INTERNATIONAL STANDARD

ISO 4264

Third edition
2018-06

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

Reference number
ISO 4264:2018(E)

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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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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 lubricants*.

This third edition cancels and replaces the second edition (ISO 4264:2007), which has been technically revised.

The main changes from the previous edition are as follows:

— this edition includes a statement on the existence of sample specific bias;

— the second procedure to establish the cetane index using nomography is moved into an informative annex;

— ISO 3924 is added as an alternative to test method ISO 3405.

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

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1 Scope

This document specifies 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 document, the term "cetane index" implies cetane index by four-variable equation.

This document is applicable to fuels containing non-petroleum derivatives from tar sand and oil shale. It is not applicable to pure hydrocarbons, nor to distillate fuels derived from coal. Cetane index calculations do not take into account the effects from additives used to enhance the Cetane number.

NOTE 1 This document was originally developed using a matrix of fuels, some of which contain non-petroleum derivatives from tar sands and oil shale.

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.

The most suitable range of fuel properties for application of this document is as follows:

Fuel property	**Range**
Cetane number	32,5 to 56,5
Density at 15 °C, kg/m^3	805,0 to 895,0
10 % (*V/V*) distillation recovery temperature, °C	171 to 259
50 % (*V/V*) distillation recovery temperature, °C	212 to 308
90 % (*V/V*) distillation recovery temperature, °C	251 to 363

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

As a consequence of sample-specific biases observed, the expected error can be greater even when the fuel's properties fall inside the recommended range of application. Therefore, users can assess the required degree of prediction agreement to determine the fitness-for-use of the prediction.

NOTE 4 Sample specific biases were observed for distillate fuels containing FAME (fatty acid methyl ester).

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