



SLOVENSKI STANDARD
oSIST prEN 590:2024
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Goriva za motorna vozila - Dizelsko gorivo - Zahteve in preskusne metode

Automotive fuels - Diesel - Requirements and test methods

Kraftstoffe - Dieselmotorkraftstoff - Anforderungen und Prüfverfahren

Carburants pour automobiles - Carburants pour moteur diesel (gazole) - Exigences et méthodes d'essai

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Automotive fuels - Diesel - Requirements and test methods

Carburants pour automobiles - Combustibles pour
moteurs diesel (gazole) - Exigences et méthodes
d'essai

Kraftstoffe für Kraftfahrzeuge - Dieseldieselloststoff -
Anforderungen und Prüfverfahren

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 19.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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<https://standards.iteh.ai/catalog/standards/sist/291bb03b-c03a-4f16-8f97-0cc0eacee14b/osist-pren-590-2024>



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

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Contents	Page
European foreword.....	3
1 Scope	4
2 Normative references	4
3 Terms and definitions	6
4 Sampling	7
5 Pump marking	7
6 Requirements and test methods	7
6.1 Dyes and markers	7
6.2 Additives	7
6.2.1 General	7
6.2.2 Methylcyclopentadienyl manganese tricarbonyl (MMT)	7
6.3 Fatty acid methyl ester (FAME)	7
6.4 Other (bio-) components	8
6.5 Particle count	8
6.5.1 Requirements	8
6.5.2 Test method	9
6.6 Generally applicable requirements and related test methods	9
6.7 Climate-dependent requirements and related test methods	11
6.8 Precision and dispute	13
Annex A (informative) Further information regarding particle count requirements	15
Bibliography	19

European foreword

This document (prEN 590:2024) 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 590:2022.

This document has originally been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association [6].

Requirements following amendment 2003/17/EC [2], 2009/30/EC [3], 2011/63/EU [4] and 2014/77/EU [5] to the European Fuels Quality Directive 98/70/EC [1], are taken into account. Dates are included with all normative test method references for properties required by Annex II of the Fuels Quality Directive 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 similar accuracy and the same or better 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].

Further significant technical changes between this document and the previous edition are EN 590:2022:

- introduction of Clause 3 “Terms and definitions”;
- inclusion of a particle count limit of 10,000 counts/ml for particles $\geq 4 \mu\text{m}$ at “the point of particle certification” in a new Table 2 and 6.5;
- introduction of test method IP 630 procedure A and B to measure the number of particles $\geq 4 \mu\text{m}$ in diesel fuel;
- addition of the constant pressure viscometer method (EN ISO 18335) as an alternative test method to viscosity by EN ISO 3104;
- a reduction of the minimum density for summer grades (A, B, C) from $820,0 \text{ kg/m}^3$ to $815,0 \text{ kg/m}^3$ and the displacement of the parameter to Table 1;
- addition of Annex A “Further information regarding particle count requirements”.

1 Scope

This document specifies requirements and test methods for marketed and delivered automotive diesel fuel. It is applicable to automotive diesel fuel for use in diesel engine vehicles designed to run on automotive diesel fuel containing up to 7,0 % (V/V) Fatty Acid Methyl Ester (FAME).

NOTE 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 12662-1, *Liquid petroleum products — Determination of total contamination — Part 1: Middle distillates and diesel fuels*

EN 12916:2024, *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 16091, *Liquid petroleum products — Middle distillates and fatty acid methyl ester (FAME) fuels and blends — Determination of oxidation stability by rapid small scale oxidation test (RSSOT)*

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 16906:2023, *Liquid petroleum products — Determination of the ignition quality of diesel fuels — Fixed compression ratio 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*

EN 17306:2023, *Liquid petroleum products — Determination of distillation characteristics at atmospheric pressure — Micro-distillation*

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

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)*

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)*

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

EN ISO 12156-1, *Diesel fuel — Assessment of lubricity using the high-frequency reciprocating rig (HFRR) — Part 1: Test method (ISO 12156-1)*

EN ISO 12185:2024, *Crude petroleum, petroleum products and related products — Determination of density — Laboratory density meter with an oscillating U tube sensor (ISO 12185:2024)*

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)*

prEN 590:2024 (E)

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 18335, *Petroleum products and related products — Determination of kinematic viscosity by calculation from the measured dynamic viscosity and density — Method by constant pressure viscometer (ISO 18335)*

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 20884:2019/A1:2021, *Petroleum products — Determination of sulfur content of automotive fuels — Wavelength-dispersive X-ray fluorescence spectrometry (ISO 20884:2019/Amd 1:2021)*

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*

IP 630, *Determination of the concentration of dispersed particles in diesel fuel — Automatic Particle Counter (APC) Light Obscuration Method*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp/ui>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1 point of particle certification
point of import of EN 590 automotive diesel fuel into a CEN member country from a non-CEN member country, or, *point of production* (3.2) of EN 590 automotive diesel fuel inside a CEN member country

Note 1 to entry Figure A.1 provides diagrammatic examples of points of particle certification.

3.2 point of production
point where fuel and/or blend components, when blended together, are certified to conform to EN 590 automotive diesel fuel inside a CEN member country

Note 1 to entry The point of production could be, but is not limited to, a refinery or blending hub.

Note 2 to entry A diesel fuel not fully conforming to EN 590 is considered a blend component.

3.3

particle certification

confirmation that the fuel meets the particle count requirement as per Table 2

3.4

particle recertification

confirmation, in the supply chain after the *point of particle certification* (3.1), that the automotive diesel fuel still meets the particle count requirement as per Table 2

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 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 fuel 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.

6 Requirements and test methods

6.1 Dyes and markers

The use of dyes or markers is allowed. [oSIST prEN 590:2024](https://standards.iteh.ai/catalog/standards/sist/291bb03b-c03a-4f16-8f97-0cc0eace14b/osist-pren-590-2024)

6.2 Additives

6.2.1 General

In order to improve the performance 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 5). The presence of the MMT is limited via a manganese content limit as in Table 1.

6.3 Fatty acid methyl ester (FAME)

Diesel fuel may contain up to 7,0 % (V/V) of FAME complying with EN 14214:2012+A2:2019, in which case the climate dependent requirements set out in 5.4.2 of EN 14214:2012+A2:2019 do not apply.

prEN 590:2024 (E)

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 diesel fuel according to this document are set out in 5.4.3 of EN 14214:2012+A2:2019. 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 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 diesel fuel.

NOTE 2 Cold flow requirements for FAME as a blend component in 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 590 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 renewable¹ feedstock at refineries is also allowed provided that the final fuel meets the requirements of this document.

6.5 Particle count

6.5.1 Requirements

At the point of particle certification, EN 590 automotive diesel fuel before or after the addition of FAME and/or paraffinic diesel, shall meet the requirements of Table 2.

Particle recertification is not required if movement occurs inside or between CEN member countries.

Subsequent blending with diesel fuel complying with EN 590 and/or FAME and/or paraffinic diesel in a CEN member country after the point of particle certification does not require particle recertification.

Annex A provides further information and illustration.

¹ For clarification of the term “renewable” see Directive (EU) 2018/2001 [15].