

Automotive fuels - Fatty acid methyl ester (FAME) fuel and blends with diesel fuel - Determination of oxidation stability by accelerated oxidation method at 110 °C

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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| <p>See Eesti standard EVS-EN 15751:2025 sisaldab Euroopa standardi EN 15751:2025 ingliskeelset teksti.</p> <p>Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 14.05.2025.</p> <p>Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.</p> | <p>This Estonian standard EVS-EN 15751:2025 consists of the English text of the European standard EN 15751:2025.</p> <p>This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.</p> <p>Date of Availability of the European standard is 14.05.2025.</p> <p>The standard is available from the Estonian Centre for Standardisation and Accreditation.</p> |
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English Version

Automotive fuels - Fatty acid methyl ester (FAME) fuel and blends with diesel fuel - Determination of oxidation stability by accelerated oxidation method at 110 °C

Carburants pour automobiles - Esters méthyliques d'acides gras (EMAG) et mélanges avec du gazole - Détermination de la stabilité à l'oxydation par méthode d'oxydation accélérée à 110 °C

Kraftstoffe - Fettsäure-Methylester (FAME) Kraftstoff und Mischungen mit Dieselmotorkraftstoff - Bestimmung der Oxidationsstabilität mit beschleunigtem Oxidationsverfahren bei 110 °C

This European Standard was approved by CEN on 7 April 2025.

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European foreword

This document (EN 15751:2025) 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of an identical text or by endorsement, at the latest by November 2025, and conflicting national standards shall be withdrawn at the latest by November 2025.

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

This document supersedes EN 15751:2014.

This document has been improved by editorial changes to clarify the test procedure.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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Introduction

This document is based on EN 14112 [1], which was specifically adapted for the determination of oxidation stability of fatty acid methyl esters (FAME). This method had been developed under CEN/TC 307 (Fats and oils). At the time of development, the method was applicable for FAME fuel according to EN 14214 [2], but questions remained on the accuracy towards blends of FAME and diesel fuel.

The modifications to EN 14112 as given in this document, allow application of this test method for oxidation stability for pure FAME and diesel/FAME blends at various levels.

The goal was to have one single test method for FAME fuel, diesel/FAME blends and pure diesel fuels. Although the modifications cover FAME fuel and diesel/FAME blends, CEN/TC 307 decided that it was better to retain EN 14112 for methyl esters and publish a separate standard for all automotive fuel and heating oil applications, as the use of 'diesel and diesel blends' falls out the scope of CEN/TC 307.

EN 15751 was originally developed to describe the oxidation stability of blends consisting of conventional diesel fuel and FAME. FAME blends with paraffinic diesel fuel were not included into the fuel matrix used to acquire precision data.

While developing specification EN 15940 [3] for paraffinic diesel fuel, three laboratories executed a small test on neat paraffinic fuel and on 7 % (V/V) FAME blends based on products originating from both Fischer-Tropsch synthesis and hydrotreatment processes. No indications were found that FAME blends with paraffinic diesel fuel behave differently than blends consisting of conventional diesel fuel and FAME.

The modifications required a new validation covering pure FAME, diesel/FAME blends and pure diesel fuels which resulted in the fact that the method has a lower precision for pure petroleum-based diesel fuels.

1 Scope

This document specifies a test method for the determination of the oxidation stability of fuels for diesel engines at 110 °C, by means of measuring the induction period of the fuel up to 48 h. The method is applicable to fatty acid methyl esters (FAME) intended for the use as pure biofuel or as a blending component for diesel fuels, and to blends of FAME with diesel fuel containing 2 % (V/V) of FAME at minimum.

The precision of the test method has been developed for conventional diesel. This test method is applicable for paraffinic diesel fuels as specified in EN 15940, however, a separate precision statement for paraffinic diesel is not available.

NOTE 1 EN 14112 [1] describes a similar test method for the determination of the oxidation stability of pure fatty acid methyl esters (see the Introduction to this document). Additionally, EN 16568 [4] describes a similar test method for the determination of the oxidation stability of fuels for diesel engines at 120 °C, by means of measuring the induction period of the fuel up to 20 h. EN 16568 is applicable to blends of FAME with diesel fuel containing 2 % (V/V) of FAME at minimum. Other alternative test methods for the determination of the oxidation stability of distillate fuels are described in CEN/TR 17225 [5].

NOTE 2 For induction periods higher than 48 h the precision is not covered by the precision statement of this method. The limit values of the relevant fuel standards are well within the scope of this test method.

NOTE 3 The presence of cetane improver can reduce the oxidation stability determined by this test method. Limited studies with EHN (2-ethyl hexyl nitrate) indicated, however, that the stability is reduced to an extent which is within the reproducibility of the test method.

NOTE 4 For the purposes of this document, the term “% (V/V)” is used to represent the volume fraction (φ) of a material.

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.

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

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

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

induction period

time which passes between the moment when the measurement is started and the moment when the formation of oxidation products begins to increase rapidly