



**SLOVENSKI STANDARD**  
**oSIST prEN ISO 1183-1:2024**  
**01-april-2024**

---

**Polimerni materiali - Metode za določanje gostote nepenjenih polimernih materialov - 1. del: Metoda s potapljanjem, metoda s tekočinskim piknometrom in titracijska metoda (ISO/DIS 1183-1:2024)**

Plastics - Methods for determining the density of non-cellular plastics - Part 1: Immersion method, liquid pycnometer method and titration method (ISO/DIS 1183-1:2024)

Kunststoffe - Verfahren zur Bestimmung der Dichte von nicht verschäumten Kunststoffen - Teil 1: Eintauchverfahren, Verfahren mit Flüssigkeitspycnometer und Titrationsverfahren (ISO/DIS 1183-1:2024)

Plastiques - Méthodes de détermination de la masse volumique des plastiques non alvéolaires - Partie 1: Méthode par immersion, méthode du pycnomètre en milieu liquide et méthode par titrage (ISO/DIS 1183-1:2024)

<https://standards.iteh.ai/catalog/standards/sist/2bfe7bb5-da6e-4df0-b9a1-a94f0715c9ec/osist-pren-iso-1183-1-2024>

**Ta slovenski standard je istoveten z: prEN ISO 1183-1**

---

**ICS:**

83.080.01	Polimerni materiali na splošno	Plastics in general
-----------	--------------------------------	---------------------

<b>oSIST prEN ISO 1183-1:2024</b>	<b>en,fr,de</b>
-----------------------------------	-----------------



# DRAFT INTERNATIONAL STANDARD

## ISO/DIS 1183-1

ISO/TC 61/SC 5

Secretariat: DIN

Voting begins on:  
2024-01-30Voting terminates on:  
2024-04-23

---

---

## Plastics — Methods for determining the density of non-cellular plastics —

Part 1:

### Immersion method, liquid pycnometer method and titration method

*Plastiques — Méthodes de détermination de la masse volumique des plastiques non alvéolaires —  
Partie 1: Méthode par immersion, méthode du pycnomètre en milieu liquide et méthode par titrage*

ICS: 83.080.01

iTeh Standards  
(<https://standards.iteh.ai>)  
Document Preview

[oSIST prEN ISO 1183-1:2024](https://standards.iteh.ai/catalog/standards/sist/2bfe7bb5-da6e-4df0-b9a1-a94f0715c9ec/osist-pren-iso-1183-1-2024)<https://standards.iteh.ai/catalog/standards/sist/2bfe7bb5-da6e-4df0-b9a1-a94f0715c9ec/osist-pren-iso-1183-1-2024>

This document is circulated as received from the committee secretariat.

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

**ISO/CEN PARALLEL PROCESSING**



Reference number  
ISO/DIS 1183-1:2024(E)

© ISO 2024

iTeh Standards  
(<https://standards.iteh.ai>)  
Document Preview

[oSIST prEN ISO 1183-1:2024](https://standards.iteh.ai/catalog/standards/sist/2bfe7bb5-da6e-4df0-b9a1-a94f0715c9ec/osist-pren-iso-1183-1-2024)

<https://standards.iteh.ai/catalog/standards/sist/2bfe7bb5-da6e-4df0-b9a1-a94f0715c9ec/osist-pren-iso-1183-1-2024>



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2024

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

	Page
Foreword.....	iv
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Conditioning and test atmosphere</b> .....	<b>2</b>
<b>5 Methods</b> .....	<b>3</b>
5.1 Method A — Immersion method.....	3
5.1.1 Apparatus.....	3
5.1.2 Immersion liquid.....	4
5.1.3 Specimens.....	4
5.1.4 Procedure.....	4
5.2 Method B — Liquid pycnometer method.....	7
5.2.1 Apparatus.....	7
5.2.2 Immersion liquid.....	7
5.2.3 Specimens.....	7
5.2.4 Procedure.....	7
5.3 Method C — Titration method.....	8
5.3.1 Apparatus.....	8
5.3.2 Immersion liquids.....	8
5.3.3 Specimens.....	8
5.3.4 Procedure.....	9
<b>6 Test report</b> .....	<b>9</b>
<b>Annex A (informative) Liquid systems suitable for use in Method C</b> .....	<b>11</b>
<b>Annex B (normative) Determination of air density</b> .....	<b>12</b>
<b>Annex C (informative) Determination of specimen volume</b> .....	<b>14</b>
<b>Annex D (informative) Derivation of Formulae</b> .....	<b>16</b>
<b>Annex E (informative) Precision statement</b> .....	<b>18</b>
<b>Bibliography</b> .....	<b>20</b>

## ISO/DIS 1183-1:2023(E)

### 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)).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at [www.iso.org/patents](http://www.iso.org/patents). ISO shall not be held responsible for identifying any or all such patent rights.

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

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 5, *Physical-chemical properties*.

