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

Part 3:
Gas pycnometer method

*Plastiques — Méthodes pour déterminer la masse volumique des
plastiques non alvéolaires —*

Partie 3: Méthode utilisant un pycnomètre à gaz

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International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet iso@iso.ch

Printed in Switzerland

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 1183-3 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 5, *Physical-chemical properties*. Together with the other parts (see below), it cancels and replaces ISO 1183:1987, which has been technically revised.

ISO 1183 consists of the following parts under the general title, *Plastics — Methods for determining the density of non-cellular plastics*:

- *Part 1: Immersion method, pycnometer method and titration method*
- *Part 2: Density gradient column method*
- *Part 3: Gas pycnometer method*

Annex A of this part of ISO 1183 is for information only.

Introduction

This part of ISO 1183 is one of a series dealing with methods of measuring the density of solid non-cellular plastics. The values obtained using this part of ISO 1183 are expected to be comparable to those obtained using the other parts.

Density measurements may be used to investigate variations in the physical structure or the molecular order of materials. Such measurements are widely used to determine the degree of crystallinity of polymers. In addition, they may be used to determine the amount of filler present.

The density of a plastic material may depend on any conditioning or thermal treatment which the material has undergone.

The physical structure of a polymer can change with time and temperature. Its volume is also a temperature-dependent property. This means that the density may vary with time and/or temperature.

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Part 3: Gas pycnometer method

WARNING — The use of this part of ISO 1183 may involve hazardous materials, operations or equipment. This part of ISO 1183 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 part of ISO 1183 to establish appropriate health and safety practices and to determine the applicability of any regulatory limitations prior to use.

1 Scope

This part of ISO 1183 specifies a method for the determination of the density or the specific volume of solid non-cellular plastics of any shape which do not contain closed pores.

2 Terms, definitions, symbols, units and abbreviated terms

For the purposes of this part of ISO 1183, the following terms, definitions, symbols, units and abbreviated terms apply:

2.1

test material

material to be tested

2.2

test specimen

that part of the test material actually subjected to the test

2.3

mass

m

quantity of matter contained in a body

NOTE Mass is expressed in kilograms (kg) or grams (g).

2.4

weight

W

force produced by gravity acting on a mass

NOTE 1 Since gravity varies with location, so does weight.

NOTE 2 Weight is expressed in newtons (N).