ILNAS

Institut luxembourgeois de la normalisation
de l'accréditation, de la sécurité et qualité
des produits et services

ILNAS-EN 15940:2023

Automotive fuels - Paraffinic diesel fuel from synthesis or hydrotreatment - Requirements and test methods

Carburants pour automobiles - Gazoles paraffiniques de synthèse ou obtenus par hydrotraitement - Exigences et méthodes d'essais

Kraftstoffe - Paraffinischer Dieselkraftstoff von Synthese oder Wasserstoffbearbeitung - Anforderungen und Prüfverfahren

05/2023

National Foreword

This European Standard EN 15940:2023 was adopted as Luxembourgish Standard ILNAS-EN 15940:2023.

Every interested party, which is member of an organization based in Luxembourg, can participate for FREE in the development of Luxembourgish (ILNAS), European (CEN, CENELEC) and International (ISO, IEC) standards:

- Participate in the design of standards
- Foresee future developments
- Participate in technical committee meetings

https://portail-qualite.public.lu/fr/normes-normalisation/participer-normalisation.html

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 15940

May 2023

ICS 75.160.20

Supersedes EN 15940:2016+A1:2018+AC:2019

English Version

Automotive fuels - Paraffinic diesel fuel from synthesis or hydrotreatment - Requirements and test methods

Carburants pour automobiles - Gazoles paraffiniques de synthèse ou obtenus par hydrotraitement - Exigences et méthodes d'essais

Kraftstoffe - Paraffinischer Dieselkraftstoff von Synthese oder Wasserstoffbearbeitung - Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 10 April 2023.

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-CENELEC 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-CENELEC Management Centre has the same status as the official versions.

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

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN 15940:2023 E

Contents

Page

European foreword

This document (EN 15940:2023) 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 2023, and conflicting national standards shall be withdrawn at the latest by November 2023.

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 will supersede EN 15940:2016+A1:2018+AC:2019.

Significant technical changes between this document and the previous version are EN 15940:2016+A1:2018+AC:2019:

a) update of the note in the scope explaining the product approval for vehicle purpose;

b) removal of the former A-deviation for Belgium due to change of legislation in the meantime;

c) update to the normative references towards undated versions where they don't concern requirements originating from European Directives (in line with decisions by CEN/TC 19 in coordination with the European Commission), and updating the effective publication dates where required;

d) inclusion of the amended EN 14214 FAME specification;

e) addition of micro-distillation (EN 17306) as an alternative test method to distillation by EN ISO 3405 and EN ISO 3924;

f) addition of the ICN technique (EN 17155) as alternative methods for cetane number determination by EN ISO 5165;

g) addition of automated method (EN ISO 22995) as an alternative test method to cloud point by EN ISO 3015;

h) addition of the Stabinger viscometer (ISO 23581) as an alternative test method to viscosity by EN ISO 3104;

i) addition of EDXRF spectrometry method (EN ISO 13032) as an alternative test method to sulfur determination;

j) replacement of the clauses setting requirements for cavitation prevention and seizure control, plus the seizure protection Annex, by adapting the improved lubricity requirement in Table 1, by removal from Table 1 of the reporting requirement for IBP, and by introduction of a shorter cautionary statement under 6.4.6;

k) addition of oxidation stability by rapid small scale oxidation method (EN 16091) as an alternative test method to oxidation stability by EN 15751 for diesel fuel containing FAME above 2,0 % (*V/V*);

l) introduction of instructions how to apply bias correction;

m) deletion of the reference to an alternative correlation equation in EN 15195 for results outside the method scope range;

n) updating of Annex A based on recent test method standard updates;

o) considerations around use of this document for heating fuel application have been introduced in the Introduction;

p) update of reference EN 15195;

r) allowance of blending EN 590 diesel.

In this document, all relevant characteristics, requirements and test methods are specified. These specifications are relevant for the driveability of the vehicles and are currently known to prevent harm to the vehicles and their powertrains. Climate dependent requirements of this document may vary according to national adoptions of EN 590 and EN 14214, and should be indicated by a specific National Annex.

Requirements following amendment 2003/17/EC [11], 2009/30/EC [12], 2011/63/EU [13] and 2014/77/EU [14] to the European Fuels Quality Directive 98/70/EC [10], are taken into account. Dates are included with all normative test method references in order to comply with the requirements of the European Commission; with the accompanying assurance by CEN/TC 19 that any referenced updated versions will always give at least the same accuracy and at least the same level of precision (see [12]).

The marking at the pump of this product is in line with the requirements of the Fuels Quality Directive and the Alternative Fuels Infrastructure Directive [15].

Several assessments of test methods for paraffinic diesel fuel have been executed and the results thereof [8] led to conclusions regarding the applicability of each of the test methods as required in Clause 6. The conclusion of these assessments, partially funded by the European Commission, led to the possibility to upgrade the original Technical Specification into a full European Standard. Although it is its main actual use, the product is now no longer limited to captive fleet usage, but the scope defines the need to check the use of the product with the vehicle manufacturer. There are no EU legislative needs to limit the product to captive fleets. Such restriction is not for the specification but for the market to decide upon. Therefore, and in the light of the need to check the use of the product with the vehicle manufacturer, all restrictions towards captive fleet from the CEN/TS text have been deleted.

