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

Produits pétroliers — Détermination de la qualité d'inflammabilité des carburants pour moteurs diesel — Méthode cétane

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Foreword

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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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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 28, *Petroleum products and related products of synthetic or biological origin*.

This fourth edition cancels and replaces the third edition (ISO 5165:1998), which has been technically revised. It has been aligned with ASTM D613-15ae1.

The main changes compared to the previous edition are as follows:

— the Scope has been extended to paraffinic diesel from synthesis or hydrotreatment, in line with the outcome of the interlaboratory study organized by CEN/TC 19 in 2013[1];

— the possibility to use, as an alternative, the new digital (XCP) cetane panel has been added;

— the possibility to rate a sample with primary reference fuels (hexadecane and heptamethylnonane) has been added;

— a determinability limit has been introduced;

— a new procedure for measuring samples having cetane numbers expected to be greater than “T” secondary reference fuel has been introduced;

— cross-references to annexes that have been deleted in ASTM D613-15ae1 have been removed.

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WARNING — The use of this document can involve hazardous materials, operations and equipment. This document does not purport to address all of the safety problems associated with its use. It is the responsibility of users of this document to take appropriate measures to ensure the safety and health of personnel prior to the application of the document.

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)[1] confirmed that paraffinic diesel from synthesis or hydrotreatment, containing up to 7 % (*V/V*) 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, vegetable oils, etc. However, 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 because these are the historical units used in the manufacture of the equipment, and thus some references in this document include these 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 D613-15ae1, *Standard Test Method for Cetane Number of Diesel Fuel Oil*

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

3 Terms and definitions

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