International Standard

ISO 12185

Second edition
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Crude petroleum, petroleum products and related products — Determination of density — Laboratory density meter with an oscillating U-tube sensor

Pétroles bruts, produits pétroliers et produits connexes — Détermination de la masse volumique — Appareil de masse volumique de laboratoire à capteur à tube en U oscillant

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Foreword

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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 document 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).

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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.

This document was prepared by Technical Committee ISO/TC 28, *Petroleum and related products, fuels and lubricants from natural or synthetic sources*, Subcommittee SC 2, *Measurement of petroleum and related products,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 19, *Gaseous and liquid fuels, lubricants and related products of petroleum, synthetic and biological origin,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 12185:1996), which has been technically revised. It also incorporates the Technical Corrigendum ISO 12185:1996/Cor 1:2001.

The main changes are as follows:

— definitions have been added in Clause 3;

— a quality control (QC) check has been added in 9.5.

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.

Introduction

The first edition of this standard (ISO 12185:1996) was written at a time when there were relatively few models of density meter with an oscillating U-tube sensor on the market.

There are now a considerable number of different manufacturers and models of laboratory density meter available worldwide, many of which use different methodologies or algorithms to cope with the effect of viscosity on displayed density.

This document therefore encompasses a wider range of instruments than those covered in the first edition and gives guidance and requirements for accurate density analyses, such as apparatus and apparatus preparation (see Clauses 5 and 9, Annex A).

Crude petroleum, petroleum products and related products — Determination of density — Laboratory density meter with an oscillating U-tube sensor

1 Scope

This document specifies a method for the determination, using an oscillating U-tube density meter, of the density of crude petroleum and related products within the range 600 kg/m^3 to 1 100 kg/m^3, which can be handled as single-phase liquids at the test temperature and pressure.

This document is applicable to liquids of any vapour pressure as long as suitable precautions are taken to ensure that they remain in single phase. Loss of light components leads to changes in density during both the sample handling and the density determination.

This method is not intended for use with in-line density meters.

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 91, *Petroleum and related products — Temperature and pressure volume correction factors (petroleum measurement tables) and standard reference conditions*

ISO 3015, *Petroleum and related products from natural or synthetic sources — Determination of cloud point*

ISO 3016, *Petroleum and related products from natural or synthetic sources — Determination of pour point*

ISO 3170, *Petroleum liquids — Manual sampling*

ISO 3171, *Petroleum liquids — Automatic pipeline sampling*

IP 389: *Determination of wax appearance temperature (WAT) of middle distillate fuels by differential thermal analysis (DTA) or differential scanning calorimetry (DSC)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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/

3.1
density
ρ
mass of liquid per unit volume at a specified temperature

Note 1 to entry: This is usually the mass of liquid expressed in kilograms, divided by its volume, expressed in cubic metres. The unit of measurement can be displayed as either kg·m^{-3} or kg/m^3. When quoting liquid density, the temperature at which it has been measured shall also be quoted (e.g. 840,0 kg/m^3 at 20,1 °C).