SLOVENSKI STANDARD
oSIST prEN 16734:2021

01-junij-2021

Goriva za motorna vozila - Dizelsko gorivo za motorna vozila B10 - Zahteve in preskusne metode

Automotive fuels - Automotive B10 diesel fuel - Requirements and test methods

Kraftstoffe für Kraftfahrzeuge - B10 Dieselkraftstoff - Anforderungen und Prüfverfahren

Carburants pour automobiles - Carburant B10 pour moteur automobile diesel - Exigences et méthodes d'essai

Ta slovenski standard je istoveten z: prEN 16734

ICS:

75.160.20 Tekoča goriva Liquid fuels

oSIST prEN 16734:2021 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 16734

May 2021

ICS 75.160.20

Will supersede EN 16734:2016+A1:2018

English Version

Automotive fuels - Automotive B10 diesel fuel - Requirements and test methods

Carburants pour automobiles - Carburant B10 pour moteur automobile diesel - Exigences et méthodes d'essai

Kraftstoffe für Kraftfahrzeuge - B10 Dieselkraftstoff - Anforderungen und Prüfverfahren

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

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

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European foreword

This document (prEN 16734:2021) 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 document is currently submitted to the CEN Enquiry.

This document will supersede EN 16734:2016+A1:2018.

This document has originally been prepared under a mandate [1] given to CEN by the European Commission and the European Free Trade Association. It has been developed in coordination with representatives of those institutions.

This document describes a specification for diesel fuel containing up to 10,0 % (*V/V*) Fatty Acid Methyl Ester. This product is not suitable for all vehicles, so consumers and providers should consult vehicle manufacturers or manuals before use.

Requirements following amendment 2003/17/EC [3], 2009/30/EC [4], 2011/63/EU [5] and 2014/77/EU [6] to the European Fuels Quality Directive 98/70/EC [2], 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 [4]).

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 [7].

Significant technical changes between this document and the previous edition are:

— Inclusion of the amended EN 14214 FAME specification.

— 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 were required.

— Deletion of the Fuel Ignition Tester (EN 16144) as an alternative test method for cetane number determination due to its absence of use in the market. Whereas the BASF engine (EN 16906) and the ICN technique (EN 17155) have now been included as alternative methods for cetane number determination,

— Addition of micro-distillation (EN 17306) as an alternative test method to distillation by EN ISO 3405 and EN ISO 3924.

— Addition of automated method (EN ISO 22995) as an alternative test method to cloud point by EN ISO 3015.

— Addition of the Stabinger viscometer (ISO 23581) as an alternative test method to viscosity by EN ISO 3104.

— 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).

— Deletion of Annex A on precision data and introduction of a NOTE under 6.5.1 in relation to test method precision data for diesel fuel containing FAME.

— Update to the 'workmanship clause' in 6.5.3 to address the issue of abrasive wear of fuel injection equipment by hard particles in diesel fuel.

— Introduction of further clarification around the lubricity requirement in Table 1.

— Reduction of the minimum density limit for Grades D, E and F, moving the property from Table 1 to Table 2.

— Clarification of the dispute requirement concerning sulfur content in 6.7.3.

— Deletion of the allowance for cetane alternative methods in 6.7.4.

— Addition of 6.7.11 to address situations in which the test method includes a bias-correction to the dispute method.

— Deletion of the A-deviation for Belgium following change of national legislation.

1 Scope

This document specifies requirements and test methods for marketed and delivered automotive B10 diesel fuel, i.e. diesel fuel containing up to 10,0 %(*V/V*) Fatty Acid Methyl Ester. It is applicable to fuel for use in diesel engine vehicles compatible with automotive B10 diesel fuel.

NOTE 1 This product is allowed in Europe [4], but national legislation can set additional requirements or rules concerning, or even prohibiting, marketing or delivering of the product.

NOTE 2 In this document, A-deviations apply (see Annex A).

