

Method for

Determination of absolute density at 20 °C of liquid chemical products for industrial use

[ISO title: Liquid chemical products for industrial use —
Determination of density at 20 °C]

UDC 531.756.1:542.3

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Chemicals Standards Committee (CIC/-) to Technical Committee CIC/54, upon which the following bodies were represented:

Chemical Industries Association

Ministry of Defence

Coopted members

This British Standard, having been prepared under the direction of the Chemicals Standards Committee, was published under the authority of the Board of BSI and comes into effect on 30 December 1988

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First published January 1970
First revision December 1988

The following BSI references relate to the work on this standard:
Committee reference CIC/54
Draft (ref. 87/56117) announced in *BSI News* February 1988

ISBN 0 580 16930 8

Amendments issued since publication

Amd. No.	Date of issue	Comments

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National foreword

This British Standard has been prepared under the direction of the Chemicals Standards Committee. It is identical with ISO 758:1976 *“Liquid chemical products for industrial use — Determination of density at 20 °C”*, prepared by Technical Committee ISO/TC 47, Chemistry, of the International Organization for Standardization (ISO).

The principal difference between this standard and the 1970 edition is that the text is more complete and has been brought up to date.

Terminology and conventions. The text of the International Standard has been approved as suitable for publication as a British Standard without deviation. Some terminology and certain conventions are not identical with those used in British Standards; attention is drawn especially to the following.

The comma has been used as a decimal marker. In British Standards it is current practice to use a full point on the baseline as the decimal marker.

The symbol “ml” has been used for millilitre. In British Standards it is current practice to use the symbol “mL”.

Wherever the words “International Standard” appear, referring to this standard, they should be read as “British Standard”.

Cross-reference

International Standard	Corresponding British Standard
ISO 3507:1976	BS 733 <i>Pyknometers</i> Part 1:1983 <i>Specification</i> (Identical)

Additional information. With reference to clause 6, water complying with grade 3 of BS 3978 *“Specification for water for laboratory use”* is suitable.

Attention is drawn to the related British Standard BS 4699:1985 *“Methods for determination of density or relative density of petroleum and petroleum products (pyknometer methods)”*, which is identical with ISO 3838:1983 *“Crude petroleum and liquid or solid petroleum products — Determination of density or relative density — Capillary-stoppered pyknometer and graduated bicapillary pyknometer methods”*. BS 4699 provides for the determination of density at various temperatures and for more precise values; precision data are included.

NOTE *Textual error.* In the footnote to clause 7, “atmospheric” should be read as “atmospheric”.

This standard describes a method of test only and should not be used or quoted as a specification defining limits of purity. Reference to this standard should indicate that the method of test used is in accordance with BS 4522:1988.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 and 2, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope and field of application

This International Standard specifies a reference method for the determination of the density, at 20 °C, of liquid chemical products for industrial use.

2 Reference

ISO 3507, *Pyknometers*.

3 Definition

density at 20 °C of a material

the mass of unit volume of the material at 20 °C. It is expressed in grams per millilitre

4 Principle

Determination of the mass at 20 °C of a volume of the material contained in a pyknometer flask, and determination of the volume of the latter by determining the mass of a corresponding volume of water at 20 °C. Calculation of the density by dividing the mass of the material by the capacity of the flask.

5 Apparatus

Ordinary laboratory apparatus, and

5.1 Pyknometer flask, type 3 (Gay-Lussac) (see ISO 3507), made of glass and of a size and type suitable for use with the material under test, preferably 25 or 50 ml (see the Figure).

5.2 Water bath, capable of being controlled at $20 \pm 0,1$ °C.

6 Procedure

6.1 Clean and dry the flask (**5.1**) and weigh it, with its stopper, to the nearest 0,001 g. Fill the flask with freshly boiled and cooled distilled water, and determine the apparent mass of the contents, previously brought to $20 \pm 0,1$ °C in the water bath (**5.2**).

6.2 Empty, clean and dry the flask, fill it with the sample under test, and determine in a similar manner the apparent mass of sample contained in the flask at 20 °C.

NOTE With volatile liquids, it is essential that suitable precautions be taken to avoid loss by evaporation.

7 Expression of results

The density of the sample at 20 °C, in grams per millilitre, is given by the formula

$$\frac{m_1 + A}{m_2 + A} \times \rho$$

where

m_1 is the apparent mass, in grams, of sample required to fill the flask at 20 °C;

m_2 is the apparent mass, in grams, of water required to fill the flask at 20 °C;

ρ is the density of water at 20 °C = 0,998 2 g/ml;

A is the buoyancy correction = $\rho_a \times m_2$,

where ρ_a is the density of air $\approx 0,001 2$ g/ml.¹⁾

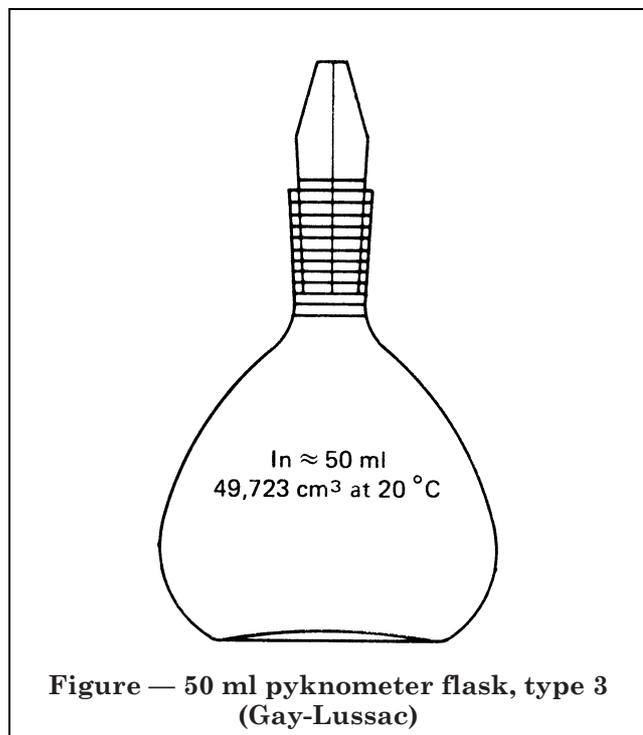
Calculate the result to three decimal places.

8 Test report

The test report shall include the following particulars:

- the reference of the method used;
- the results and the method of expression used;
- any unusual features noted during the determination;
- any operation not included in this International Standard or in the International Standard to which reference is made, or regarded as optional.

¹⁾ This Figure varies slightly with atmospheric conditions, but normal variations will have a negligible effect on density determinations.



**Figure — 50 ml pyknometer flask, type 3
(Gay-Lussac)**

Publications referred to

See national foreword.

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