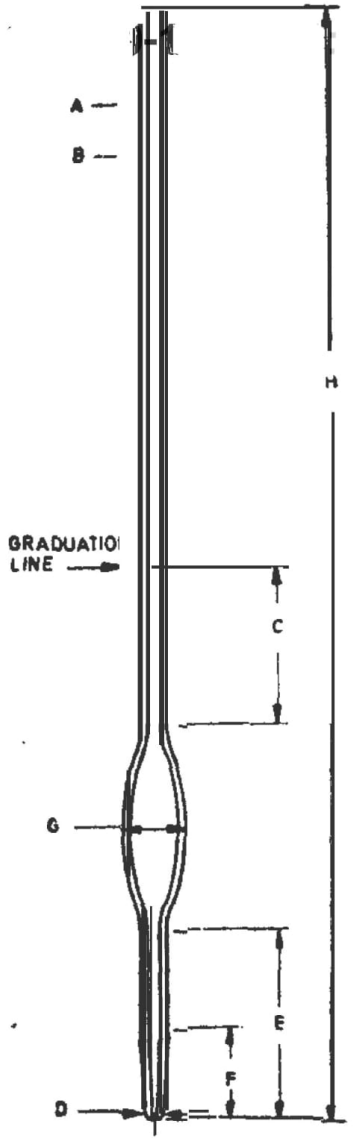

FIG. 1 PIPETTES, OSTWALD-FOLIN TYPE

TABLE 2 MANDATORY DIMENSIONS
(Clause 5.2)

DIMENSIONS*	NOMINAL CAPACITY ml				
	0.2	0.5	1	2	3
Internal diameter of the suction tube (*A*), mm	1.5 ± 0.3	1.7 ± 0.3	2.0 ± 0.3	2.3 ± 0.3	2.7 ± 0.3
Distance of graduation line from top of bulb, minimum (C), mm	10	10	10	10	10
External diameter of jet† (*D*), mm	2.0 ± 0.5	2.0 ± 0.5	2.0 ± 0.5	2.0 ± 0.5	2.0 ± 0.5

TABLE 3 RECOMMENDED DIMENSIONS
(Clause 5.2)

DIMENSIONS‡	NOMINAL CAPACITY ml				
	0.2	0.5	1	2	3
Wall thickness of suction tube (B), mm	2	2	2	2	2
Length of delivery tube§ (E), mm	45	45	45	50	50
Length of tapered portion forming jet (F), mm	20	20	20	25	25
External diameter of bulb (G), mm	7	9	11	14	16
Overall length of pipette maximum (H), mm	230	240	250	260	260

* see Fig. 1.
† For a jet with a ground finish this dimension is measured at the top of the bevel, not at the tip of the jet.
‡ see Fig. 1.
§ in making measurements of the length or the delivery tube, the tube is regarded as terminating where it begins to expand at the junction with the bulb.

6 WORKMANSHIP AND FINISH

6.1 The pipettes shall be well annealed, free from bubbles and, as far as possible, free from striae, stones and other visible defects (For definitions see IS : 1382-1961*) and shall be symmetrical about their axes. The top of the pipettes shall be finished by grinding at right angles to the axis with a slight bevel outside, or by fire polishing to a smooth regular surface. The delivery jet shall be made with a long gradual taper which shall not have any sudden constriction at the orifice. The end of the jet shall preferably be ground smooth at right angles to the axis of the pipette and shall be slightly beveled on the outside. Alternatively, the end may be finished by fire-polishing, provided that the requirements given in the clause are met. The pipettes shall pass the thermal shock test specified in **12.1.**

7 GRADUATION LINE

7.1 The graduation mark shall be a fine, cleanly etched permanent line of uniform thickness not exceeding 0.3, mm, completely encircling the pipette and lying in a plane at right angles to the axis of the pipette. It shall pass the permanency of marking test specified in 12.2.

8 DELIVERY TIME

8.1 Type l - The delivery time for Ostwald-Folin pipettes adjusted for delivery is the time occupied by the free descent of the water meniscus from the graduation line to the point at which it comes to rest in the jet, when the pipette is held vertical and the tip of the jet is in contact with the inside of a beaker held slightly inclined to the vertical. The delivery time thus determined shall be not less than 10 seconds nor more than 20 seconds for all sizes of pipettes.

The observed delivery time and the marked delivery time shall be within the above limits and shall not differ from each other by more than 2 seconds.

8.2 Type 2 - The orifice of the jet of pipettes adjusted for content shall be such that the delivery time is within the limits specified in Table 4, but the delivery time shall not be marked on the pipettes.

TABLE 4 DELIVERY TIMES FOR TYPE 2 PIPETTES

NOMINAL CAPAPITY, ml	0.2	0.5	1	2	3
Delivery time, seconds	3 to 6	4 to 8	5 to 10	7 to 15	10 to 20

9 TESTS

9.1 Thermal Shock Test – The pipettes shall be boiled in water for 30 minutes then immersed in water at 20°C. The pipettes shall not chip or crack.

9.2 Permanency of Graduation – The pipettes shall be immersed in a chromic acid mixture[**] and kept there for 15 minutes. The pipettes shall then be rinsed thoroughly in distilled water and dried thoroughly. This shall be repeated once. There shall be no fading of the graduation marks.

