CAN/CGSB-3.5-2026

Supersedes CAN/CGSB-3.5-2021,
Amendment No. 1, September 2022
Corrigendum No. 1 August 2023

Automotive gasoline

Developed by the Canadian General Standards Board

Canada

SCC CCN

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This standard was developed by the Canadian General Standards Board and published in February 2026.

ICS 75.160.20

ISBN 978-0-660-97850-5

Catalogue number P29-003-005-2026E-PDF

CETTE NORME NATIONALE DU CANADA EST DISPONIBLE EN VERSIONS FRANÇAISE ET ANGLAISE. La version française de la présente norme est intitulée *Essence automobile*

Canadian General Standards Board

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Translation of this National Standard of Canada was conducted by the Government of Canada.

Preface

This National Standard of Canada CAN/CGSB-3.5, *Automotive gasoline*, was published in February 2026.

Changes since the previous edition

- CAN/CGSB-3.511 has been merged into CAN/CGSB 3.5. There are now three types of gasoline, each with four grades.
- Updated several definitions and added definitions of conventional and synthetic hydrocarbons, which are now referenced in paragraph 5.5.
- Added ASTM D8340 and D6122 as practices for validated test methods.
- Revised the minimum limit from 20 to 25 minutes in ASTM D7525, which is listed as an alternative method for oxidation stability.
- Gasoline volatility limits updated based upon a set of revised guidelines and using a weather dataset covering the years from 1991 to 2020 (inclusive).
- Reworded footnotes in Tables 2, 3A, 3B, 3C 3D, 3E and 3F to better reflect *British Columbia, Ontario, Quebec, New Brunswick and Nova Scotia regulations.*
- Added footnote to Table 3G regarding the supply of gasoline in summer for use in the following winter.
- Updated various regulations in Annex B.
- Deleted Annex C.

The following definitions apply in understanding how to implement this National Standard of Canada:

- “shall” indicates a **requirement**;
- “should” indicates a **recommendation**;
- “may” is used to indicate that something is **permitted**;
- “can” is used to indicate that something is **possible**, for example, that an organization is able to do something.

Notes accompanying clauses do not include requirements or alternative requirements. The purpose of a note accompanying a clause is to separate explanatory or informative material from the text. Annexes are designated normative (mandatory) or informative (non-mandatory) to define their application.

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Automotive gasoline

1 Scope

This National Standard of Canada applies to three types of gasoline to which no lead or phosphorus compounds have been added.

Type A contains 1.0 to 10% by volume denatured fuel ethanol, E1-E10.

Type B contains 11 to 15% by volume denatured fuel ethanol, E11-E15.

Type C contains up to 0.9% by volume denatured fuel ethanol, E0.

They are intended for use in spark-ignition engines under a wide range of climatic conditions. Each type may be supplied in one of four grades which differ in anti-knock index (octane rating).

Type B gasoline in this standard is intended for use in automotive vehicles that are compatible with oxygenated gasoline containing up to 15% by volume ethanol (see 9.6).

This standard is not intended to apply to the mixing of gasolines, either at or after the point of retail sale.

Gasoline specified in this standard may contain other oxygenates as additives (see 5.6).

Provincial, territorial, and federal regulations control some parameters and specify test methods included in this standard, and when such government regulations are more restrictive, they supersede the requirements in this standard.

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.

Units of measurement – Quantities and dimensions used in this standard are provided in units from the International System of Units (SI units). This standard expresses the industry standard nominal measurements in North America of “% by mass” and “% by volume”. The SI equivalent expressions for these units are % (m/m) and % (V/V) respectively.

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 contact information provided below was 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 hydrocarbon components in automotive gasoline using gas chromatography*

No. 19.5 — *Determination of lead in automotive gasoline (Atomic absorption)*

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

No. 60.32 — *Standard test method for determination of the corrosiveness to silver of gasoline, middle distillate fuels and oxygenated fuels using silver wool – Rapid ultrasonic method*

CAN/CGSB-3.516 — *Denatured fuel ethanol for use in automotive spark-ignition fuels*

2.1.1 Contact information

The above may be obtained from the Canadian General Standards Board. Telephone: 1-800-665-2472. Email: ncr.cgsb-ongc@tpsgc-pwgsc.gc.ca. Web site: https://www.tpsgc-pwgsc.gc.ca/ongc-cgsb/index-eng.html. They may also be obtained from the Government of Canada Publications, Publishing and Depository Services, Public Services and Procurement Canada. Telephone: 1-800-635-7943 or 613-941-5995. Email: publications@tpsgc-pwgsc.gc.ca. Web site: https://publications.gc.ca/site/eng/home.html.

2.2 ASTM International

Annual Book of ASTM Standards (see Annex A)

2.2.1 Contact information

The above may be obtained from ASTM International. Telephone: 610-832-9585. Web site: https://www.astm.org, or from the Standard Store by Accuris. Web site: https://store.accuristech.com.

