

Graduated pipettes —

Part 3: Specification for blow-out pipettes —

[ISO title: Laboratory glassware — Graduated pipettes —
Part 4: Blow-out pipettes]

Cooperating organizations

The Laboratory Apparatus Standards Committee, under whose direction this British Standard was prepared, consists of representatives from the following:

Agricultural Research Council
 Association for Science Education
 British Educational Equipment Association
 British Laboratory Ware Association*
 British Lampblown Scientific Glassware Manufacturers Association Ltd.*
 British Pharmacopoeia Commission
 Chemical Industries' Association
 Department of Health and Social Security*
 Department of Industry (Laboratory of the Government Chemist)*
 Institute of Petroleum
 Ministry of Defence*
 Pharmaceutical Society of Great Britain
 Royal Society of Chemistry
 Scientific Instrument Manufacturers' Association
 Society of Chemical Industry*
 Society of Glass Technology
 Standardization of Tar Products Tests Committee

The organizations marked with an asterisk in the above list, together with the following, were directly represented on the Technical Committee entrusted with the preparation of this British Standard:

Association of Clinical Biochemists
 Glass Manufacturers' Federation
 Institute of Medical Laboratory Sciences
 Coopted member

This British Standard, having been prepared under the direction of the Laboratory Apparatus Standards Committee, was published under the authority of the Board of BSI and comes into effect on 31 May 1982

© BSI 07-1999

First published May 1937
 First revision August 1952
 Second revision June 1962
 Third revision November 1976
 Fourth revision, in Parts, May 1982

The following BSI references relate to the work on this standard:
 Committee reference LBC/27
 Draft for comment 79/54288 DC

ISBN 0 580 12744 3

Amendments issued since publication

Amd. No.	Date of issue	Comments

Contents

	Page
Cooperating organizations	Inside front cover
National foreword	ii
1 Scope and field of application	1
2 Reference	1
3 Requirements for graduated pipettes	1
Figure — Graduation and figuring of blow-out pipettes	2
Table 1 — Lower end of scale	1
Table 2 — Delivery time of blow-out pipettes	1
Publications referred to	Inside back cover

National foreword

This Part of this British Standard has been prepared under the direction of the Laboratory Apparatus Standards Committee. It is identical with ISO 835-4 “*Laboratory glassware — Graduated pipettes — Part 4: Blow-out pipettes*” published in 1981 by the International Organization for Standardization (ISO).

BS 700 was originally published in 1937 and first revised in 1952 under the title “*Graduated pipettes and one-mark cylindrical pipettes*”. The standard was again revised in 1962, when the one-mark cylindrical pipettes were omitted from it, and account was taken of international standardization work in progress at that time.

In 1968 ISO/R 835 was published which covered graduated pipettes types I and II, and BS 700 was revised in 1976 to take into account this ISO

Recommendation and amendments to it that were under consideration. The earlier edition of BS 700 included requirements for a type III pipette which was adjusted for content from the jet to any graduation line. This was omitted from the 1976 revision because of lack of demand and was replaced by another pipette, also designated type III, but adjusted for delivery from the zero line (at the top) to the jet. In addition, the 1976 revision included requirements for a blowout pipette, adjusted for delivery from the highest graduation line (at the top) to the jet, but with the last drop expelled by blowing. The method of use of this pipette is the responsibility of the user and for this reason alternative scales were permitted; one with the zero at the jet and the other with the zero at the highest graduation line, which reflects the general method of using the pipette as a dispenser. Pipettes of types III and IV were of class B accuracy only, and delivery times for types I and II pipettes were reduced.

Proposals made by the UK for further revision of ISO/R 835 to include shorter delivery times for types I and II pipettes were accepted, and in 1981 the ISO Recommendation was revised and published in four Parts, ISO 835-1 to 835-4. The equivalent British Standards for ISO 835-1 and ISO 835-2 are BS 700-1 and BS 700-2 respectively. The Technical Committee responsible for this British Standard, whilst approving ISO 835-3 as an international standard, decided that there should be no British Standard corresponding to ISO 835-3 because graduated pipettes having a 15 s waiting time are not used in the UK and its markets.