This document is based on current knowledge at the time of publishing, but will require review based on further experiences with the use of paraffinic diesel fuel or when the specification for either regular automotive diesel fuel, EN 590, or FAME, EN 14214, has been determined (revised) by CEN/TC 19 or based on further experiences with the use of paraffinic diesel fuel according to this document. Further background can be found in CEN/TR 16389 [4].

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.

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

Introduction

This document has been laid down to specify a standard with requirements for diesel fuel on the basis of synthesis gas or of hydrotreated bio-oils, –fats or other suitable feedstock. Paraffinic diesel fuel does not meet the automotive diesel fuel standard, EN 590 [1]. Its density can be outside the limits for automotive diesel fuel, and the described class A type fuel has a higher cetane number. Paraffinic diesel fuel is extensively available and has been increasingly approved for usage in vehicles since the first publication of EN 15940. However it is not released for all vehicles, consult vehicle manufacturer before use.

As some production processes result in a fuel containing cyclo-paraffins, as well as n-paraffins and iso-paraffins, they show different cetane number compared to other paraffinic diesel fuels. Hence, in this document, two classes have been specified, one class showing improved ignition quality compared to automotive diesel fuel meeting EN 590.

Blending of paraffinic diesel fuel with fatty acid methyl ester (FAME) is covered in this document. Against the background of the EU Renewable Energy Directive (RED, 2018/2001/EC [9]) and also the latest developments regarding the European automotive diesel fuel standard, there is now a pressing requirement to allow for FAME blend variations of those paraffinic fuels, which are not already classified as being from renewable resources.

Paraffinic diesel fuel is also used as a blending component in automotive diesel fuel. In that case it does not have to meet EN 15940 requirements since composition and properties of diesel fuel blends are specified in the respective automotive diesel fuel standards, e.g. EN 590 and EN 16734 (see EN 590:2022, 6.4 and EN 16734:2022, 6.4 [3]).

The document will be usable on a voluntary basis for engine clearance, fuel acceptance and fuelling station allowance, supporting both local regulations and international trade. See also CEN/TR 16389 [4].

For heating application of paraffinic diesel fuel specific national standards apply.

1 Scope

This document describes requirements and test methods for paraffinic diesel fuel marketed and delivered as such, containing a level of up to 7,0 % (*V/V*) fatty acid methyl ester (FAME). It is applicable to fuel for use in diesel engines and vehicles compatible with paraffinic diesel fuel. It specifies two classes of paraffinic diesel fuel: high cetane and normal cetane.

Paraffinic diesel fuel originates from synthesis or hydrotreatment processes.

NOTE 1 For general diesel engine warranty, the vehicle manufacturer needs to be consulted before use. Paraffinic automotive diesel fuel may need a validation step to confirm the compatibility of the fuel with the vehicle, which for some existing engines may still need to be done (see also the Introduction to this document). However, it is noted that paraffinic diesel fuel is extensively available and has been increasingly approved by vehicle manufacturers for usage in vehicles since the first publication of this document.

NOTE 2 For the purposes of this document, the terms "% (*m/m*)" and "% (*V/V*)" are used to represent respectively the mass fraction and the volume fraction.

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 116, *Diesel and domestic heating fuels — Determination of cold filter plugging point — Stepwise cooling bath method*

EN 12662, *Liquid petroleum products — Determination of total contamination in middle distillates, diesel fuels and fatty acid methyl esters*

EN 12916:2019+A1:2022, *Petroleum products — Determination of aromatic hydrocarbon types in middle distillates — High performance liquid chromatography method with refractive index detection*

EN 14078:2014, *Liquid petroleum products — Determination of fatty acid methyl ester (FAME) content in middle distillates — Infrared spectrometry method*

EN 14214:2012+A2:2019, *Liquid petroleum products — Fatty acid methyl esters (FAME) for use in diesel engines and heating applications — Requirements and test methods*

EN 15195:2023, *Liquid petroleum products — Determination of ignition delay and derived cetane number (DCN) of middle distillate fuels by combustion in a constant volume chamber*

EN 15751, *Automotive fuels — Fatty acid methyl ester (FAME) fuel and blends with diesel fuel — Determination of oxidation stability by accelerated oxidation method*

EN 16329, *Diesel and domestic heating fuels — Determination of cold filter plugging point — Linear cooling bath method*

EN 16906:2017, *Liquid petroleum products — Determination of the ignition quality of diesel fuels — BASF engine method*

EN 16942, *Fuels — Identification of vehicle compatibility — Graphical expression for consumer information*

EN 17155:2018, *Liquid petroleum products — Determination of indicated cetane number (ICN) of middle distillate fuels — Primary reference fuels calibration method using a constant volume combustion chamber*