Australian Standard™

Verification and use of volumetric apparatus

Part 2: Guide to the use of piston-operated volumetric apparatus (POVA)

This Australian Standard was prepared by Committee CH/1, Laboratory Glassware and Related Apparatus. It was approved on behalf of the Council of Standards Australia on 27 March 1998 and published on 5 June 1998.

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Environment Protection Authority, N.S.W.

National Association of Testing Authorities, Australia

National Standards Commission

Royal Australian Chemical Institute

Royal College of Pathologists of Australasia

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PREFACE

This Standard was prepared by the Standards Australia Committee CH/1, Laboratory Glassware and Related Apparatus to supersede AS 4163—1994, *Glassware—Guide to the use of piston operated volumetric apparatus (POVA)*.

This Standard will be Part 2 of a series comprising:

AS 2162 Verification and use of Volumetric apparatus.
AS 2162.1 Part 1: General—Volumetric glassware.
AS 2162.2 Part 2: Guide to the use of piston-operated volumetric apparatus.

The objective of this Standard is to provide methods of testing and guidelines for the operation of piston-operated volume apparatus (POVA) to improve accuracy and repeatability in delivering measured volumes of liquids in analytical procedures. Changes in this edition include the addition of Clause 5.4.8 and Appendix A, minor modifications to Table 1, Clauses 4.5.3 and 5.4.7, and the addition of a new note to Clause 4.4.3(j).

ISO/DIS 8655-1/2/3/4, *Piston and/or plunger operated volumetric apparatus* is acknowledged as the source of many of the requirements and methods included in this Standard.

The term ‘informative’ has been used in this Standard to define the application of the appendix to which it applies. An ‘informative’ appendix is only for information and guidance.

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FOREWORD

Pipettes and burettes for dispensing precise volumes of liquids in chemical analyses are being rapidly replaced by piston-operated volume apparatus (POVA).

Most of these instruments are calibrated for specific modes of operation and any changes in the method of use may significantly affect the accuracy and repeatability of their delivery.

In many cases only microquantities of liquid are dispensed, so that traditional methods for the calibration and standardization of pipettes and burettes no longer apply.

In addition to the necessary information for use, such as operating conditions, maintenance and cleaning or sterilizing requirements, it is essential to know the performance tolerances of the instruments in terms of accuracy and repeatability before they can be used with confidence.

STANDARDS AUSTRALIA

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SECTION 1 SCOPE AND GENERAL

1.1 SCOPE This Standard provides guidelines for the design and construction of piston-operated volumetric apparatus (POVA) used in laboratories for dispensing precise volumes of liquid. Methods for the use, verification and calibration of these instruments are included. The following types are considered:

(a) Pipetters.

(b) Dispensers.

(c) Diluters.

(d) Displacement burettes.

NOTES:

1 The test requirements and the number of significant figures contained in the tables in this Standard relate to their use in the calibration procedures described in Section 4.

2 When laboratories use this Standard to verify POVA as described in Section 5 such attention to detail may not be as critical.

1.2 REFERENCED DOCUMENTS The following documents are referred to in this Standard:

AS
1680 Interior lighting

2831 Thermometers—Solid stem—Long and short—For precision use

ISO
653 Long solid-stem thermometers for precision use

655 Long enclosed-scale thermometers for precision use

1.3 DEFINITIONS For the purpose of this Standard, the definitions below apply.

1.3.1 Accuracy of measurement—the closeness of agreement between the true value and the mean result which would be obtained by applying the experimental procedure a very large number of times.

1.3.2 Adjustable POVA—where there is a facility for continuously adjusting the delivered volume.

NOTES:

1 Preset fixed-volume POVA having more than one volume setting are not covered by this definition.

2 The direction from which the delivery volume setting is approached (i.e. from a higher or a lower setting) may affect the volume delivered. The manufacturer's instructions should be followed, where they are given. In the absence of any specific instructions, the user should always approach the volume setting from the same direction.