

Australian Standard[®]

Density bottles

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 14 December 1995 and published on 5 March 1996.

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AS 2378—1996

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Density bottles

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PREFACE

This Standard was prepared by the Standards Australia Committee CH/1 for Laboratory Glassware and Related Apparatus as a revision of AS 2378—1980.

The objective of this Standard is to provide specifications for a range of Gay-Lussac type density bottles, and procedures covering their use.

This Standard is substantially the same as the 1980 edition, but omits the 100 mL flask and changes the tolerances on the capacity of the range of flasks.

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

The density of a liquid at a given temperature is a characteristic physical constant which is often included in standard specifications. The two methods most commonly used for determining the density of a liquid, are by means of a hydrometer or a density bottle. Density hydrometers and their use are dealt with in AS 2026. The type of bottle specified in this Standard is not suitable for determining the densities of liquids with relatively high viscosities, because of the small capillary bore of the stopper. For more viscous liquids, density bottles of the Hubbard type are usually used. For determination of density at temperatures below room temperature, the Reischauer type of density bottle is recommended.

For work of high precision, and especially for the determination of the density of volatile liquids, the use of a loosely fitting cap is desirable to reduce evaporation. Such a cap is easily made from a test tube of suitable size and it has therefore not been considered necessary to include a specification for it in this Standard.

Appendices A, B and C describe respectively, alternative methods for determining the capacity of a density bottle, standard methods of calculating density from the measurements obtained using a density bottle, and the calculations required for the measurement of liquid in bulk.

STANDARDS AUSTRALIA

Australian Standard**Density bottles**

1 SCOPE This Standard specifies requirements for a series of density bottles suitable for the determination of the density of a liquid with an uncertainty of not greater than 1 part in 10 000.

NOTES:

- 1 The accuracy obtainable depends on the size of the density bottle, the maintenance of constant temperature and the skill of the operator.
- 2 Recommended methods for the determination of the capacity of density bottles are described in Appendix A.
- 3 Appendix B provides a simple method of computing the density of a liquid using measurements obtained with a density bottle.
- 4 Appendix C shows the calculations required for the measurement of liquid in bulk.

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

AS

2162 Code of practice for the use of volumetric glassware

BS

1797 Tables for use in the calibration of volumetric glassware

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

3.1 Accuracy—a qualitative term describing the degree of closeness with which the indications of an instrument approach the true values of the measurand.

3.2 Capacity—the volume of water at 20°C, expressed in millilitres, required to fill the bottle at 20°C, the stopper being inserted in the neck and the bottle filled to the top of the capillary bore.

3.3 Uncertainty of a measurement—that part of the expression of the corrected result of a measurement which defines the range of values within which the true value or, if appropriate, the accepted true value is estimated to lie.

NOTE: In Australia the uncertainty statement is normally based on a 95% level of confidence.

4 NOMINAL CAPACITIES AND TOLERANCES ON CAPACITIES

4.1 Nominal capacities Three sizes of density bottle are specified, of nominal capacities 10 mL, 25 mL and 50 mL.

4.2 Tolerances on capacities The tolerances on capacities shall be as shown in Table 1.

5 MATERIAL The bottles shall be made of good quality clear glass. They shall be of sound workmanship and shall be well annealed. The stopper and the bottle shall have similar thermal properties.