

Specification for

Capillary pipettes —

Microchemical apparatus —

Group D: Volumetric apparatus

Confirmed
January 2010

Co-operating organizations

The Laboratory Apparatus Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

- Agricultural Research Council
- Air Ministry
- Association of British Chemical Manufacturers*
- Association of Scientific Workers
- Board of Trade
- British Association for the Advancement of Science
- British Chemical Ware Manufacturers' Association*
- British Laboratory Ware Association*
- British Lampblown Scientific Glassware Manufacturers' Association*
- British Pharmacopœia Commission
- British Scientific Instrument Research Association*
- Chemical Society*
- D.S.I.R. — Laboratory of the Government Chemist*
- D.S.I.R. — National Chemical Laboratory*
- Glass Manufacturers' Federation*
- Institute of Petroleum
- Ministry of Aviation*
- Ministry of Health
- National Physical Laboratory (D.S.I.R.)*
- Oil Companies Materials Association
- Pharmaceutical Society of Great Britain*
- Royal Institute of Chemistry*
- Science Masters' Association
- Scientific Instrument Manufacturers' Association
- Society for Analytical Chemistry*
- Society of Chemical Industry*
- Society of Glass Technology*
- Standardization of Tar Products Tests Committee

This British Standard, having been approved by the Laboratory Apparatus Industry Standards Committee and endorsed by the Chairman of the Chemical Divisional Council, was published under the authority of the General Council on 26 February 1963

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The Government departments and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

- Admiralty
- Association of Clinical Pathologists
- Medical Research Council
- Physiological Society
- War Office
- Individual manufacturers

Amendments issued since publication

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Foreword

This standard makes reference to the following British Standard:

BS 1797, *Tables for use in the calibration of volumetric glassware*.

This British Standard was first published in 1938 as BS 797, “*One-mark capillary pipettes*”, the 1954 revision was published under the same number but in order to include it also in the BS 1428, “*Microchemical apparatus*” series (see list in Appendix C), it was allotted the additional number BS 1428-D4. A further step has now been taken and first place given to this latter number, the original number, BS 797, being relegated to the status of a subsidiary reference. In this revision a further category of two-mark content pipettes (Type 4) has been added and several changes in dimensions have been made. All the dimensions are now mandatory except for the overall lengths of the pipettes which are recommended for the guidance of manufacturers. Because of the desirability that Types 3 and 4 pipettes of capacity 0.02 ml and above should be suitable for use with both aqueous solutions and biological fluids such as blood, a relatively narrow range of jet diameter is permitted for these pipettes.

All the one-mark pipettes may now be made from soda-lime or borosilicate glass. Enamel-back tubing and lead glass may also be used.

In preparing this revision, account has been taken of International Standardization work in the field of laboratory glassware and this has led to the inclusion of a subsidiary standard temperature of 27 °C for the convenience of tropical countries and to the use of the inscription “Ex” in place of “D” to indicate that the pipette is to be used to deliver, or the inscription “In” instead of “C” to indicate that the pipette is to be used to contain.

Appendix A describes methods of determining capacity using water for pipettes of Types 2, 3 and 4, and a method using mercury for pipettes of Type 3.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 9 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This British Standard specifies ranges of graduated, one-mark and two-mark capillary pipettes suitable for general laboratory use.

2 Types and sizes

Four types of capillary pipette are specified, as follows:

Type 1. Graduated pipettes calibrated for delivery from the zero line down to any graduation line as illustrated in Figure 1. Three sizes are specified, as follows:

- Nominal capacity 0.1 ml, subdivided into 0.005 ml intervals;
- Nominal capacity 0.2 ml, subdivided into 0.01 ml intervals;
- Nominal capacity 0.5 ml, subdivided into 0.02 ml intervals.

Type 2. Graduated pipettes calibrated for content from the jet to any graduation line, as illustrated in Figure 2. Three sizes are specified, as follows:

- Nominal capacity 0.1 ml, subdivided into 0.005 ml intervals;
- Nominal capacity 0.2 ml, subdivided into 0.01 ml intervals;
- Nominal capacity 0.5 ml, subdivided into 0.02 ml intervals.

Type 3. One-mark pipettes calibrated for content, as illustrated in Figure 3. Four sizes are specified, of nominal capacity 0.005, 0.01, 0.02 and 0.05 ml.

Type 4. Two-mark pipettes calibrated for content, as illustrated in Figure 4. Two sizes are specified, of nominal capacity 0.2 ml, subdivided into 0.1 ml intervals, and 0.1 ml, subdivided into 0.05 ml intervals.

3 Definition of capacity

3.1 pipettes of type 1

the capacity corresponding to any graduation line is defined as the volume of water at 20 °C, expressed in millilitres, delivered by the pipette at 20 °C, when emptied from the zero line to that graduation line, as described in Appendix A

3.2 pipettes of types 2, 3 and 4

the capacity corresponding to any graduation line is defined as the volume of water at 20 °C, expressed in millilitres, contained by the pipette at 20 °C, when filled from the jet to that graduation line, the lowest point of the water meniscus being set in the horizontal plane containing the top edge of the graduation line, with the pipette vertical. The capacity can be determined by the methods described in Appendix A

NOTE When a pipette of any type is required for use in a country which has adopted a standard temperature of 27 °C, this figure is to be substituted for 20 °C.

4 Tolerances on capacity

Tolerances on capacity for all the pipettes shall be as shown in Table 1.

The tolerance represents the maximum error allowed at any point and also the maximum difference allowed between the errors at any two points.

5 Material

All capillary pipettes shall be made from either soda-lime or borosilicate glass. One-mark and two-mark pipettes shall be made from either clear or enamel-back glass tubing; other pipettes shall be made from clear glass tubing. In either case, the glass shall be as free as possible from visible defects and shall be well annealed. The manufacturer shall state the type of glass used.

Table 1 — Tolerances on capacity

Nominal capacity of pipette, ml	0.005	0.01	0.02	0.05	0.1	0.2	0.5
Tolerance, ml	± 0.0002	± 0.0002	± 0.0004	± 0.001	± 0.002	± 0.004	± 0.006