

International Standard



3993

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Liquefied petroleum gas and light hydrocarbons — Determination of density or relative density — Pressure hydrometer method

Gaz de pétrole liquéfiés et hydrocarbures légers — Détermination de la masse volumique ou de la densité relative — Méthode de l'aréomètre sous pression

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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 3993 was developed by Technical Committee ISO/TC 28, *Petroleum products and lubricants*, and was circulated to the member bodies in March 1983.

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

Austria	Iran	Sri Lanka
Australia	Iraq	Sweden
Belgium	Israel	Switzerland
Brazil	Italy	Turkey
Canada	Japan	United Kingdom
China	Netherlands	USA
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Germany, F. R.	Peru	Venezuela
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The member body of the following country expressed disapproval of the document on technical grounds :

France

Liquefied petroleum gas and light hydrocarbons — Determination of density or relative density — Pressure hydrometer method

1 Scope and field of application

1.1 This International Standard specifies a method for the determination of density or relative density of liquefied petroleum gases and other light hydrocarbons. The prescribed apparatus shall not be used for materials having gauge vapour pressures higher than 1,4 MPa¹⁾ (14 bar) (absolute vapour pressure 1,5 MPa) at the test temperature.

CAUTION — Attention is drawn to the hazards encountered when working with liquefied petroleum gas or light hydrocarbons. The requirements of any national, local or domestic safety code should always be strictly observed.

1.2 Alternative calibration procedures are described, but only the one using a certified hydrometer is suitable for the determination of density to be used in calculations of quantities for custody transfer or fiscal purposes.

NOTE — An alternative method for calculating the density of liquefied petroleum gases from gas chromatographic analysis is described in ISO 6578²⁾.

1.3 Provision is made in the annex for the use of thermohydrometers.

2 Definitions

For the purpose of this International Standard, the following definitions shall apply.

2.1 density : The mass of the liquid divided by its volume.

When reporting the density, the unit of density used, together with the temperature, shall be explicitly stated, for example kilogram per metre cubed or gram per millilitre at t °C (see the note). The standard reference temperature for international trade in petroleum and its products is 15 °C (see ISO 5024); but other reference temperatures may be required for legal metrology or other special purposes.

NOTE — In this International Standard, the preferred unit is the kilogram per metre cubed, but provision is also made for the use of the gram per millilitre.

2.2 relative density (this term now replaces the former term specific gravity) : The ratio of the mass of a volume of the liquid at a temperature t_1 to the mass of an equal volume of pure water at a temperature t_2 , i.e. the ratio of the density of the liquid at a temperature t_1 to the density of pure water at a temperature t_2 .

When reporting the relative density, the temperatures t_1 and t_2 shall be explicitly stated, for example relative density 60/60 °F. The standard reference temperature is 15 °C, but 20 °C and 60 °F are also in general use for t_1 and t_2 and other temperatures may be employed for t_1 .

3 Principle

The apparatus is purged with a portion of the sample before filling with the portion to be used for testing. The pressure cylinder is filled to a level at which the enclosed hydrometer floats freely. The hydrometer reading and the temperature of the sample are noted.

1) The SI unit of pressure is the pascal : 1 Pa = 1 N/m²; 10⁵ Pa = 1 bar = 1,019 72 kgf/cm²

2) At present at the stage of draft.