NOTE 3 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, *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 15195:2014, *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 16576:2014, *Automotive fuels - Determination of manganese and iron content in diesel - Inductively coupled plasma optical emission spectrometry (ICP OES) method*

EN 16715:2015, *Liquid petroleum products - Determination of ignition delay and derived cetane number (DCN) of middle distillate fuels - Ignition delay and combustion delay determination using a constant volume combustion chamber with direct fuel injection*

EN 16906:2017,[1] *Liquid petroleum products — Determination of the ignition quality of diesel fuels — BASF engine method*

[1]standard under revision

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*

EN 17306:2019, *Liquid petroleum products - Determination of distillation characteristics at atmospheric pressure - Micro-distillation*

EN ISO 3015, *Petroleum and related products from natural or synthetic sources - Determination of cloud point (ISO 3015)*

EN ISO 2160, *Petroleum products - Corrosiveness to copper - Copper strip test (ISO 2160)*

EN ISO 2719, *Determination of flash point - Pensky-Martens closed cup method (ISO 2719)*

EN ISO 3104, *Petroleum products - Transparent and opaque liquids - Determination of kinematic viscosity and calculation of dynamic viscosity (ISO 3104)*

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

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

EN ISO 3405:2019, *Petroleum and related products from natural or synthetic sources - Determination of distillation characteristics at atmospheric pressure (ISO 3405:2019)*

EN ISO 3675:1998, *Crude petroleum and liquid petroleum products - Laboratory determination of density - Hydrometer method (ISO 3675:1998)*

EN ISO 3924:2019, *Petroleum products - Determination of boiling range distribution - Gas chromatography method (ISO 3924:2019)*

EN ISO 4259-2, *Petroleum and related products - Precision of measurement methods and results - Part 2: Interpretation and application of precision data in relation to methods of test (ISO 4259-2)*

EN ISO 4264, *Petroleum products - Calculation of cetane index of middle-distillate fuels by the four variable equation (ISO 4264:2018)*

EN ISO 5165:2020, *Petroleum products - Determination of the ignition quality of diesel fuels - Cetane engine method (ISO 5165:2020)*

EN ISO 6245, *Petroleum products - Determination of ash (ISO 6245:2001)*

EN ISO 10370, *Petroleum products - Determination of carbon residue - Micro method (ISO 10370)*

EN ISO 12185:1996[1)], *Crude petroleum and petroleum products — Determination of density — Oscillating U-tube method (ISO 12185:1996)*

EN ISO 12205, *Petroleum products - Determination of the oxidation stability of middle-distillate fuels (ISO 12205)*

EN ISO 12937, *Petroleum products - Determination of water - Coulometric Karl Fischer titration method (ISO 12937)*

EN ISO 13032:2012, *Petroleum products - Determination of low concentration of sulfur in automotive fuels - Energy-dispersive X-ray fluorescence spectrometric method (ISO 13032:2012)*

EN ISO 13759, *Petroleum products - Determination of alkyl nitrate in diesel fuels - Spectrometric method (ISO 13759)*

EN ISO 20846:2019, *Petroleum products - Determination of sulfur content of automotive fuels - Ultraviolet fluorescence method (ISO 20846:2019)*

EN ISO 20884:2019, *Petroleum products - Determination of sulfur content of automotive fuels - Wavelength-dispersive X-ray fluorescence spectrometry (ISO 20884:2019)*

EN ISO 22995, *Petroleum products - Determination of cloud point - Automated step-wise cooling method (ISO 22995)*

ISO 23581, *Petroleum products and related products — Determination of kinematic viscosity — Method by Stabinger type viscometer*

3 Terms and definitions

No terms and definitions are listed in this document.

4 Sampling

Samples shall be taken as described in EN ISO 3170 or EN ISO 3171 and/or in accordance with the requirements of national standards or regulations for the sampling of automotive diesel fuel. The national requirements shall be set out in detail or shall be referred to by reference in a National Annex to this document.

In view of the sensitivity of some of the test methods referred to in this document, particular attention shall be paid to compliance with any guidance on sampling containers which is included in the test method standard.

5 Pump marking

Information to be marked on dispensing pumps and nozzles used for delivering automotive B10 diesel fuel, and the dimensions of the mark shall be in accordance with EN 16942.

Labelling shall be clearly visible, easily legible and displayed at any point where diesel with metallic additives is made available to consumers. The label shall contain: “Contains metallic additives” in the national language(s) and shall be laid down in the National Annex to this document.

Further indication on dispensing pumps in the national language of “Not suitable for all vehicles; consult vehicle manufacturer or manual before use” is also strongly recommended.

6 Requirements and test methods

6.1 Dyes and markers

The use of dyes or markers is allowed.

6.2 Additives

6.2.1 General

In order to improve the quality, the use of additives is allowed. Suitable fuel additives without known harmful side-effects are recommended in the appropriate amount, to help to avoid deterioration of driveability and emissions control durability. Other technical means with equivalent effect may also be used.

NOTE Deposit forming tendency test methods suitable for routine control purposes have not yet been identified and developed.

6.2.2 Methylcyclopentadienyl manganese tricarbonyl (MMT)

When methylcyclopentadienyl manganese tricarbonyl (MMT) is used, a specific labelling is required (see also Clause 4). The presence of the MMT is limited via a manganese content limit as in Table 1.

