

**Naftasaadused. Tsetaaniarvu  
arvutamine keskmiselt destilleeritud  
kütustes nelja muutujaga võrrandi abil**

Petroleum products - Calculation of cetane index of  
middle-distillate fuels by the four-variable equation

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN ISO 4264:2007 sisaldab Euroopa standardi EN ISO 4264:2007 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 30.10.2007 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN ISO 4264:2007 consists of the English text of the European standard EN ISO 4264:2007.</p> <p>This document is endorsed on 30.10.2007 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>
--	---

<p><b>Käsitlusala:</b></p> <p>Käesolev standard kirjeldab tsetaaniarvu arvutamise käiku naftapäritoluga keskmiselt destilleeritud kütustes. Arvutatud väärtust on nimetatud kui "tsetaaniindeks nelja muutujaga võrrandi abil". Standard ei ole rakendatav kütustele, mis sisaldavad kasvava tsetaaniarvuga lisandeid, ka mitte puhastele süsivesinikele ja ka mitte destillaatkütustele, mis pärinevad kivisöest. Standard on rakendatav kütustele, mis sisaldavad mitteraafat derivaate bitumioosetest liivadest ja põlevkiviõlist.</p>	<p><b>Scope:</b></p> <p>This International Standard describes a procedure for the calculation of the cetane index of middle-distillate fuels from petroleum-derived sources. The calculated value is termed the "cetane index by four-variable equation". Throughout the remaining text of this International Standard, the term "cetane index" implies cetane index by four-variable equation. This International Standard is not applicable to fuels containing additives for raising the cetane number, nor to pure hydrocarbons, nor to distillate fuels derived from coal. It is applicable to fuels containing non-petroleum derivatives from tar sand and oil shale.</p>
---	---

ICS 75.160.20

**Võtmesõnad:** arvutamisreeglid, kütused, määramine, naftasaadused, tsetaaniarv, vedelkütused

English Version

**Petroleum products - Calculation of cetane index of middle-distillate fuels by the four-variable equation (ISO 4264:2007)**

Produits pétroliers - Calcul de l'indice de cétane des distillats moyens par équation à quatre variables (ISO 4264:2007)

Mineralölerzeugnisse - Berechnung des Cetanindex von Mitteldestillat-Kraftstoffen aus der 4 Parameter-Gleichung (ISO 4264:2007)

This European Standard was approved by CEN on 13 August 2007.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

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.

CEN members are the national standards bodies of 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.



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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents	Page
Foreword.....	3

## Foreword

This document (EN ISO 4264:2007) 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 February 2008, and conflicting national standards shall be withdrawn at the latest by February 2008.

This document supersedes EN ISO 4264:1996.

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 the United Kingdom.

### Endorsement notice

The text of ISO 4264:2007 has been approved by CEN as a EN ISO 4264:2007 without any modification.

---

---

**Petroleum products — Calculation of  
cetane index of middle-distillate fuels by  
the four-variable equation**

*Produits pétroliers — Calcul de l'indice de cétane des distillats moyens  
par équation à quatre variables*



**PDF disclaimer**

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2007

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Published in Switzerland

## 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 4264 was prepared by Technical Committee ISO/TC 28, *Petroleum products and lubricants*.

This second edition cancels and replaces the first edition (ISO 4264:1995), of which it constitutes a minor revision with the changes to Figures 1, 2 and 3 and the updating of the normative references in Clause 2.

# Petroleum products — Calculation of cetane index of middle-distillate fuels by the four-variable equation

**WARNING —** The use of this International Standard may involve hazardous materials, operations and equipment. This International Standard does not purport to address all 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 describes a procedure for the calculation of the cetane index of middle-distillate fuels from petroleum-derived sources. The calculated value is termed the “cetane index by four-variable equation”. Throughout the remaining text of this International Standard, the term “cetane index” implies cetane index by four-variable equation.

This International Standard is not applicable to fuels containing additives for raising the cetane number, nor to pure hydrocarbons, nor to distillate fuels derived from coal. It is applicable to fuels containing non-petroleum derivatives from tar sand and oil shale.

**NOTE 1** This International Standard was originally developed using a matrix of fuels, some of which contain non-petroleum derivatives from tar sands and oil shale. Other cetane index equations have since been developed which can be more applicable to tar sands products.

**NOTE 2** The cetane index is not an alternative way to express the cetane number; it is a supplementary tool, to be used with due regard for its limitations.

**NOTE 3** The cetane index is used to estimate the cetane number of diesel fuel when a test engine is not available to determine this property directly, or when insufficient sample is available for an engine rating. In cases where the cetane number of a fuel has been previously established, the cetane index can be used to verify the cetane number of subsequent samples of that fuel, provided the fuel's source and mode of manufacture remain unchanged.

The recommended range of fuel properties for application of this International Standard is as follows:

Fuel property	Recommended range
Cetane number	32,5 – 56,5
Density at 15 °C, kg/m <sup>3</sup>	805,0 – 895,0
10 % (V/V) distillation recovery temperature, °C	171 – 259
50 % (V/V) distillation recovery temperature, °C	212 – 308
90 % (V/V) distillation recovery temperature, °C	251 – 363

Within the recommended range of cetane number (32,5 to 56,5), the expected error of the prediction via the cetane index equation will be less than  $\pm 2$  cetane numbers for 65 % of the distillate fuels examined. Errors may be greater for fuels whose properties fall outside the recommended range of application.

## 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.

ISO 91-1:1992, *Petroleum measurement tables — Part 1: Tables based on reference temperatures of 15 °C and 60 °F*

ISO 3405:2000, *Petroleum products — Determination of distillation characteristics at atmospheric pressure*

ISO 3675:1998, *Crude petroleum and liquid petroleum products — Laboratory determination of density — Hydrometer method*

ISO 12185:1996, *Crude petroleum and petroleum products — Determination of density — Oscillating U-tube method*

## 3 Principle

The density at 15 °C and the temperatures at which 10 % (V/V), 50 % (V/V) and 90 % (V/V) are recovered (distillation recovery temperatures) are determined by standard test methods and the cetane index is calculated from these test data using known correlations.

## 4 Procedure

**4.1** Determine the density at 15 °C of the sample, to the nearest 0,1 kg/m<sup>3</sup>, by the procedure described in ISO 3675 or ISO 12185, using the corrections given in ISO 91-1 if appropriate.

**4.2** Determine the temperatures, to the nearest 1 °C, at which 10 % (V/V), 50 % (V/V) and 90 % (V/V) of the sample is recovered during distillation, corrected to standard barometric pressure, by the procedure described in ISO 3405.

## 5 Calculation

**5.1** Calculate the cetane index by one of the procedures given in 5.1.1 and 5.1.2.

**5.1.1** Insert the measured values (see 4.1 and 4.2) in Equation (1) below and calculate the cetane index, *CI*.

$$CI = 45,2 + 0,089 2T_{10N} + (0,131 + 0,901B)T_{50N} + (0,052 3 - 0,42B)T_{90N} + \dots \\ \dots + 0,000 49(T_{10N}^2 - T_{90N}^2) + 107B + 60B^2 \quad (1)$$

where

$$T_{10N} = T_{10} - 215;$$

$$T_{50N} = T_{50} - 260;$$

$$T_{90N} = T_{90} - 310;$$

$T_{10}$  is the 10 % (V/V) distillation recovery temperature, in degrees Celsius;

$T_{50}$  is the 50 % (V/V) distillation recovery temperature, in degrees Celsius;