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**CAN/CGSB-3.27-2018**

Supersedes CAN/CGSB-3.27-2012

# Naphtha fuel

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**NATIONAL STANDARD OF CANADA** **CAN/CGSB-3.27-2018**

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# Naphtha fuel

CETTE NORME NATIONALE DU CANADA EST DISPONIBLE EN VERSIONS FRANÇAISE ET ANGLAISE.

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*Acknowledgment is made for the translation of this National Standard of Canada by the Translation Bureau of Public Services and Procurement Canada.*

This National Standard of Canada CAN/CGSB-3.27-2018 supersedes the 2012 edition.

**Changes since the previous edition**

- Rounding-off of specified limiting values; and
- Addition of test methods to quantify aromatics, benzene, olefins, sulphur, distillation and vapour pressure.

# Contents

Page

# Naphtha fuel

## 1 Scope

This standard applies to one type of naphtha fuel suitable for use in catalytic-type heaters and in naphtha pressure-appliances such as stoves, lanterns, heating units and blowtorches.

The specified limiting values in this standard are present to allow the use of this naphtha fuel in catalytic heaters. The use of other types of fuel in catalytic heaters such as fuels with a higher boiling point range, higher vapour pressure or higher sulphur concentration could result in poor or hazardous performance.

The testing and evaluation of a product against this standard may require the use of materials and/or equipment that could be hazardous. This document does not purport to address all the safety aspects associated with its use. Anyone using this standard has the responsibility to consult the appropriate authorities and to establish appropriate health and safety practices in conjunction with any applicable regulatory requirements prior to its use.

## 2 Normative references

The following normative documents contain provisions that, through reference in this text, constitute provisions of this National Standard of Canada. The referenced documents may be obtained from the sources noted below.

NOTE The addresses provided below were valid at the date of publication of this standard.

An undated reference is to the latest edition or revision of the reference or document in question, unless otherwise specified by the authority applying this standard. A dated reference is to the specified revision or edition of the reference or document in question.

### 2.1 Canadian General Standards Board (CGSB)

CAN/CGSB-3.0 — *Methods of testing petroleum and associated products*:

No. 14.3 — *Standard test method for the identification of components in automotive gasoline using gas chromatography*

No. 28.8 —*Visual haze rating of liquid fuels.*

#### 2.1.1 Source

The above may be obtained from the Canadian General Standards Board, Sales Centre, Gatineau, Canada K1A 1G6. Telephone 819-956-0425 or 1-800-665-2472. Fax 819-956-5740. E-mail ncr.cgsb-ongc@tpsgc-pwgsc.gc.ca. Web site www.tpsgc-pwgsc.gc.ca/ongc-cgsb/index-eng.html.

### 2.2 ASTM International

*Annual Book of ASTM Standards* (see Annex A).

#### 2.2.1 Source

The above may be obtained from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, U.S.A., telephone 610-832-9585, fax 610-832-9555, Web site www.astm.org, or from IHS Markit, 200-1331 MacLeod Trail SE, Calgary, Alberta T2G 0K3, telephone 613-237-4250 or 1-800-267-8220, fax 613-237-4251, Web site www.global.ihs.com.

## 3 Terms and definitions

For the purposes of this National Standard of Canada, the following term and definition apply.

**3.1**
**naphtha fuel**
light distillate fuel generally composed of C5 to C12 hydrocarbons and naturally occurring, petroleum-derived non-hydrocarbons.

## 4 General requirements

**4.1** The naphtha fuel shall be visually clear and free from undissolved water, sediment, and suspended matter under the temperature and conditions of custody transfer. It is recommended that the fuel not be dyed.

**4.2** The naphtha fuel shall be a stable, homogeneous liquid free from foreign matter likely to clog filters or nozzles, or damage equipment.

**3.3** The naphtha fuel shall not contain any metal–containing additives such as anti-knock compounds or combustion enhancers.

**4.2** If the naphtha fuel contains additives, the supplier shall provide the purchaser with a record of the type and concentration (see 7.1 a).

