

**Liquid petroleum products -
Determination of ignition delay and
derived cetane number (DCN) of middle
distillate fuels by combustion in a
constant volume chamber**

Liquid petroleum products - Determination of ignition delay and derived cetane number (DCN) of middle distillate fuels by combustion in a constant volume chamber

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 15195:2007 sisaldab Euroopa standardi EN 15195:2007 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 31.05.2007 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 15195:2007 consists of the English text of the European standard EN 15195:2007.</p> <p>This document is endorsed on 31.05.2007 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p>Käsitlusala: This document specifies a test method for the quantitative determination of ignition delay of middle distillate fuels intended for use in compression ignition engines. The method utilizes a constant volume combustion chamber designed for operation by compression ignition, and employing direct injection of fuel into compressed air that is controlled to a specified pressure and temperature. An equation is given to calculate the derived cetane number (DCN) from the ignition delay measurement.</p>	<p>Scope: This document specifies a test method for the quantitative determination of ignition delay of middle distillate fuels intended for use in compression ignition engines. The method utilizes a constant volume combustion chamber designed for operation by compression ignition, and employing direct injection of fuel into compressed air that is controlled to a specified pressure and temperature. An equation is given to calculate the derived cetane number (DCN) from the ignition delay measurement.</p>
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Võtmesõnad:

ICS 75.160.20

English Version

Liquid petroleum products - Determination of ignition delay and derived cetane number (DCN) of middle distillate fuels by combustion in a constant volume chamber

Produits pétroliers liquides - Détermination du délai d'inflammation et de l'indice de cétane dérivé (ICD) des distillats moyens par combustion dans une enceinte à volume constant

Flüssige Mineralölerzeugnisse - Bestimmung des Zündverzugs und der abgeleiteten Cetanzahl (ACZ) von Kraftstoffen aus Mitteldestillaten in einer Verbrennungskammer mit konstantem Volumen

This European Standard was approved by CEN on 8 March 2007.

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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 Management Centre has the same status as the official versions.

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Foreword

This document (EN 15195:2007) 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 October 2007, and conflicting national standards shall be withdrawn at the latest by October 2007.

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

Introduction

This document is derived from joint standardization work in the Energy Institute and ASTM International. It is based on IP 498/06 [1] published by the Energy Institute and harmonized with equivalent IP [2] and ASTM [3] Standards.

The described method is an alternative quantitative determination of the cetane number of middle distillate fuels intended for use in compression ignition engines. Correlation studies between this method and EN ISO 5165:1998 have been done and the results of this are incorporated in this European Standard.

The basis of this method is the derived cetane number correlation equation as given in Clause 13. The ongoing validation of the equation is monitored and evaluated through the existing monthly American and European fuel exchange programs. The validation data will be reviewed by CEN/TC 19 with a frequency of at least every two years. As a result of the review, CEN/TC 19 may make the decision to, if necessary, modify the existing equation/correlation or develop a new one. As part of this review, the sample types will be examined, and if certain types are underrepresented, further steps may be taken to evaluate how they perform.

For the moment the basics of one type of apparatus are described¹. Once more correlation data on different types of derived cetane number testing equipment is available, CEN/TC 19 will consider revising this European Standard.

¹ The injection pump in the currently described apparatus is covered by a patent.

1 Scope

This document specifies a test method for the quantitative determination of ignition delay of middle distillate fuels intended for use in compression ignition engines. The method utilizes a constant volume combustion chamber designed for operation by compression ignition, and employing direct injection of fuel into compressed air that is controlled to a specified pressure and temperature. An equation is given to calculate the derived cetane number (DCN) from the ignition delay measurement.

This standard is applicable to diesel fuels, including those containing FAME. The method is also applicable to middle distillate fuels of non-petroleum origin. However, users applying this standard especially to unconventional diesel fuels are warned that the relationship between derived cetane number and combustion behaviour in real engines is not yet fully understood. The standard covers the ignition delay range from 3,3 ms to 6,4 ms (61 DCN to 34 DCN). The combustion analyser can measure shorter or longer ignition delays, but precision can be affected.

NOTE For the purpose of this European Standard, the expression “% (V/V)” is used to represent the volume fraction and “% (m/m)” the mass fraction.

WARNING — The use of this standard may involve hazardous materials, operations and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2 Normative references

The following referenced documents are indispensable for the application 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 ISO 3170, *Petroleum liquids — Manual sampling (ISO 3170:2004)*

EN ISO 3171, *Petroleum liquids — Automatic pipeline sampling (ISO 3171:1988)*

EN ISO 3696, *Water for analytical laboratory use - Specification and test methods (ISO 3696:1987)*

EN ISO 5165:1998, *Petroleum products - Determination of the ignition quality of diesel fuels - Cetane engine method (ISO 5165:1998)*

ISO 1998-2:1998, *Petroleum industry – Terminology - Part 2: Properties and tests*

ISO 4010, *Diesel engines — Calibrating nozzle, delay pintle type*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1998-2:1998 and the following apply.

3.1

cetane number

CN

measure of the ignition performance of a fuel in a standardized engine test on a scale defined by reference fuels

NOTE 1 It is expressed as the percentage by volume of hexadecane (cetane) in a reference blend having the same ignition delay as the fuel for analysis. The higher the cetane number, the shorter the ignition delay.