2.3 Environment and Climate Change Canada (ECCC)

Benzene in Gasoline Regulations (SOR/97-493)

Sulphur in Gasoline Regulations (SOR/99-236)

2.3.1 Contact information

The above may be obtained from the Department of Justice Canada, Communications Branch. Web site: https://laws-lois.justice.gc.ca/eng/index.html. If this Web site becomes inoperative, regulations may also be found at https://www.canlii.org.

2.4 NACE International

TM-0172 — *Determining Corrosive Properties of Cargoes in Petroleum Product Pipelines*

2.4.1 Contact information

The above may be obtained from NACE International. Telephone: 281-228-6200. Web site: https://www.ampp.org. Email: firstservice@nace.org.

2.5 Transport Canada (TC)

Transportation of Dangerous Goods Regulations (SOR/2001-286)

2.5.1 Contact information

The above may be obtained from the Department of Justice Canada, Communications Branch. Web site: https://laws-lois.justice.gc.ca/eng/index.html. If this Web site becomes inoperative, regulations may also be found at https://www.canlii.org.

2.6 Revenue Canada

Denatured and Specially Denatured Alcohol Regulations (SOR/2005-22)

2.6.1 Contact information

The above may be obtained from the Department of Justice Canada, Communications Branch. Web site: https://laws-lois.justice.gc.ca/eng/index.html. If this Web site becomes inoperative, regulations may also be found at https://www.canlii.org.

2.7 United States Environmental Protection Agency (U.S. EPA)

Certified Gasoline Detergents

2.7.1 Contact information

The above may be obtained from the U.S. Environmental Protection Agency, Transportation and Air Quality. Web site: http://www3.epa.gov/otaq/fuels1/ffars/web-detrg.htm.

2.8 See Annex B for other acts and regulations that apply to automotive gasoline.

3 Terms and definitions

For the purposes of this National Standard of Canada, the following terms and definitions apply.

antiknock index
average of the Research (*RON*) and Motor (*MON*) octane number for the fuel, i.e. (*RON* + *MON*)/2.

benzene emissions number (BEN)
estimate of the evaporative, running and tailpipe benzene emissions from vehicles that is calculated in accordance with Schedule 1 of the Benzene in Gasoline Regulations (see Annex B, B.1.6).

closed loop side stream sampler
sample line connected to a storage tank or pipeline capable of extracting a sample and re-injecting any excess back into the product being sampled.

conventional hydrocarbons
hydrocarbons derived from natural gas-liquid condensates, crude oil, heavy oil, shale oil and oil sands, which are generally accompanied by low levels of naturally occurring non-hydrocarbons.

denatured fuel ethanol
commercially manufactured ethanol containing denaturant, as required by the Denatured and Specially Denatured Alcohol Regulations – SOR/2005-22, which leaves the ethanol suitable for use in automotive spark-ignition engines and makes it unsuitable for beverage or medicinal use.

driveability index (DI)
parameter based on distillation temperatures. It is designed to ensure good vehicle performance relating to time-to-start, stalls, hesitations, stumbles, surges and backfiring. It is defined as:

Equation 1

$DI = 1.5 \times T10 + 3 \times T50 + T90 + f \times (\%\ volume\ ethanol)$

where:

T10, *T50*, *T90* = temperatures (°C) at 10%, 50%, and 90% evaporated in a distillation test (see 6.21);

% volume ethanol = concentration of ethanol in the gasoline, in % by volume.

f = the multiplier for % volume ethanol, with the following assigned values.

% volume ethanol	*f*
< 1.0	Zero
1.0-10.	1.33
11	2.12
12	2.90
13	3.69
14	4.47
15	5.26

DI can be converted to its degrees Fahrenheit equivalent, as follows:

Equation 2

$DI_F = 1.8 \times DI + 176$

where:

DI_F = *DI* based on °F;

DI = *DI* based on °C.

DVPE
vapour pressure reported as dry vapour pressure equivalent (DVPE)

gasoline
fuel intended for use in spark-ignited internal combustion engines that conforms to the requirements of this standard.

grade
gasoline as differentiated by the antiknock index, with Grade 1 having the lowest index (see 4.1.2).

oxygenate
oxygen-containing organic compound, such as an alcohol or ether, which may be used as a fuel or blend component.

phase separation
formation of two layers: a lower aqueous layer and an upper hydrocarbon layer separated by a common boundary or layer of emulsion.

point of blending
location at or downstream of a primary terminal where gasoline is produced by blending gasoline components (for example, denatured fuel ethanol or butane). Blending does not include the commingling of gasolines at the point of retail sale or the addition of additives.

point of retail sale
location where the end user takes delivery of the product.

primary supplier
for gasoline that is
a) manufactured in a refinery, the manufacturer;
b) imported, the importer; and
c) blended, the blender.

