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# International Standard 7258

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## **Polytetrafluoroethylene (PTFE) tubing for aerospace applications — Methods for the determination of the density and relative density**

*Tubes en polytétrafluoréthylène (PTFE) à usage aéronautique — Méthodes de détermination de la masse volumique et de la densité*

**First edition — 1984-06-15**

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**UDC 621.643.29 : 629.7 : 531.75**

**Ref. No. ISO 7258-1984 (E)**

**Descriptors :** aircraft industry, plastic tubes, tests, determination, density (mass/volume).

## Foreword

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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.

International Standard ISO 7258 was developed by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, and was circulated to the member bodies in December 1981.

It has been approved by the member bodies of the following countries :

Australia	Czechoslovakia	Romania
Austria	Egypt, Arab Rep. of	South Africa, Rep. of
Belgium	France	Spain
Brazil	Germany, F.R.	Sweden
Canada	Italy	United Kingdom
China	Netherlands	USA

No member body expressed disapproval of the document.

# Polytetrafluoroethylene (PTFE) tubing for aerospace applications — Methods for the determination of the density and relative density

## 0 Introduction

Density and relative density are frequently used to follow the variations in the physical structure of specimens and in calculations of the amount of material necessary to fill a given volume. Density is the preferred property relating the mass and volume of an object, specimen or material. These properties may also be useful in determining uniformity among samples or specimens.

## 1 Scope and field of application

This International Standard specifies three methods for the determination of the density and relative density of polytetrafluoroethylene (PTFE) tubing used in the manufacture of medium and high pressure, high temperature, PTFE hose assemblies for aerospace applications :

Method A — Density gradient column method without a preconditioning heating and cooling cycle.

Method B — Displacement of water and determination of change of weight method.

Method C — Density gradient column method with a preconditioning heating and cooling cycle.

NOTE — The term "Apparent Specific Gravity" is used within the PTFE hose industry for the density or relative density determined by methods A and B. The term "Relative Specific Gravity" is similarly used for the results of method C.

## 2 Definitions

**2.1 density** : The mass per unit volume of material at  $t$  °C density is expressed as follows :

density,  $t$  °C :  $\rho_t$  in grams per cubic centimetre or grams per millilitre

For the purpose of this International Standard,  $t$  is equal to 25 °C.

**2.2 relative density** : The ratio of the mass in air of a given volume of material to the mass in air of an equal volume of a reference material at the same temperature; it is expressed as

relative density,  $t/t$  °C :  $d'_t$

where  $t$  is the temperature in degrees Celsius. For the purpose of this International Standard,  $t$  is equal to 25 °C.

### NOTES

1 Throughout this International Standard, the term "relative density" should be taken as meaning relative density with respect to water. In this context, the English term "specific gravity" is often used for "relative density" when the reference material (see 2.2) is water.

2 Density in grams per cubic centimetre may be converted to relative density with respect to water as follows :

$$d = \frac{\rho_t}{\rho'_t}$$

where

$d$  is the relative density;

$\rho_t$  is the density of the specimen;

$\rho'_t$  is the density of water, at temperature  $t$ .

At a temperature of 25 °C,  $\rho'_t = 0,997 1 \text{ g/cm}^3$ .

## 3 Apparatus

### 3.1 Methods A and C

**3.1.1 Density gradient tube**, a suitable graduate with stopper, preferably ground glass.

**3.1.2 Constant temperature bath**, a means of controlling the temperature of the liquid in the tube at  $25 \pm 1$  °C. A thermostatted water jacket around the tube is a satisfactory and convenient method of achieving this.