

**Naftatooted. Mootorikütuste
detonatsioonikarakteristikute määramine.
Uurimismeetod**

**Petroleum products - Determination of knock
characteristics of motor fuels - Research method (ISO
5164:2014)**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 5164:2014 sisaldab Euroopa standardi EN ISO 5164:2014 inglisekeelset teksti.	This Estonian standard EVS-EN ISO 5164:2014 consists of the English text of the European standard EN ISO 5164:2014.
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English Version

Petroleum products - Determination of knock characteristics of
motor fuels - Research method (ISO 5164:2014)

Produits pétroliers - Détermination des caractéristiques
antidétonantes des carburants pour moteurs - Méthode de
recherche (ISO 5164:2014)

Mineralölerzeugnisse - Bestimmung der Klopfestigkeit von
Ottokraftstoffen - Research-Verfahren (ISO 5164:2014)

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN ISO 5164:2014) has been prepared by Technical Committee ISO/TC 28 "Petroleum products and lubricants" 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of an identical text or by endorsement, at the latest by December 2014, and conflicting national standards shall be withdrawn at the latest by December 2014.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 5164:2005.

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Endorsement notice

The text of ISO 5164:2014 has been approved by CEN as EN ISO 5164:2014 without any modification.

Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Principle	3
5 Reagents and reference materials	3
6 Apparatus	5
7 Sampling and sample preparation	6
8 Basic engine and instrument settings and standard operating conditions	6
8.1 Installation of engine equipment and instrumentation	6
8.2 Engine speed	6
8.3 Valve timing	7
8.4 Valve lift	7
8.5 Intake valve shroud	7
8.6 Carburettor venturi	7
8.7 Direction of engine rotation	7
8.8 Valve clearances	7
8.9 Oil pressure	7
8.10 Oil temperature	8
8.11 Cylinder jacket coolant temperature	8
8.12 Intake air temperature	8
8.13 Intake air humidity	8
8.14 Cylinder jacket coolant level	8
8.15 Engine crankcase lubricating oil level	9
8.16 Crankcase internal pressure	9
8.17 Exhaust back-pressure	9
8.18 Exhaust and crankcase breather system resonance	9
8.19 Belt tension	9
8.20 Rocker arm carrier support basic setting	9
8.21 Rocker arm carrier basic setting	9
8.22 Rocker arm and push rod length basic settings	9
8.23 Basic spark setting	10
8.24 Basic ignition timer control arm setting	10
8.25 Basic ignition timer transducer to rotor vane gap setting	10
8.26 Spark-plug gap	10
8.27 Basic cylinder height setting	10
8.28 Fuel-air ratio	11
8.29 Carburettor cooling	12
8.30 Knockmeter reading limits	12
8.31 Detonation meter spread and time constant settings	12
9 Engine calibration and qualification	12
9.1 General	12
9.2 Engine fit-for-use qualification	12
9.3 Fit-for-use procedure in the 87,1 RON to 100,0 RON range	13
9.4 Fit-for-use procedure below 87,1 RON and above 100,0 RON	14
9.5 Checking performance on check fuels	14
10 Procedure	15
10.1 General	15
10.2 Start-up	15

10.3	Calibration	15
10.4	Sample fuel	16
10.5	Primary reference fuel No. 1	16
10.6	Primary reference fuel No. 2	17
10.7	Additional measurement readings	17
10.8	Special instructions for ratings above 100,0 RON	17
11	Calculation	18
12	Expression of results	18
13	Precision	19
13.1	General	19
13.2	Repeatability, r	19
13.3	Reproducibility, R	19
13.4	Precision for ratings at barometric pressures below 94,6 kPa	19
13.5	Precision for fuels containing 15% to 25% (V/V) ethanol	20
14	Test report	20
Annex A (informative) Test variable characteristics		21
Bibliography		24

Introduction

The purpose of this International Standard is to accord ISO status to a test procedure that is already used in a standardized form all over the world. The procedure in question is published by ASTM International as Standard Test Method D 2699-12.

By publishing this International Standard, ISO recognizes that this method is used in its original text in many member countries and that the standard equipment and many of the accessories and materials required for the method are obtainable only from specific manufacturers or suppliers. To carry out the procedure in every detail requires reference to annexes and appendices of ASTM D 2699-12. The annexes detail the specific equipment and instrumentation required, the critical component settings and adjustments, and include the working tables of referenced settings. The appendices provide background and additional insight about auxiliary equipment, operational techniques and the concepts relative to proper maintenance of the engine and instrumentation items.

The accumulated motor fuel data relating to knock characteristics determined in many countries has, for many years, been based on the use of the CFR engine and the ASTM octane test methods. Accepted worldwide, petroleum industry octane number requirements for motor fuels are defined by the research method and associated CFR F-1 Octane Rating Unit¹⁾, which emphasizes the need for this method and test equipment to be standardized. The initiation of studies to use a different engine for ISO purposes has therefore been considered an unnecessary duplication of effort.

For these reasons, it has been considered desirable by ISO Technical Committee 28, *Petroleum products and lubricants*, to adopt the ASTM D 2699 standard procedures. However, this International Standard refers to annexes and appendices of ASTM D 2699 without change because of their extensive detail. These annexes and appendices are not included in this International Standard because they are available from ASTM International.

Due to identified component obsolescence issues, the original, analogue control panel has been replaced by the manufacturer by new digital panel as of 2011. Service parts availability for the analogue system will be phased out in the future. Research work was executed by ASTM International^[5] to check whether there was statistically observable systemic bias between the 501C and the new digital knock measurement system.

With respect to precision ISO and ASTM technical committees concluded that there was numerically comparable precision for repeatability between the 501C and new panel knock measurement systems, and no statistically observable difference for reproducibility between the 501C and new panel knock measurement systems. This means that the new CFR octane panel could be included in the test method.

1) The sole manufacturer of the Model CFR F-1 Octane Rating Unit is Waukesha Engine, Dresser Waukesha, Inc., 1000 West St. Paul Avenue, Waukesha, WI 53188, USA.

Petroleum products — Determination of knock characteristics of motor fuels — Research method

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

1 Scope

This International Standard establishes the rating of liquid spark-ignition engine fuel in terms of an arbitrary scale of octane numbers using a standard single-cylinder, four-stroke cycle, variable compression ratio, carburetted, CFR engine operated at constant speed. Research octane number (RON) provides a measure of the knock characteristics of motor fuels in automotive engines under mild conditions of operation.

This International Standard is applicable for the entire scale range from 0 RON to 120 RON, but the working range is 40 RON to 120 RON. Typical motor fuel testing is in the range of 88 RON to 101 RON.

This International Standard is applicable for oxygenate-containing fuels containing up to 4,0 % (m/m) oxygen and for gasoline containing up to 25 % (V/V) ethanol.

NOTE 1 Although 25 % (V/V) of ethanol corresponds to approximately 9 % (m/m) oxygen, full applicability of this test method for that oxygen range has only been checked for gasoline type of fuels.

NOTE 2 Work is under way to check the possibility to use the method up to and including 85 % (V/V) ethanol.

NOTE 3 This International Standard specifies operating conditions in SI units but engine measurements may be specified in inch-pound units because these were the units used in the manufacture of the equipment, and thus some references in this International Standard include these units in parenthesis.

NOTE 4 For the purposes of this standard, the terms “% (m/m)” and “% (V/V)” are used to represent the mass fraction, μ , and the volume fraction, φ , of a material respectively.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 D2699-12, *Standard Test Method for Research Octane Number of Spark-Ignition Engine Fuel*

3 Terms and definitions

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