6.3 Fatty acid methyl ester (FAME)

Automotive B10 diesel fuel may contain up to 10,0 % (*V/V*) of FAME complying with EN 14214:2012+A2:2019.

NOTE 1 A suitable method for the separation and identification of FAME is given in EN 14331 [8].

Climate dependent requirements for FAME as a blending component for use in automotive B10 diesel fuel according to this document are set out in EN 14214:2012+A2:2019, 6.4.3. The specific grades shall be specified on a national basis according to local climatic conditions and the FAME volume in the diesel fuel.

The finished blend of automotive B10 diesel fuel shall also comply with the climate dependent requirements set out in 6.6 of this document.

Cold flow additives, when used in FAME, should be specifically matched to the base diesel fuel and FAME quality to ensure correct performance consistent with the requirements set out in this document. The choice could result in incompatibility between the cold flow additives used in the FAME and the diesel fuel. The choice of cold flow additive technology should be a contractual matter between the fuel blender and the FAME supplier taking into account the climatic-dependent requirements of the finished automotive B10 diesel fuel.

NOTE 2 Cold flow requirements for FAME as a blend component in automotive B10 diesel fuel are set out in Tables 3a and 3b and the National Annex of EN 14214:2012+A2:2019, in order to control maximum content of saturated monoglycerides in the final EN 16734 blend to ensure trouble-free operation. Work is on-going to identify a suitable performance test to control this aspect of low temperature performance.

In order to improve the oxidation stability of FAME, it is strongly recommended to add oxidation stability enhancing additives to FAME at the production stage and before storage, providing an oxidation stability similar to that obtained with 1 000 mg/kg of 2,6-di-tert-butyl-4-hydroxytoluene (BHT, officially designated by IUPAC as 2,6-bis(1,1-dimethylethyl)-4-methylphenol).

The similar action may be read as providing oxidation stability performance at least equal to that obtained with 1 000 mg/kg of BHT.

CAUTION — There is a potential risk of precipitate formation with oxidation stability enhancing additives at low temperatures in low aromatic arctic fuel. Caution should therefore be taken in the choice of oxidation stability enhancing additives to arctic grade FAME.

6.4 Other (bio-) components

Limits for FAME do not apply to other (non-petroleum derived) hydrocarbons, such as Hydrotreated Vegetable Oil (HVO), Gas To Liquid (GTL) or Biomass To Liquid (BTL) derived hydrocarbons, since these paraffinic diesel components are allowed in any proportions provided that the final blend complies with the requirements of this document.

The co-processing of renewable[2] feedstock at refineries is also allowed provided that the final automotive B10 diesel fuel meets the requirements of this document.

6.5 Generally applicable requirements and related test methods

6.5.1 When tested by the methods indicated in Table 1, automotive B10 diesel fuel shall be in accordance with the limits specified in Table 1. The test methods listed in Table 1 have been assessed for application to automotive diesel containing FAME at the maximum level allowed by this document.

NOTE The following methods were found to have precision data for diesel fuel containing up to 5 % (*V/V*) FAME, similar to the published values:

— Ash content, EN ISO 6245

— Oxidation stability, EN ISO 12205

6.5.2 The limiting value for the carbon residue given in Table 1 is based on product prior to addition of ignition improver, if used. If a value exceeding the limit is obtained on finished fuel in the market, EN ISO 13759 shall be used as an indicator of the presence of a nitrate-containing compound. If an ignition improver is thus proved present, the limit value for the carbon residue of the product under test cannot be applied. The use of additives does not exempt the manufacturer from meeting the requirement of maximum 0,30 % (*m/m*) of carbon residue prior to addition of additives.

6.5.3 Automotive B10 diesel fuel shall be free from any adulterant or contaminant that may render the fuel unacceptable for use in diesel engine vehicles. Attention is drawn to Annex B of CEN/TR 15367-1 [9] in relation to the issue of abrasive wear of fuel injection equipment by hard particles in diesel fuel. It includes information relating to acceptable (precautionary) particle count levels and laboratory test methods.

NOTE 1 For further information on preventing contamination by water or sediment that may occur in the supply chain, or for cross-contamination, it is advisable to check CEN/TR 15367-1 [9] or CEN/TR 15367-3 [10] respectively.

NOTE 2 CEN/TC 19 is developing a test method to quantify fine, abrasive particles in diesel fuels.

[2] For clarification of renewable, see Directive 2009/28/EC [11].