

ISO 4787:2021-11 (E)

Laboratory glass and plastic ware - Volumetric instruments - Methods for testing of capacity and for use

Contents		Page
Foreword		v
Introduction		vi
1	Scope	1
2	Normative references	1
3	Terms and definitions	2
4	Principle	2
5	Volume and reference temperature	2
5.1	Unit of volume	2
5.2	Reference temperature	2
6	Apparatus and calibration liquid	2
6.1	Balance	2
6.2	Measurement devices	2
6.3	Calibration liquid	3
6.4	Receiving vessel	3
7	Factors affecting the accuracy of volumetric instruments	3
7.1	General	3
7.2	Temperature	3
7.2.1	Temperature of the volumetric instrument	3
7.2.2	Temperature of calibration liquid	3
7.3	Cleanliness of surface	4
7.4	Conditions of used volumetric instruments	4
7.5	Delivery time and waiting time	4
8	Setting the meniscus	5
8.1	General	5
8.2	Setting the meniscus	5
8.2.1	Meniscus of transparent liquids	5
8.2.2	Meniscus of opaque liquids	7
9	Calibration procedure	7
9.1	General	7
9.2	Test room	7
9.3	Filling and delivery	7
9.3.1	Volumetric flasks and measuring cylinders	7
9.3.2	Pipettes adjusted to deliver	7
9.3.3	Pipettes adjusted to contain	8
9.3.4	Burettes adjusted to deliver	8
9.3.5	Pycnometers	9
9.4	Weighing	9
9.5	Volume and uncertainty calculation	9
10	Procedure for use	10
10.1	General	10

10.2	Volumetric flasks (in accordance with ISO 1042 or ISO 5215)	11
10.3	Measuring cylinders (in accordance with ISO 4788 or ISO 6706)	11
10.4	Burettes (in accordance with ISO 385)	11
10.5	Pipettes	12
10.5.1	Pipettes adjusted to deliver (see ISO 648 and ISO 835, or other pipettes, e.g. plastic ones)	12
10.5.2	Pipettes adjusted to contain	12
10.6	Pycnometers	12
Annex A (informative) Cleaning of volumetric glassware		13
Annex B (informative) Cleaning of volumetric plasticware		14
Annex C (normative) Calculation formulae and tables		15
Annex D (informative) Coefficient of cubic thermal expansion		19
Annex E (informative) Uncertainty estimation and repeatability calculation		20
Bibliography		21