## 5 Detailed requirements

**5.1** The naphtha fuel shall comply with the specified limiting values. The specified limiting values shall not be changed. This precludes any allowances for the test method precision and for adding or subtracting digits.

**5.1.1** To determine conformance with the specified limiting values, an observed value or a calculated value shall be rounded off “to the nearest unit” in the last right-hand digit used in expressing the specified limiting values, in accordance with the rounding-off method of ASTM E29. There are three exceptions (see 5.11 a, b and c) that shall be reported to the nearest 0.5°C.

**5.1.2** Where test values differ between two parties, a resolution shall be in accordance with ASTM D3244 in order to determine conformance with the specified limiting values, with the criticality of the limits set at $P = 0.5$.

**5.1.3** Zeroes trailing the last nonzero digit for numbers represented with a decimal point are significant digits, in accordance with ASTM E29.

**5.1.4** Differences in precision, sensitivity and bias between the referee test methods and others referenced in this standard shall be considered.

**5.2** Test methods other than those referenced in this standard may be used only if they have been validated in accordance with ASTM D3764 or D6708. These are referred to as validated test methods.

**5.2.1** Validated test methods shall correlate with methods referenced in the standard. Differences in precision, sensitivity and bias between methods referenced in the standard and the validated methods shall be noted when using results from validated methods.

**5.2.2** Validated test methods shall only be used within the bounds of the data covered in their validation.

**5.3** In the event of a dispute, the procedures given in 5.1.1, 5.1.2, 5.1.3 and 5.1.4 shall be used.

**5.3.1** If parties in a dispute cannot agree on an analytical method to resolve the dispute, the method listed in the standard shall be used. Where more than one method is listed for a given detailed requirement, the referee method shall be used.

| | Property | Specified limiting values | | | |
|---|---|---|---|---|---|
| | | Min. | Max. | Test method | |
| | | | | ASTM | CGSB |
| **5.4** | Appearance at 20-25°C, visual haze rating | — | 1 | — | CAN/CGSB-3.0 No. 28.8 |
| **5.5** | Colour, Saybolt | +25 | — | D156[a]<br>D6045 | — |
| **5.6** | Aromatics, % by volume | — | 10. | D6729 | CAN/CGSB-3.0 No. 14.3[a] |
| **5.7** | Benzene, % by volume | — | 0.1 | D6729 | CAN/CGSB-3.0 No. 14.3[a] |
| **5.8** | Olefins, one of the following:<br>a) Olefins[a], % by volume<br>or | — | 2 | D6729 | CAN/CGSB-3.0 No. 14.3[a] |
| | b) Bromine number | — | 5 | D1159 | — |
| **5.9** | Residue acidity | Neutral | | D1093 | — |
| **5.10** | Sulphur, mg/kg | — | 5 | D2622<br>D3120<br>D5453[a]<br>D6920<br>D7039 | — |
| **5.11** | Distillation | | | D86[a, b]<br>D7345 | — |
| | a) Initial boiling point, °C | 38 | 71 | | |
| | b) 50% recovered, °C | 66 | 93 | | |
| | c) Final boiling point, °C | 93 | 127 | | |
| | d) Recovery, % by volume | 97 | — | | |
| | e) Residue, % by volume | — | 1.0 | | |
| **5.12** | Vapour pressure, kPa | — | 55.0 | D5191[a]<br>D5482<br>D6378 | — |
| **5.13** | Oxidative stability, induction period, min | 480 | — | D525 | — |

| | Property | Specified limiting values | | | |
|---|---|---|---|---|---|
| | | Min. | Max. | Test method | |
| | | | | ASTM | CGSB |
| 5.14 | Copper strip corrosion, 3 h at a minimum temperature of 50°C | — | No. 1 | D130 | — |
| 5.15 | Solvent washed gum content, mg/100 mL | — | 1.0 | D381 | — |

[a] Referee method to be used in the event of a dispute.

[b] The ASTM Test Method D86 utilizes either manual or automated equipment. In the event of a dispute, the automated test method shall be the referee method.