The principal differences between the 1976 edition and this edition include the introduction of a 0.5/0.01 ml pipette and a 25/0.01 ml pipette, both of class A accuracy. The blow-out pipettes are no longer designated as type IV and the alternative scale arrangement, with the zero at the top, for these pipettes has been deleted. The maximum scale lengths of the types 2, 3 and blow-out pipettes have been increased by 10 %, and the ranges of the delivery times for class B types 1, 2 and 3 have been widened.

This Part of this standard, together with Parts 1 and 2, supersedes BS 700:1976 which is withdrawn.

Terminology and conventions. The text of the international standard has been approved as suitable for publication as a British Standard without deviation. Some terminology and certain conventions are not identical with those used in British Standards; attention is drawn especially to the following.

The comma has been used throughout as a decimal marker. In British Standards it is current practice to use a full point on the baseline as the decimal marker.

Wherever the words “International Standard” appear, referring to this standard, they should be read as “British Standard”.

Cross-references

International standard	Corresponding British Standard
ISO 384:1978	BS 5898:1980 <i>Specification for principles of design and construction of volumetric glassware for laboratory use</i> (Identical) BS 700 <i>Graduated pipettes</i>
ISO 835-1:1981	Part 1:1982 <i>Specification for general requirements</i> (Identical)
ISO 835-2:1981	Part 2:1982 <i>Specification for pipettes for which no waiting time is specified</i> (Identical)

The reference to ISO 835-3, which appears in clause 1 is for information only and the lack of a corresponding British Standard does not affect the validity of this standard.

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 to iv, pages 1 and 2, an inside back cover 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 and field of application

This part of ISO 835 specifies requirements for an internationally acceptable series of graduated blow-out pipettes, which are adequate for general laboratory purposes. They are adjusted to class B accuracy.

The details specified are in conformity with ISO 384 and ISO 835-1.

NOTE Particular requirements for graduated pipettes for which no waiting time is required, are specified in ISO 835-2, and for pipettes, with which a waiting time of 15 s is to be observed, in ISO 835-3.

2 References

ISO 384, *Laboratory glassware — Principles of design and construction of volumetric glassware*.

ISO 835-1, *Laboratory glassware — Graduated pipettes — Part 1: General requirements*.

3 Requirements for graduated pipettes

Unless otherwise stated in this International Standard graduated pipettes shall conform to the general requirements specified in ISO 835-1.

3.1 Requirements for graduated blow-out pipettes

3.1.1 Definition of capacity

The capacity corresponding to any graduation line for a graduated blow-out pipette is defined as the volume of water at 20 °C, expressed in millilitres, delivered by the pipette at 20 °C, when emptied from the graduation line to the jet, outflow being unrestricted until it is sure that the meniscus has come to rest in the jet, but with delivery being completed by expelling the last drop by blowing.

NOTE Where, exceptionally, the reference temperature is 27 °C, this value shall be substituted for 20 °C.

The clean pipette shall be held in a vertical position and filled with distilled water to a few millimetres above the graduation line; the falling meniscus shall then be set to the line. Any drop adhering to the jet of the pipette shall be removed by bringing the surface of a glass vessel into contact with the tip of the jet.

Delivery shall then be made into another glass vessel slightly inclined so that the tip of the jet is in contact with the inside of the vessel, but without movement of one against the other throughout the delivery period.

To ensure that delivery is complete, a waiting time of approximately 3 s should be observed before expelling the last drop by blowing and removing the pipette from the receiving vessel.

NOTE The waiting period of 3 s is specified only for the purpose of definition. In use, it is unnecessary to adhere closely to this period; it is sufficient to be certain that the meniscus has come to rest in the jet before blowing out the pipette.

3.1.2 Graduation and figuring

3.1.2.1 For blow-out pipettes, graduation pattern 3 (see ISO 835-1) shall be applied (see the Figure).

3.1.2.2 Lowest and lowest figured graduation lines shall be in accordance with Table 1.

Table 1 — Lower end of scale

Nominal capacity	ml	1	2	5	10	25
Lowest figured graduation line	ml	0,1	0,2	0,5	2	4
Lowest graduation line	ml	0,1	0,2	0,5	1,5	2,6

NOTE These figures are calculated taking into account the requirement that 10 mm of uniform bore shall lie below lowest graduation line.

