

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

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Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
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ICS 75.160.20

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EUROPEAN STANDARD

EN ISO 5165

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2020

ICS 75.160.20

Supersedes EN ISO 5165:2018

English Version

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

Produits pétroliers - Détermination de la qualité
d'inflammabilité des carburants pour moteurs diesel -
Méthode cétane (ISO 5165:2020)

Mineralölerzeugnisse - Bestimmung der Zündwilligkeit
von Dieselkraftstoffen - Cetan-Verfahren mit dem CFR-
Motor (ISO 5165:2020)

This European Standard was approved by CEN on 2 July 2020.

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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

European foreword

This document (EN ISO 5165:2020) has been prepared by Technical Committee ISO/TC 28 "Petroleum and related products, fuels and lubricants from natural or synthetic sources" in collaboration with 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of an identical text or by endorsement, at the latest by February 2021, and conflicting national standards shall be withdrawn at the latest by February 2021.

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 ISO 5165:2018.

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Endorsement notice

The text of ISO 5165:2020 has been approved by CEN as EN ISO 5165:2020 without any modification.

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 28, *Petroleum and related products, fuels and lubricants from natural or synthetic sources*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 19, *Gaseous and liquid fuels, lubricants and related products of petroleum, synthetic and biological origin*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This fifth edition cancels and replaces the fourth edition (ISO 5165:2017), which has been technically revised. It is aligned with ASTM D613. The main changes to the previous edition are as follows:

- requirements for primary reference fuels (PRFs), secondary reference fuels (SRFs) and check fuels have been added;
- new low cetane primary reference fuel, pentamethylheptane (PMH), as an alternative to heptamethylnonane (HMN), have been added;
- new reporting requirements.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Petroleum products — Determination of the ignition quality of diesel fuels — Cetane engine method

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1 Scope

This document establishes the rating of diesel fuel oil in terms of an arbitrary scale of cetane numbers (CNs) using a standard single cylinder, four-stroke cycle, variable compression ratio, indirect injected diesel engine. The CN provides a measure of the ignition characteristics of diesel fuel oil in compression ignition engines. The CN is determined at constant speed in a pre-combustion chamber-type compression ignition test engine. However, the relationship of test engine performance to full scale, variable speed and variable load engines is not completely understood.

This document is applicable for the entire scale range from 0 CN to 100 CN but typical testing is in the range of 30 CN to 65 CN. An interlaboratory study executed by CEN in 2013 (10 samples in the range 52,4 CN to 73,8 CN)^[3] confirmed that paraffinic diesel from synthesis or hydrotreatment, containing up to a volume fraction of 7 % fatty acid methyl ester (FAME), can be tested by this test method and that the precision is comparable to conventional fuels.

This test can be used for unconventional fuels such as synthetics or vegetable oils. However, the precision for those fuels has not been established and the relationship to the performance of such materials in full-scale engines is not completely understood.

Samples with fluid properties that interfere with the gravity flow of fuel to the fuel pump or delivery through the injector nozzle are not suitable for rating by this method.

NOTE This document specifies operating conditions in SI units but engine measurements are specified in inch-pound units or Fahrenheit because these are the historical units used in the manufacture of the equipment, and thus some references in this document include these and other non-SI units in parenthesis.

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.

ISO 3170, *Petroleum liquids — Manual sampling*

ISO 3171, *Petroleum liquids — Automatic pipeline sampling*

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

ISO 4787, *Laboratory glassware — Volumetric instruments — Methods for testing of capacity and for use*

ASTM D613, *Standard Test Method for Cetane Number of Diesel Fuel Oil*

ASTM D3703, *Test Method for Hydroperoxide Number of Aviation Turbine Fuels, Gasoline and Diesel Fuels*

ASTM E832-81, *Standard Specification for Laboratory Filter Papers*