SLOVENSKI STANDARD
SIST EN ISO 835:2007

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Laboratorijska steklovina - Graduirane pipete (ISO 835:2007)

Laboratory glassware - Graduated pipettes (ISO 835:2007)

Laborgeräte aus Glas - Messpipetten (ISO 835:2007)

Verrerie de laboratoire - Pipettes graduées (ISO 835:2007)

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71.040.20	Laboratorijska posoda in aparati	Laboratory ware and related apparatus

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English Version

Laboratory glassware - Graduated pipettes (ISO 835:2007)

Verrerie de laboratoire - Pipettes graduées (ISO 835:2007)

Laborgeräte aus Glas - Messpipetten (ISO 835:2007)

This European Standard was approved by CEN on 13 March 2007.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (EN ISO 835:2007) has been prepared by Technical Committee ISO/TC 48 "Laboratory glassware and related apparatus" in collaboration with Technical Committee CEN/TC 332 "Laboratory equipment", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2007, and conflicting national standards shall be withdrawn at the latest by October 2007.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Endorsement notice

The text of ISO 835:2007 has been approved by CEN as EN ISO 835:2007 without any modifications.

INTERNATIONAL STANDARD

ISO 835

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Laboratory glassware — Graduated pipettes

Verrerie de laboratoire — Pipettes graduées

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 835 was prepared by Technical Committee ISO/TC 48, *Laboratory equipment*, Subcommittee SC 6, *Laboratory and volumetric ware*.

This first edition of ISO 835 cancels and replaces ISO 835-1:1981, ISO 835-2:1981, ISO 835-3:1981 and ISO 835-4:1981, which have been technically revised and combined into one document.

Laboratory glassware — Graduated pipettes

1 Scope

This International Standard specifies metrological and constructional requirements for graduated pipettes, adequate for general laboratory purposes.

The details specified are in conformity with the principles of design and construction of volumetric glassware given in ISO 384.

NOTE For one-mark pipettes, see ISO 648. For piston-operated pipettes, see ISO 8655-2.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 384:1978, *Laboratory glassware — Principles of design and construction of volumetric glassware*

ISO 719, *Glass — Hydrolytic resistance of glass grains at 98 °C — Method of test and classification*

ISO 1769, *Laboratory glassware — Pipettes — Colour coding*

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
delivery volume
volume of liquid discharged from the pipette

NOTE Due to retention of liquid on the inner surface of the pipette, the volume of liquid delivered is not identical with the volume of liquid contained by the pipette.

3.2
delivery time
time required for the pipette to deliver its nominal volume

3.3
waiting time
time to be observed after apparent completion of the liquid delivery of the pipette and before the final reading of the delivered volume is taken

NOTE A waiting time applies for graduated pipettes of Class AS (see 5.1 and 7.6).

4 Basis of adjustment

4.1 Unit of volume

The unit of volume shall be the millilitre (ml) which is equivalent to the cubic centimetre (cm^3).

4.2 Delivery volume

Graduated pipettes shall be adjusted with water according to ISO 3696, grade 3, to deliver their specified volume (Ex). The delivery should be under gravity and unrestricted. For details, see 7.5.

4.3 Reference temperature

The standard reference temperature, i.e. the temperature at which the pipette is intended to deliver its volume, shall be 20 °C.

When the pipette is required for use in a country which has adopted a standard reference temperature of 27 °C (the alternative recommended in ISO 384 for tropical use), this figure shall be substituted for 20 °C.

5 Types and classes of accuracy

5.1 Classes of accuracy

Two classes of accuracy are specified:

— Classes A and AS for the higher grade;

— Class B for the lower grade.

The maximum permissible errors for both classes are specified in Table 1.

The pipettes shall be adjusted as follows:

— Class A: without waiting time;

— Class AS: with a specified waiting time of 5 s (see 7.6);

— Class B: without waiting time.

5.2 Types of pipettes

5.2.1 Type 1: Partial delivery

Graduated pipettes adjusted for delivery of a liquid from zero line at the top to any graduation line; nominal capacity shall be represented by the lowest graduation line.

5.2.2 Type 2: Total delivery

Graduated pipettes adjusted for delivery of a liquid from any graduation line down to the jet; nominal capacity shall be represented by the highest graduation line.

5.2.3 Type 3: Total delivery

Graduated pipettes adjusted for delivery of a liquid from zero line at the top to any graduation line; nominal capacity shall be obtained by delivery down to the jet.

5.2.4 Type 4: Blow-out

Graduated pipettes for total delivery (see Type 3) where the last drop of liquid in the jet is expelled by blowing. Blow-out pipettes shall be adjusted to accuracy Class B.

6 Maximum permissible errors

Maximum permissible errors in the delivered volume shall not exceed the limits specified in Table 1. These limits represent the maximum permitted error at any point and also the maximum permissible difference between the errors at any two points.

Table 1 — Capacities, subdivisions and maximum permissible errors

Nominal capacity	Smallest scale division	Maximum permissible error	
		Classes A and AS	Class B
ml	ml	± ml	± ml
0,1	0,01	0,006	0,01
0,2	0,01	0,006	0,01
0,5	0,01	0,006	0,01
1	0,01	0,007	0,01
1	0,10	0,007	0,01
2	0,02	0,010	0,02
2	0,10	0,010	0,02
5	0,05	0,030	0,05
5	0,10	0,030	0,05
10	0,1	0,05	0,1
20	0,1	0,1	0,2
25 [a]	0,1	0,1	0,2
25	0,2	0,1	0,2

[a] Length 450 mm, see Table 2.

If graduated pipettes are required of capacities and/or subdivisions other than those listed in Table 1, they shall conform to the essential requirements of this International Standard.

The relationships between maximum permissible error and capacity, as well as between maximum permissible error and meniscus diameter as given in ISO 384:1978, Annex A and Annex B, shall be observed.