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# INTERNATIONAL STANDARD



# 758

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## Liquid chemical products for industrial use — Determination of density at 20 °C

*Produits chimiques liquides à usage industriel — Détermination de la masse volumique à 20 °C*

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**Descriptors :** chemical compounds, liquids, physical tests, density (mass/volume), measurement, pycnometric analysis.

## FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

Prior to 1972, the results of the work of the technical committees were published as ISO Recommendations; these documents are in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 47, *Chemistry*, has reviewed ISO Recommendation R 758-1968 and found it technically suitable for transformation. International Standard ISO 758 therefore replaces ISO Recommendation R 758-1968, to which it is technically identical.

ISO Recommendation R 758 has been approved by the member bodies of the following countries :

|                     |                |                |
|---------------------|----------------|----------------|
| Australia           | Germany        | Poland         |
| Austria             | Hungary        | Portugal       |
| Belgium             | India          | Romania        |
| Chile               | Israel         | Spain          |
| Colombia            | Italy          | United Kingdom |
| Czechoslovakia      | Japan          | U.S.S.R.       |
| Egypt, Arab Rep. of | Korea, Rep. of | Yugoslavia     |
| France              | Netherlands    |                |

The member body of the following country had expressed disapproval of the Recommendation on technical grounds :

U.S.A.

The member body of the following country disapproved the transformation of the Recommendation into an International Standard :

Netherlands

# Liquid chemical products for industrial use – Determination of density at 20 °C

## 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;

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

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

where  $\rho_a$  is the density of air  $\approx 0,001 2$  g/ml.\*

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.

\* This figure varies slightly with atmospheric conditions, but normal variations will have a negligible effect on density determinations.