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**Paints and varnishes —  
Determination of density —**

**Part 1:  
Pycnometer method**

*Peintures et vernis — Détermination de la masse volumique —  
Partie 1: Méthode pycnométrique*



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## 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

This third edition cancels and replaces the second edition (ISO 2811-1:2011), which has been technically revised with the following changes:

- a) the information on the accuracy of the analytical balance (6.2) and the thermometer (6.3) was changed;
- b) a requirement was added that the sample shall be free from air bubbles;
- c) the spelling of pycnometer was corrected.

ISO 2811 consists of the following parts, under the general title *Paints and varnishes — Determination of density*:

- *Part 1: Pycnometer method*
- *Part 2: Immersed body (plummet) method*
- *Part 3: Oscillation method*
- *Part 4: Pressure cup method*

# Paints and varnishes — Determination of density —

## Part 1: Pycnometer method

### 1 Scope

This part of ISO 2811 specifies a method for determining the density of paints, varnishes and related products using a metal or Gay-Lussac pycnometer.

The method is limited to materials of low or medium viscosity at the temperature of test. The Hubbard pycnometer (see ISO 3507) can be used for highly viscous materials.

### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1513, *Paints and varnishes — Examination and preparation of test samples*

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

ISO 15528, *Paints, varnishes and raw materials for paints and varnishes — Sampling*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

#### 3.1 density

$\rho$

mass divided by the volume of a portion of a material

Note 1 to entry: It is expressed in grams per cubic centimetre.

### 4 Principle

A pycnometer is filled with the product under test. The density is calculated from the mass of the product in the pycnometer and the known volume of the pycnometer.

### 5 Temperature

The effect of temperature on density is highly significant with respect to filling properties, and varies with the type of product.

For international reference purposes, it is essential to standardize one test temperature, and  $(23,0 \pm 0,5) ^\circ\text{C}$  is specified in this part of ISO 2811. It can be more convenient, however, to carry out comparative testing at some other agreed temperature, for example  $(20,0 \pm 0,5) ^\circ\text{C}$ , as specified by relevant weights and measures legislation (see [B.2](#)).