This fourth edition cancels and replaces the third edition (ISO 1183-1:2019), which has been technically revised. The main changes compared to the previous edition are as follows:

- In [Clause 4](#), the temperature specifications of the immersion liquid and air have been added.
- In [Clause 5.1](#), an alternate version of the immersion method has been introduced which does not need a wire to suspend the specimen.
- In [5.1](#), the technical requirements for the pycnometer, the thermometer and the immersion liquids have been revised.
- In [5.1](#), the (classic) procedure using a wire to suspend the specimen has been clarified.
- In [5.1.4](#), the Formulae for the calculation of the density have been revised to include the buoyancy in air.
- [Clause 6](#) has been deleted, the buoyancy correction has been moved to [5.1.4.4](#) and the calculation of the density of air has been moved to [Annex B](#).
- [Annex B](#) (changed from informative to normative) has been shortened to cover the calculation of air only. The method of correction for buoyancy of air has been revised and is now included in [formulae \(3\) and \(4\) in 5.1.4.4](#).
- [Annex C](#) (informative) has been added to present formulae for the determination of the volume of specimens measured by the immersion method.
- [Annex D](#) (informative) has been added to explain the updated formulae in [5.1](#) and [Annex C](#).

— Precision data has been added in [Annex E](#) (informative).

A list of all parts in the ISO 1183 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

**iTeh Standards**  
**(<https://standards.itih.ai>)**  
**Document Preview**

[oSIST prEN ISO 1183-1:2024](#)

<https://standards.itih.ai/catalog/standards/sist/2bfe7bb5-da6e-4df0-b9a1-a94f0715c9ec/osist-pren-iso-1183-1-2024>





# Plastics — Methods for determining the density of non-cellular plastics —

## Part 1:

# Immersion method, liquid pycnometer method and titration method

## 1 Scope

This document specifies three methods for the determination of the density of non-cellular plastics in the form of void-free moulded or extruded objects, as well as powders, flakes and granules.

- Method A: Immersion method, for solid plastics (except for powders) in void-free form.
- Method B: Liquid pycnometer method, for particles, powders, flakes, granules or small pieces of finished parts.
- Method C: Titration method, for plastics in any void-free form.

**NOTE** Density is frequently used to follow variations in physical structure or composition of plastic materials. Density can also be useful in assessing the uniformity of samples or specimens. Often, the density of plastic materials depend upon the choice of specimen preparation method. When this is the case, precise details of the specimen preparation method are intended to be included in the appropriate material specification. This note is applicable to all three methods.

**WARNING** — The use of this document might involve hazardous materials, operations or equipment. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user of this document to establish appropriate health and safety practices.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 291, *Plastics — Standard atmospheres for conditioning and testing*

ISO 472, *Plastics — Vocabulary*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 472 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

## ISO/DIS 1183-1:2023(E)

### 3.1

#### mass

$m$

quantity of matter contained in a body

Note 1 to entry: It is expressed in kilograms (kg) or grams (g).

### 3.2

#### apparent mass

$m_x$

mass of a body obtained by measuring its weight in a medium X using an appropriately calibrated balance

Note 1 to entry: It is expressed in kilograms (kg) or grams (g).

### 3.3

#### density

$\rho$

ratio of the mass  $m$  of a sample to its volume  $V$  (at the test temperature  $T$ ), expressed in kg/m<sup>3</sup>, kg/dm<sup>3</sup> (g/cm<sup>3</sup>) or kg/l (g/ml)

Note 1 to entry: The following terms, based upon ISO 80000-4,<sup>[1]</sup> are given in [Table 1](#) for clarification.

**Table 1 — Density terms**

Term	Symbol	Formulation	Units
Density	$\rho$	$m/V$	kg/m <sup>3</sup>
			kg/dm <sup>3</sup> (g/cm <sup>3</sup> )
Specific volume	$v$	$V/m (= 1/\rho)$	kg/l (g/ml)
			m <sup>3</sup> /kg
			dm <sup>3</sup> /kg (cm <sup>3</sup> /g)
			l/kg (ml/g)

## 4 Conditioning and test atmosphere

The test atmosphere shall be in accordance with ISO 291, class 2.

The temperature of the immersion liquid shall also comply with the temperature requirements of ISO 291, class 2.

For the immersion method and only if the density of the immersion liquid is taken for the actual temperature of the immersion liquid (see [5.1.4.1](#)), the air temperature may be within 18 to 28 °C instead of the stricter requirements from ISO 291. If the buoyancy in air is neglected or the density of air is taken as the approximate value (see [5.1.4.4](#)), controlling of the air humidity is usually not required.

In general, conditioning specimens to constant temperature is not required, because the determination itself brings the specimen to the constant temperature of the test.

Specimens which change in density during the test to such an extent that the change is greater than the required accuracy shall be conditioned prior to measurement in accordance with the applicable material specification. When changes in density with time or atmospheric conditions are the primary purpose of the measurements, the specimens shall be conditioned as described in the material specification and, if no material specification exists, then as agreed upon by the interested parties.