SLOVENSKI STANDARD
oSIST prEN ISO 18335:2023

01-julij-2023

Naftni in sorodni proizvodi - Določanje kinematične viskoznosti z izračunom iz izmerjene dinamične viskoznosti in gostote - Metoda z viskozimetrom pri konstantnem tlaku (ISO/DIS 18335:2023)

Petroleum products and related products - Determination of kinematic viscosity by calculation from the measured dynamic viscosity and density - Method by constant pressure viscometer (ISO/DIS 18335:2023)

Mineralölerzeugnisse und verwandte Produkte - Bestimmung der dynamischen Viskosität und Berechnung der kinematischen Viskosität - Verfahren mit konstantem Druck Viskosimeter (ISO/DIS 18335:2023)

Produits pétroliers et produits connexes - Détermination de la viscosité cinématique par calcul à partir des mesures de viscosité dynamique et de masse volumique - Méthode par viscosimètre à pression constante (ISO/DIS 18335:2023)

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ICS:

75.080	Naftni proizvodi na splošno	Petroleum products in general

oSIST prEN ISO 18335:2023 **en,fr,de**

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Petroleum products and related products — Determination of kinematic viscosity by calculation from the measured dynamic viscosity and density – Method by constant pressure viscometer

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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).

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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 ISO/TC 28, *Petroleum and related products, fuels and lubricants from natural or synthetic sources.*

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 purpose of this document is to prescribe a procedure for the measurement of dynamic viscosity and density, and then a calculation of kinematic viscosity from these when applied to petroleum and related liquids. Kinematic viscosity is often a characteristic that is called out in product specifications and is a frequent measurement in testing laboratories. The constant pressure viscometer provides a versatile and efficient technique using less time and labour for the laboratory.

Petroleum products and related products — Determination of kinematic viscosity by calculation from the measured dynamic viscosity and density – Method by constant pressure viscometer

1 Scope

This document specifies a procedure for the determination of dynamic viscosity (η) and density (ρ) for the calculation of kinematic viscosity (ν) of middle distillate fuels, fatty acid methyl ester fuels (FAME) and mixtures of these up to 60 % with middle distillate fuels, and lubricating oils including base oils, formulated oils, and synthetics, using a constant pressure viscometer. The range of kinematic viscosities covered in this test method is from 0,5 mm^2/s to 2 000 mm^2/s, with precision at 40 °C from 1,0 mm^2/s to 1 286 mm^2/s, and precision at 100 °C from 3,0 mm^2/s to 157 mm^2/s.

The result obtained using the procedure described in this document depends on the rheological behaviour of the sample. This document is predominantly applicable to liquids whose shear stress and shear rate are proportional (Newtonian flow behaviour). However, if the viscosity changes significantly with the shear rate, comparison with other measuring methods is only permissible at similar shear rates.

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 3170, *Petroleum liquids — Manual sampling*

ISO 3171, *Petroleum liquids — Automatic pipeline sampling*

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 per unit volume of a substance at a given temperature

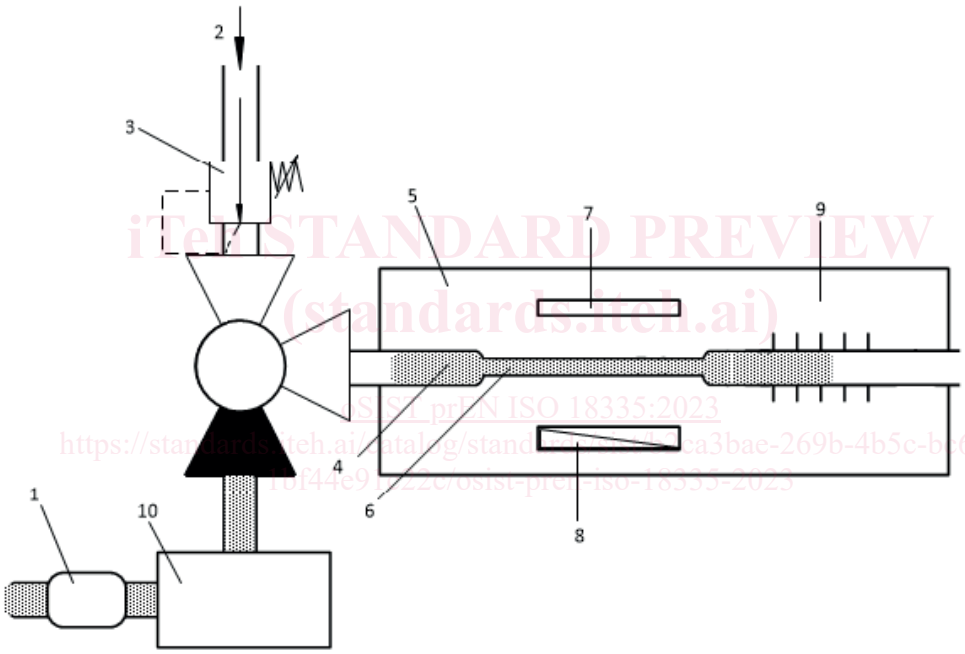
3.2
dynamic viscosity
η
ratio between the applied shear stress and rate of shear of a liquid at a given temperature

3.3
kinematic viscosity
ν
resistance to flow of a fluid under gravity.

Note 1 to entry: The kinematic viscosity can be calculated by dividing the *dynamic viscosity* (3.2) with *density* (3.1).

4 Principle

A test portion is delivered to the temperature-controlled measuring section consisting of a horizontal capillary tube with optical sensors and an oscillating U-tube densitometer (see Figure 1). The test portion is forced through the capillary viscometer under pressure and the time taken for a fixed volume to flow through a length of the tube and optical array is measured and automatically recorded. The density is determined by the oscillation frequency of the U-tube in conjunction with calculations. The kinematic viscosity is calculated by dividing the dynamic viscosity by the density.



Key
1 75 µm screen
2 compressed air
3 pressure regulator
4 specimen
5 thermal block
6 capillary
7 temperature sensor
8 thermoelectric cooling/heating
9 detector array
10 density meter

Figure 1 — Overview of the measurement principle