

Plastics — Liquid resins — Determination of density by the pycnometer method

The European Standard EN ISO 1675:1998 has the status of a
British Standard

ICS 83.080.10

National foreword

This British Standard is the English language version of EN ISO 1675:1998. It is identical with ISO 1675:1985. It supersedes BS 2782-6:Method 620E:1980 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PRI/21, Testing of plastics, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

Attention is drawn to the fact that CEN and CENELEC Standards normally include an annex which lists normative references to international publications with their corresponding European publications. The British Standards which implement these international or European publications may be found in the BSI Standards Catalogue under the section entitled "International Standards Correspondence Index", or by using the "Find" facility of the BSI Standards Electronic Catalogue.

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, the EN ISO title page, page 2, the ISO title page, page ii, pages 1 and 2 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.

Amendments issued since publication

Amd. No.	Date	Comments

This British Standard, having been prepared under the direction of the Sector Committee for Materials and Chemicals, was published under the authority of the Standards Committee and comes into effect on 15 December 1998

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ICS 83.080.01

Descriptors: See ISO document

English version

Plastics — Liquid resins — Determination of density by the pycnometer method

(ISO 1675:1985)

Plastiques — Résines liquides —
Détermination de la masse volumique par la
méthode du pycnomètre
(ISO 1675:1985)

Kunststoffe — Flüssige Harze — Bestimmung
der Dichte nach dem Pycnometer-Verfahren
(ISO 1675:1985)

This European Standard was approved by CEN on 12 June 1998.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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Foreword

The text of the International Standard from Technical Committee ISO/TC 61 "*Plastics*" of the International Organization for Standardization (ISO) has been taken over as an European Standard by Technical Committee CEN/TC 249 "*Plastics*", the secretariat of which is held by IBN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 1999, and conflicting national standards shall be withdrawn at the latest by January 1999.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 1675:1985 has been approved by CEN as a European Standard without any modification.

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International Standard



1675

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Plastics — Liquid resins — Determination of density by the pycnometer method

Plastiques — Résines liquides — Détermination de la masse volumique par la méthode du pycnomètre

Second edition — 1985-08-15

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.

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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 1675 was prepared by Technical Committee ISO/TC 61, *Plastics*.

ISO 1675 was first published in 1975. This second edition cancels and replaces the first edition, of which it constitutes a technical revision.

Descriptors: Plastics, liquid resins, tests, determination, density (mass/volume), pycnometric analysis, pycnometers.

1 Scope and field of application

This International Standard specifies a method for the determination of the density of liquid resins using a pycnometer.

2 Definition

density; mass density

mass divided by volume (Definition taken from ISO 31/3.)

it may be expressed in grams per millilitre (g/ml)¹⁾

3 Principle

Determination of the mass at 23 °C of resin contained in a pycnometer of known volume.

NOTE This method is easily applicable to low and medium viscosity resins. Difficulties in the procedure exist for high viscosity resins.

4 Apparatus

4.1 Pycnometer, consisting of a precision graduated flask. The height of the neck above the graduation mark shall not exceed 50 mm.

The graduated volume of the pycnometer at 23 ± 0,1 °C, measured by weighing the mass of distilled water contained in the pycnometer at this temperature, shall be known to within 1 part in 10 000 (see note to clause 6).

The pycnometers normally used have the characteristics given in the following table.

Volume of flask, <i>V</i>	Internal diameter of neck, <i>d</i>
ml	mm
100 ± 0,1	13 ± 1
50 ± 0,05	11 ± 1

4.2 Funnel, whose stem, the internal diameter of which shall be as large as possible, penetrates into the pycnometer exactly down to the level of the graduation mark.

4.3 Balance, accurate to 0,2 mg.

4.4 Water-bath, capable of being maintained at 23 ± 0,1 °C.

4.5 Fine filter paper

4.6 Transparent conical flask, with wide neck (for example Erlenmeyer), stoppered, of capacity 200 to 600 ml.

5 Procedure

5.1 Preparation of resin

Place at least 150 g of resin in the conical flask (4.6) and inspect the contents of the flask for bubbles. If any bubbles are observed, allow the stoppered flask to stand long enough for all the bubbles to dissipate before or while bringing the flask and its contents to 23 ± 0,1 °C by immersion in the water bath (4.4).

NOTE To accelerate the release of bubbles, especially any adjacent to the walls of the flask, disturb or detach them using a fine wire inserted through the neck of the flask.

5.2 Measurement of density

Weigh the empty pycnometer (4.1) to the nearest 0,2 mg.

Place the pycnometer in the water-bath (4.4) and fill the pycnometer with resin using the funnel (4.2).

The following points require close attention:

- bubbles shall not be present in the resin in the pycnometer; if bubbles form, wait for them to disappear, if necessary rubbing the walls of the pycnometer with a fine metal wire, or, better still, empty the pycnometer, clean it and refill;
- fill the pycnometer exactly to the graduation mark;
- remove the funnel without letting its stem touch the neck of the pycnometer.

Wait at least 30 min and check that the level in the pycnometer remains at the graduation mark. If necessary, add a few more drops of resin or remove excess resin by means of fine filter paper (4.5), which may be wound around a glass rod.

Weigh the filled pycnometer to the nearest 0,2 mg.

¹⁾ 1 g/ml = 1 000 kg/m³

6 Expression of results

The density at 23 °C, ρ_{23} , expressed in grams per millilitre, is given by the equation

$$\rho_{23} = \frac{m_1 - m_0}{V} + \rho_a$$

where

m_1 is the apparent mass, in grams, of the filled pyknometer at 23 °C;

m_0 is the apparent mass, in grams, of the empty pyknometer at 23 °C;

ρ_a is the density of air at 23 °C $\approx 0,001\ 2$ g/ml (air buoyancy correction);

V is the volume, in millilitres, of the pyknometer at 23 °C.

Give the result to three places of decimals.

NOTE To check or determine the volume of the pyknometer at 23 °C using distilled water, use the equation

$$V = \frac{m_2 - m_0}{\rho_e - \rho_a} = \frac{m_2 - m_0}{0,996\ 4}$$

where

m_2 is the apparent mass, in grams, of the pyknometer filled with distilled water at 23 °C;

ρ_e is the density of distilled water at 23 °C
= 0,997 6 g/ml.

7 Test report

The test report shall contain the following information:

- a) a reference to this International Standard;
- b) complete identification of the material tested;
- c) the density at 23 °C, ρ_{23} , expressed in grams per millilitre;
- d) details of procedure not specified in this International Standard and any incidents likely to have influenced the results.

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