10 MARKING

10.1 Each pipette shall be marked permanently and legibly with the following inscriptions:

a) Name of the manufacturer, his initials or trade-mark;
b) Nominal, capacity in ml;
c) Inscription '27°C' to indicate that the pipette is calibrated at 27°C;
d) Inscription ' Ex ' to indicate that the pipette is adjusted for delivery or inscription 'In' to indicate that the pipette is adjusted for content;
e) For Type 1 pipettes, Delivery time; and
f) On pipettes of Type 1 (adjusted for delivery) the word 'blowout' and/ or a band of matt surface (ground or sand blasted) 3 to 5 mm wide at 15 to 20 mm from top of the suction tube, to indicate that the liquid remaining in the jet after free delivery has ceased is to be gently blown out to obtain the full delivery capacity.

10.2 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 Standard* Act, 2016 and the Rules and Regulations framed thereunder, and the product(s) may be marked with the Standard Mark.

11 PACKING

11.1 Each pipette shall be packed as given in 11.1.1 or as agreed to between the manufacturer and the purchaser.

11.1.1 Each pipette shall, be enclosed in cardboard carton, cushioned with cottonwool at both the ends.

12 SAMPLING

11.1 Sampling and acceptance criteria shall be as agreed to between the purchaser and the supplier preferably as given in IS 4426.

[**] Chromic acid mixture composition:

Sodium dichromate	200g
Water	1000 ml
Sulphuric acid	1500 ml

ANNEX A
(Clause 4.1)
METHOD OF USING TYPE 1 PIPETTES

A-1 PROCEDURE

A-1.1 The pipette is held in a vertical position with the jet downwards and filled to a short distance above the graduation line, the liquid being retained in the pipette by pressing a finger on the top of the suction tube. Any liquid remaining on the outside of the delivery jet is removed. By reducing the pressure of the finger, liquid is allowed to run out slowly. As the descending liquid surface approaches the graduation line the pressure of the finger is increased so that the liquid surface is brought to rest with the lowest point of the meniscus (see Note) in the horizontal plane containing the top edge of the graduation line. The drop of liquid then adhering to the jet is removed by bringing the inside of a suitable vessel, for example, a beaker, into contact with the jet and detaching the drop on to the side of the vessel. The receiving vessel is placed beneath the pipette, inclined slightly so that the tie of the jet of the pipette is in contact with the inside of the vessel. The finger is then removed from contact with the top of the pipette to allow delivery of the liquid into the receiving vessel. Free delivery of the liquid into the receiving vessel is allowed without restricting the rate of outflow. When free delivery ceases and the meniscus comes to rest in the jet, the remaining liquid *is* gently blown out while the jet is rotated in con tact with the side of the receiving vessel. To avoid any suck back due to capillary attraction, the jet should be removed from contact after the last drop of liquid has been blown out and before blowing ceases.

NOTE – The meniscus can be dear & defined by folding a strip of black paper round the pipette, the top edge of the paper being not more than 1 mm below the graduation line. The meniscus shaded is viewed against a white background.

ANNEX B

(Clauses *4.1.1 and 4.12*)

DETERMINATION OF CAPACITY

B-1. GENERAL

B-1.0 When determining the capacity of a pipette, the procedure in B-l.1 and B-l.2 is to be observed, the pipette having first been thoroughly cleaned.

B-1.1 Type 1 – Using the procedure described in Appendix A, the pipette is filled with pure water and allowed to deliver into a suitable receiving vessel, for example, a covered beaker or weighing bottle, containing some water and which has previously been counterpoised against a similar vessel of the same diameter also containing water. The weight of water thus delivered is determined by re-weighing the receiving vessel. During the whole operation, the receiving and tare vessel should be treated alike as far as possible and in particular they should be covered and uncovered at the same time.

All operations are carried out at room temperature. The volume of water delivered by the pipette at 27°C is calculated by applying a correction for water temperature and, where necessary, for air temperature and pressure to the weight of water delivered in the receiving vessel.

NOTE – If a single pan balance is used, both vessels are weighed in turn before the contents of the pipette are emptied into one of them; both vessels are then re-weighed in the same sequence and allowance is made for any loss in weight exhibited by the ‘control’ vessel.

B-1.2 Type 2 – The weight of the empty dried pipette is determined. The pipette is clamped in a vertical position with the jet downwards, and filled with pure water to a short distance above the graduation line, the water being retained in the pipette by pressing a finger on top of the suction tube. Any water remaining on the outside of the delivery jet is removed. By reducing the pressure of the finger, water is allowed to run out slowly. As the descending water surface approaches the graduation line the pressure of the finger is increased so that the water surface is brought to rest with the lowest point of the meniscus (see also Note under **A-1.1**) in the horizontal plane containing the top edge of ‘the graduation line. The drop of water adhering to the jet is removed by bringing the inside of a suitable vessel, for example, a beaker, into contact with the jet and detaching the drop on to the side of the vessel. By releasing the pressure of the finger the pipette is allowed to drain into a suitable receiving vessel, for example, a covered breaker or weighing bottle, containing some water and which has previously been counterpoised against a similar vessel of the same diameter also containing water. The pipette is re-weighed to determine the weight of water left inside it and the weight of water which drained from the pipette is determined by re-weighing the receiving vessel. These two weights are combined to give the total weight of water contained by the pipette and the volume contained at 27°C is calculated by applying a correction for water temperature and, where necessary, fhr air

temperature and pressure.

NOTE – If a single pan balance is used, both vessels are weighed in turn before the contents of the pipette are emptied into one of them; both vessels are then re-weighed in the same sequence and allowance is made for any loss in weight exhibited by the ‘ control ’ vessel.