# 6 Inspection

## 6.1 Sampling

**6.1.1** Sampling equipment and procedures shall be designed and used to obtain representative samples of the product. Sampling lines, hoses, etc., should be flushed prior to taking a sample. Sampling containers shall be appropriate for preserving the integrity of the sample for the detailed requirement being determined. Procedures shall be in accordance with ASTM D4057, D4177, D5842 or D5854.

**6.1.2** Sample volume shall be consistent with the requirements of the testing laboratory and/or the authority having jurisdiction. Unless otherwise specified (see 7.1.b), a sample of at least 3 L shall be taken.

# 7 Options

**7.1** The following options shall be specified in the application of this standard:

a) Additive types and concentrations, if present (see 4.4)

b) Sample size, if other than specified (see 6.1.2).

# Annex A
*(normative)*

## Referenced ASTM International publications (see 2.2)

**Annual Book of ASTM Standards**

ASTM D86 Standard Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure

ASTM D130 Standard Test Method for Corrosiveness to Copper from Petroleum Products by the Copper Strip Test

ASTM D156 Standard Test Method for Saybolt Color of Petroleum Products (Saybolt Chromometer Method)

ASTM D381 Standard Test Method for Gum Content in Fuels by Jet Evaporation

ASTM D525 Standard Test Method for Oxidation Stability of Gasoline (Induction Period Method)

ASTM D1093 Standard Test Method for Acidity of Hydrocarbon Liquids and Their Distillation Residues

ASTM D1159 Standard Test Method for Bromine Numbers of Petroleum Distillates and Commercial Aliphatic Olefins by Electrometric Titration

ASTM D2622 Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry

ASTM D3120 Standard Test Method for Trace Quantities of Sulfur in Light Liquid Petroleum Hydrocarbons by Oxidative Microcoulometry

ASTM D3244 Standard Practice for Utilization of Test Data to Determine Conformance with Specifications

ASTM D3764 Standard Practice for Validation of the Performance of Process Stream Analyzer Systems

ASTM D4057 Standard Practice for Manual Sampling of Petroleum and Petroleum Products

ASTM D4177 Standard Practice for Automatic Sampling of Petroleum and Petroleum Products

ASTM D5191 Standard Test Method for Vapor Pressure of Petroleum Products (Mini Method)

ASTM D5453 Standard Test Method for Determination of Total Sulfur in Light Hydrocarbons, Spark Ignition Engine Fuel, Diesel Engine Fuel, and Engine Oil by Ultraviolet Fluorescence

ASTM D5482 Standard Test Method for Vapor Pressure of Petroleum Products (Mini Method—Atmospheric)

ASTM D5842 Standard Practice for Sampling and Handling of Fuels for Volatility Measurement

ASTM D5854 Standard Practice for Mixing and Handling of Liquid Samples of Petroleum and Petroleum Products

ASTM D6045 Standard Test Method for Color of Petroleum Products by the Automatic Tristimulus Method

ASTM D6378 Standard Test Method for Determination of Vapor Pressure (VPx) of Petroleum Products, Hydrocarbons, and Hydrocarbon-Oxygenate Mixtures (Triple Expansion Method)

ASTM D6708 Standard Practice for Statistical Assessment and Improvement of Expected Agreement Between Two Test Methods that Purport to Measure the Same Property of a Material

ASTM D6729 Standard Test Method for Determination of Individual Components in Spark Ignition Engine Fuels by 100 Metre Capillary High Resolution Gas Chromatography

ASTM D6920 Standard Test Method for Total Sulfur in Naphthas, Distillates, Reformulated Gasolines, Diesels, Biodiesels, and Motor Fuels by Oxidative Combustion and Electrochemical Detection

ASTM D7039 Standard Test Method for Sulfur in Gasoline, Diesel Fuel, Jet Fuel, Kerosine, Biodiesel, Biodiesel Blends, and Gasoline-Ethanol Blends by Monochromatic Wavelength Dispersive X-ray Fluorescence Spectrometry

ASTM D7345 Standard Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure (Micro Distillation Method)

ASTM E29 Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications.