
**Piston-operated volumetric
apparatus —**

**Part 7:
Alternative measurement procedures
for the determination of volume**

Appareils volumétriques à piston —

*Partie 7: Modes opératoires de mesure alternatifs pour la
détermination de volumes*

iteh Standards
(<https://standards.iteh.ai>)
Document Preview

[ISO 8655-7:2022](https://standards.iteh.ai/catalog/standards/iso/617fa4f0-096e-420c-8547-e97e5f7bf66d/iso-8655-7-2022)

<https://standards.iteh.ai/catalog/standards/iso/617fa4f0-096e-420c-8547-e97e5f7bf66d/iso-8655-7-2022>



iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

ISO 8655-7:2022

<https://standards.iteh.ai/catalog/standards/iso/617fa4f0-096e-420c-8547-e97e5f7bf66d/iso-8655-7-2022>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2022

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

	Page
Foreword	v
Introduction	vii
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 General requirements	2
4.1 Metrological confirmation.....	2
4.2 Uncertainty of measurement.....	2
4.3 Operator qualification.....	2
5 Performance requirements	3
5.1 Performance tolerances.....	3
5.2 Operator impact.....	3
6 Test conditions	3
6.1 General.....	3
6.2 Test equipment.....	3
6.3 Test room, environmental conditions.....	3
6.4 Test volumes.....	4
6.4.1 Fixed volume POVA.....	4
6.4.2 Adjustable volume POVA.....	4
6.5 Number of measurements per test volume.....	4
6.6 Test liquids.....	5
7 Evaluation	5
7.1 Mean volume.....	5
7.2 Systematic error of measurement.....	5
7.3 Random error of measurement.....	6
8 Test methods	6
8.1 General.....	6
8.2 Gravimetric method.....	7
8.3 Dual-dye ratiometric photometric method.....	7
8.4 Single dye photometric method.....	8
8.5 Hybrid photometric/gravimetric method for multichannel POVA.....	8
8.6 Titration method.....	8
8.7 Batch testing.....	8
9 Dispense procedures	8
9.1 General.....	8
9.2 Preparation.....	9
9.3 Single-channel air displacement pipettes (in accordance with ISO 8655-2).....	9
9.3.1 General.....	9
9.3.2 Test cycle.....	9
9.4 Multi-channel pipettes (in accordance with ISO 8655-2).....	10
9.5 Positive displacement pipettes (in accordance with ISO 8655-2).....	11
9.6 Burettes (in accordance with ISO 8655-3).....	11
9.7 Dilutors (in accordance with ISO 8655-4).....	12
9.7.1 General.....	12
9.7.2 Test cycle.....	12
9.8 Dispensers (in accordance with ISO 8655-5).....	13
9.9 Syringes (in accordance with ISO 8655-9).....	13
9.9.1 General.....	13
9.9.2 Test cycle.....	13
10 Reporting of results	14

Annex A (normative) Gravimetric procedure	16
Annex B (normative) Dual-dye ratiometric photometric procedure	21
Annex C (normative) Single dye photometric procedure	29
Annex D (normative) Photometric/gravimetric hybrid procedure	33
Annex E (normative) Titrimetric procedure	41
Annex F (normative) Conversion of liquid mass to volume	45
Bibliography	48

iTeh Standards
(<https://standards.itih.ai>)
Document Preview

[ISO 8655-7:2022](https://standards.itih.ai/catalog/standards/iso/617fa4f0-096e-420c-8547-e97e5f7bf66d/iso-8655-7-2022)

<https://standards.itih.ai/catalog/standards/iso/617fa4f0-096e-420c-8547-e97e5f7bf66d/iso-8655-7-2022>

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 48, *Laboratory equipment*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 332, *Laboratory equipment*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 8655-7:2005), which has been technically revised. It also incorporates the Technical Corrigendum ISO 8655-7:2005/Cor.1:2008.

The main changes are as follows:

- a gravimetric test method was added (see [8.2](#));
- a photometric/gravimetric hybrid test method was added (see [8.5](#));
- a batch testing method was added (see [8.7](#));
- measurement procedures for all methods are given in normative [Annexes A](#) to [E](#);
- standard dispense procedures for POVA described in ISO 8655-2, ISO 8655-3, ISO 8655-4, ISO 8655-5, and ISO 8655-9 were added (see [Clause 9](#));
- requirements for operator qualification have been added (see [4.3](#));
- requirements for testing of multi-channel POVA is described in more detail, with specific procedures given for these apparatus (see [8.5](#), and [Annex D](#));
- [Annexes A](#), [B](#), and [C](#) of the first edition have been deleted and replaced.

A list of all parts in the ISO 8655 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

This corrected version of ISO 8655-7:2022 incorporates the following corrections:

ISO 8655-7:2022(E)

- decimal spaces replaced with commas in Table B.5 and Table C.3;
- in Table D.5, the dash is replaced with “25” in the second column, the concentration unit was updated to “mg/ml” and the concentration values for “mg/ml” were updated;
- in D.3.2.3, the concentration unit for 16,7 was updated from “µg/ml” to “mg/ml”;
- in D.3.2.4, the nominal concentration for 384-well plates was updated to 29,3 µg/ml;
- in D.4.5.1 and D.4.5.2, the term “conversion factor” is replaced with “correction factor”;
- the key to [Formula \(A.2\)](#) has been corrected;
- the year of publication of ISO 23783-2:— has been updated to ISO 23783-2:2022.

iTeh Standards (<https://standards.iteh.ai>) Document Preview

[ISO 8655-7:2022](#)

<https://standards.iteh.ai/catalog/standards/iso/617fa4f0-096e-420c-8547-e97e5f7bf66d/iso-8655-7-2022>

Introduction

The ISO 8655 series addresses the needs of:

- manufacturers, as a basis for quality control including, where appropriate, the issuance of manufacturer's declarations;
- calibration laboratories, test houses, users of the equipment and other bodies as a basis for independent calibration, testing, verification, and routine tests.

The tests specified in the ISO 8655 series are intended to be carried out by trained personnel.

iTeh Standards (<https://standards.iteh.ai>) Document Preview

[ISO 8655-7:2022](https://standards.iteh.ai/catalog/standards/iso/617fa4f0-096e-420c-8547-e97e5f7bf66d/iso-8655-7-2022)

<https://standards.iteh.ai/catalog/standards/iso/617fa4f0-096e-420c-8547-e97e5f7bf66d/iso-8655-7-2022>