3.1.3 Delivery time

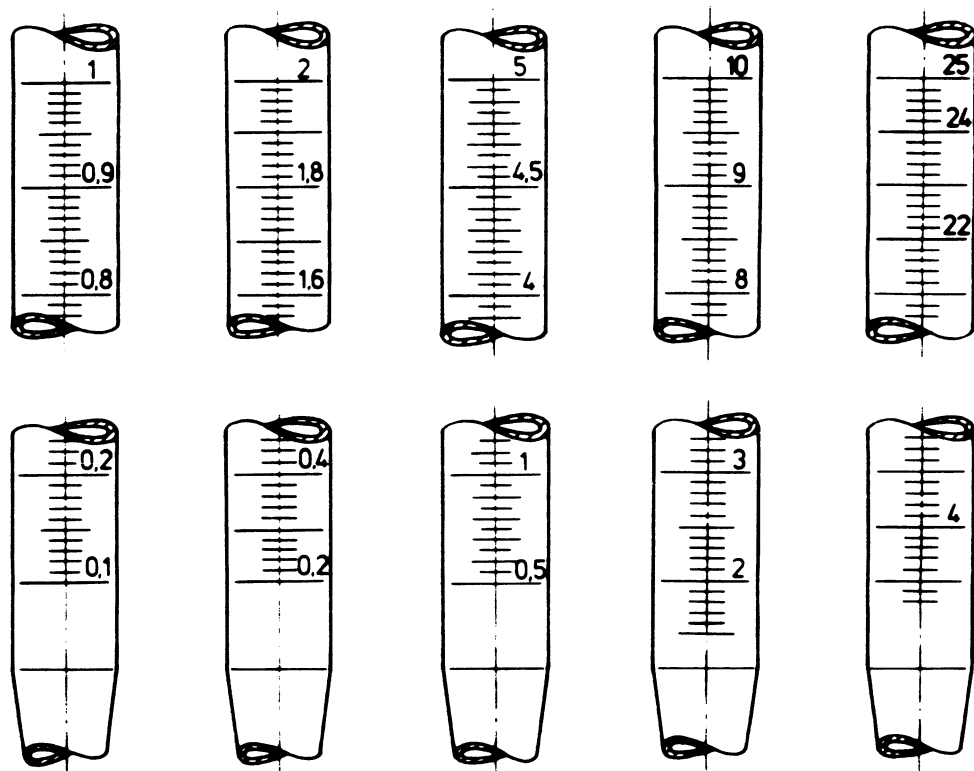
When the delivery time is marked on a pipette, then the observed delivery time and the marked delivery time shall both be within the limits given in Table 2 and shall not differ by more than 2 s.

Table 2 — Delivery time of blow-out pipettes

Nominal capacity	Delivery time	
	min.	max.
ml	s	s
1	3	5
2	4	6
5	5	7
10	6	9
25	8	11

3.1.4 Identification

Blow-out pipettes shall be provided with a small white ring close to the top of pipette (etched, sand-blasted or enamelled). Additionally, this ring may have an inscription indicating that the instrument is a blow-out pipette (for example “blow-out”, “à souffler” or similar).



NOTE There are blow-out pipettes in use graduated according to type 3 pipettes (see ISO 835-2) for delivery from zero at the top to any graduation line or — in use of total capacity delivering — down to the jet. Such pipettes, however, are not subject of this part of ISO 835.

Figure — Graduation and figuring of blow-out pipettes

Publications referred to

See national foreword.

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: 020 8996 9000. Fax: 020 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: 020 8996 9001. Fax: 020 8996 7001.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: 020 8996 7111. Fax: 020 8996 7048.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: 020 8996 7002. Fax: 020 8996 7001.

Copyright

Copyright subsists in all BSI publications. BSI also holds the copyright, in the UK, of the publications of the international standardization bodies. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI.

This does not preclude the free use, in the course of implementing the standard, of necessary details such as symbols, and size, type or grade designations. If these details are to be used for any other purpose than implementation then the prior written permission of BSI must be obtained.

If permission is granted, the terms may include royalty payments or a licensing agreement. Details and advice can be obtained from the Copyright Manager. Tel: 020 8996 7070.