Liquid petroleum products - Determination of fatty methyl ester (FAME) content in middle distillates - Infrared spectrometry method

This document is a preview generated by EVS

EESTI STANDARDIKESKUS
ESTONIAN CENTRE FOR STANDARDISATION

EESTI STANDARDI EESSÕNA	NATIONAL FOREWORD
Käesolev Eesti standard EVS-EN 14078:2010 sisaldab Euroopa standardi EN 14078:2009 ingliskeelset teksti.	This Estonian standard EVS-EN 14078:2010 consists of the English text of the European standard EN 14078:2009.
Standard on kinnitatud Eesti Standardikeskuse 28.02.2010 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.	This standard is ratified with the order of Estonian Centre for Standardisation dated 28.02.2010 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.
Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 15.12.2009.	Date of Availability of the European standard text 15.12.2009.
Standard on kättesaadav Eesti standardiorganisatsioonist.	The standard is available from Estonian standardisation organisation.

This document is a preview generated by EVS

ICS 75.160.20

Standardite reprodutseerimis- ja levitamisõigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonilisse süsteemi või edastamine ükskõik millises vormis või millisel teel on keelatud ilma Eesti Standardikeskuse poolt antud kirjaliku loata.

Kui Teil on küsimusi standardite autorikaitse kohta, palun võtke ühendust Eesti Standardikeskusega:
Aru 10 Tallinn 10317 Eesti; www.evs.ee; Telefon: 605 5050; E-post: info@evs.ee

Right to reproduce and distribute Estonian Standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without permission in writing from Estonian Centre for Standardisation.

If you have any questions about standards copyright, please contact Estonian Centre for Standardisation:
Aru str 10 Tallinn 10317 Estonia; www.evs.ee; Phone: +372 605 5050; E-mail: info@evs.ee

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 14078

December 2009

ICS 75.160.20

Supersedes EN 14078:2003

This document is a preview generated by EVS

English Version

Liquid petroleum products - Determination of fatty methyl ester (FAME) content in middle distillates - Infrared spectrometry method

Produits pétroliers liquides - Détermination de la teneur en esters méthyliques d'acides gras (EMAG) des distillats moyens - Méthode par spectrométrie infrarouge

Flüssige Mineralölerzeugnisse - Bestimmung des Gehaltes an Fettsäuremethylester (FAME) in Mitteldestillaten - Infrarotspektrometrisches Verfahren

This European Standard was approved by CEN on 14 November 2009.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

© 2009 CEN All rights of exploitation in any form and by any means reserved worldwide for CEN national Members.

Ref. No. EN 14078:2009: E

Contents

Foreword 3

1 Scope 4

2 Normative references 4

3 Principle 4

4 Reagents and materials 5

5 Apparatus 5

6 Sampling and sample handling 5

7 Procedure 5
7.1 Selection and treatment of the cell 5
7.2 Cleaning of the cells 6
7.3 Selection of the path length 6
7.4 Calibration 6
7.5 Recording of infrared spectra 7

8 Calculation 8
8.1 Calculation of FAME content in grams per litre (g/l) 8
8.2 Unit conversion from FAME content from g/l to % (*V/V*) 9

9 Expression of results 9

10 Precision 9
10.1 General 9
10.2 Repeatability, *r* 9
10.3 Reproducibility, *R* 9

11 Test report 10

Annex A (informative) **Specific adjustments for calibration and dilution** 11

Bibliography 14

This document is a preview generated by EVS

Foreword

This document (EN 14078:2009) has been prepared by Technical Committee CEN/TC 19 “Gaseous and liquid fuels, lubricants and related products of petroleum, synthetic and biological origin”, the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2010, and conflicting national standards shall be withdrawn at the latest by June 2010.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 14078:2003.

The revision was pursued with the aim to extend the measurement range to lower FAME contents and to improve the precision of the test method. Therefore, the infrared (IR) determination was analytically revised, i.e. by splitting the calibration, measurement into two separate measurement ranges. The significantly improved precision data was backed up by extensive round robin tests. Thus the application range for this test method could be lowered significantly down to a FAME content of approximately 0,05 % (*V/V*).

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

This document is a preview generated by EVS

1 Scope

This European Standard specifies a test method for the determination of Fatty Acid Methyl Ester (FAME) content in diesel fuel or domestic heating fuel by mid infrared spectrometry, which applies to FAME contents of the two measurement ranges as follows:

— range A: for FAME contents ranging from approx. 0,05 % (*V/V*) to approx. 3 % (*V/V*);

— range B: for FAME contents ranging from approx. 3 % (*V/V*) to approx. 20 % (*V/V*).

Principally, higher FAME contents can also be analyzed if diluted; however, no precision data for results outside the specified range is available at present.

This test method was verified to be applicable to samples which contain FAME conforming to EN 14214 or EN 14213. Reliable quantitative results are obtained only if the samples do not contain any significant amounts of other interfering components, especially esters and other carbonyl compounds which possess absorption bands in the spectral region used for quantification of FAME. If such interfering components are present, this test method is expected to produce higher values.

NOTE 1 For the purposes of this European Standard, the term "% (*V/V*)" is used to represent the volume fraction (φ) of a material.

NOTE 2 For conversion of grams FAME per litre (g FAME/l) to volume fraction, a fixed density for FAME of 883,0 kg/m^3 is adopted.

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

2 Normative references

The following referenced documents are indispensable for the application 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.

EN 14213, *Heating fuels — Fatty acid methyl esters (FAME) — Requirements and test methods*

EN 14214, *Automotive fuels — Fatty acid methyl esters (FAME) for diesel engines — Requirements and test methods*

EN ISO 3170, *Petroleum liquids — Manual sampling (ISO 3170:2004)*

EN ISO 3171, *Petroleum liquids — Automatic pipeline sampling (ISO 3171:1988)*

3 Principle

The mid infrared absorption spectrum of a test portion of a sample which has been diluted as appropriate with FAME-free solvent is recorded. The absorbance at the peak maximum of the typical absorption band for esters at about (1 745 ± 5) cm^{-1} is measured. Initially, calibration as well as evaluation of the data will be carried out as grams FAME per litre. For conversion of grams per litre (g/l) to the reporting unit "% (*V/V*)", a fixed density of FAME of 883,0 kg/m^3 (15 °C) is adopted.

Two measurement ranges (A or B) have been chosen for which specific adjustments for the calibration and dilution need to be followed. Measurement preferably without dilution for range A and a shorter path length of the measurement cell for range B. In particular, the lower determination range A is a challenging one; all ensuing

This document is a preview generated by EVS