INTERNATIONAL STANDARD

ISO 17198

First edition
2014-11-15

Dimethyl ether (DME) for fuels — Determination of total sulfur, ultraviolet fluorescence method

DME comme carburant ou combustible — Détermination de la teneur en soufre total — Méthode par Fluorescence Ultraviolet

Reference number
ISO 17198:2014(E)

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

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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.

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 28, *Petroleum products and lubricants*, Subcommittee SC 4, *Classifications and specifications*.

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Introduction

In general, large amounts of DME in the international trade and domestic transportation can be executed using sea and/or various land transportations. From the feed stock of synthesis gas for DME production, and throughout the loading and transportation, there is a risk of increasing sulfur contents.

Any sulfur compounds in DME contributes to SO_x emissions. It can also cause corrosion in equipment. Therefore, sulfur content is tested accurately in process feeds, in finished products, as well as for compliance determinations required by regulatory authorities. It is common practice to analyse the sulfur, either by ultraviolet fluorescence or by oxidative microcoulometry.

This International Standard specifies the procedure of test by ultraviolet fluorescence method.

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Dimethyl ether (DME) for fuels — Determination of total sulfur, ultraviolet fluorescence method

WARNING — The use of this International Standard can involve hazardous materials, operations and equipment. This International Standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this International Standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

1 Scope

This International Standard specifies a procedure of test for the sulfur content in dimethyl ether (DME) used as fuel by the ultraviolet (UV) fluorescence method. This procedure is applicable to determine the amount of total sulfur up to the value specified in ISO 16861.

This test method will not measure sulfur that is not volatile under the practical conditions of the test, namely room temperature and atmospheric pressure.

NOTE The precision of this method has been studied for a limited set of samples and content levels by a limited amount of labs. It allows establishment of a quality specification of DME but cannot be considered as a full precision determination in line with the usual statistical methodology as in ISO 4259.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 16861, *Petroleum products — Fuels (class F) — Specifications of dimethyl ether (DME)*

ISO 29945, *Refrigerated non-petroleum-based liquefied gaseous fuels — Dimethylether (DME) — Method of manual sampling onshore terminals*

3 Principle

A DME sample is directly injected into a UV fluorescence detector. The sample enters into a high-temperature combustion tube (1 000°C to 1 100°C), where the sulfur is oxidized to sulfur dioxide (SO_2) in an oxygen-rich atmosphere. Water produced during the sample combustion is removed and the sample combustion gases are exposed to ultraviolet (UV) light. The SO_2 absorbs the energy from the UV light and is converted to excited SO_2. The fluorescence emitted from the excited SO_2 as it returns to a stable state SO_2 is detected by a photomultiplier tube and the resulting signal is a measure of the sulfur contained in the sample.

4 Reagents and materials

4.1 Inert gas, argon or helium, of high purity grade with a minimum purity of 99,998 volume %.

4.2 Oxygen, of high purity grade with a minimum purity of 99,75 volume %.

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