primary terminal
distribution facility that
a) is connected directly to a refinery; or
b) can be supplied by pipeline from a refinery; or
c) receives imported product directly; or
d) is located on the Great Lakes and can be supplied by ship.

proportional sample
sample made by combining samples from different batches in volumetric proportion.

recirculation loop
piping and a transfer pump configured into a loop and used to mix the product in a storage tank by recirculating the product from one part of the tank to another.

sample integrity
no significant change in the detailed requirement being tested, i.e., between the sample point and the analytical equipment.

synthetic hydrocarbons
hydrocarbons derived from non-petroleum sources such as biomass, natural gas, coal, fats and oils by processes such as gasification, reforming, Fischer-Tropsch synthesis, hydroprocessing, catalytic cracking or hydrocracking (including coprocessing with petroleum).

type
gasoline as differentiated by the percentage by volume denatured fuel ethanol, with Type A having 1.0% to 10% by volume, Type B having 11% to 15% by volume and Type C having up to 0.9% by volume.

water tolerance
ability of a gasoline to dissolve water without phase separation.

yearly pool average
volume weighted average of a parameter in the gasoline supplied by a primary supplier during a calendar year.

4 Classification

4.1 The gasoline shall be supplied in the following types and grades, as specified (see 8.1).

4.1.1 Types

Type A — E1-E10; contains 1.0% to 10% by volume denatured fuel ethanol;
Type B — E11-E15; contains 11% to 15% by volume denatured fuel ethanol;
Type C — E0; contains up to 0.9% by volume denatured fuel ethanol.

4.1.2 Grades

Grade 1 — Regular
Grade 2 — Mid-grade
Grade 3 — Premium
Grade 4 — Super-premium

5 General requirements

5.1 The gasoline shall comply with this standard at the point of retail sale except for the volatility requirements specified in 5.2, 5.3 and 5.4.

5.2 Volatility requirements

The requirements for DVPE, distillation, and driveability index are adjusted by geographic zones of intended use and time of year. The zones are described in Table 2 and shown in Figures 1, 2 and 3. The limiting values for each zone are listed in Tables 3A to 3H.

5.3 Vapour pressure

When gasoline is blended with a component that can increase the DVPE of the blend, the DVPE limits apply to the blended product at the point of blending.

5.3.1 Vapour pressure, maximum

Maximum DVPE limits at or below 72 kPa are set by provincial regulations to minimize evaporative losses in fuel distribution and from vehicles and equipment (see Annex B). DVPE limits at or below 72 kPa in Tables 3A to 3H may be waived by the regulator but shall not exceed 72 kPa.

5.3.2 Vapour pressure, minimum

In addition to helping ensure cold startability, minimum DVPE limits are intended to help minimize the formation of a flammable mixture in the vapour space of fuel tanks at low ambient temperatures.

5.4 Application of the volatility requirements

The volatility requirements specified in 6.19, 6.20 and 6.21 shall be for the period and geographic zone of intended use, detailed in Tables 3A to 3H, with compliance at one of the following:

a) primary terminal;

b) point of entry into Canada.

The volatility schedules detailed in Tables 3A to 3H include a half-month period for turning over inventory at service stations, when necessary. A longer turnover period at times close to seasonal weather changes could result in degraded vehicle performance.

5.5 Composition

Automotive gasoline shall be essentially hydrocarbons (Type C) or hydrocarbons and ethanol (Types A and B). The hydrocarbons may be conventional, synthetic or both conventional and synthetic (See 3).

5.6 Additives

Automotive gasoline may contain additives designed and tested to improve the characteristics of the gasoline to enhance performance. Additives include, but are not limited to, metal deactivators, oxidation inhibitors, corrosion inhibitors, icing inhibitors and fuel system detergents. Additives designed and tested to enhance performance may be added in amounts less than 1.0% by volume, unless otherwise specified in this standard.

5.7 Vehicles require effective fuel system detergency to minimize engine deposits that impair performance and increase exhaust emissions (see 6.25).

5.8 Aldehydes, ketones, amines, acids, acid esters, halogenated compounds, silicon compounds, soluble polymers, used lubricating oils and solvents or other such materials shall not be added except as components of additives defined in 5.6 or as normally occurring trace constituents.

5.9 The gasoline shall be visually clear and free from undissolved water, sediment and suspended matter under the temperature and conditions of custody transfer. Components shall be thoroughly mixed to prevent the sale of compositions that do not meet the standard or are potentially damaging due to stratification in dispensing tankage.

5.10 Materials used in refinery processes, such as caustics and acids, can be carried over in trace quantities into the gasoline and could cause unexpected problems. Moreover, these contaminants cannot always be detected by the standard tests listed in this standard. It is recommended that adequate quality assurance procedures be put in place to ensure that any refinery processing materials are identified and controlled.

6 Detailed requirements

6.1 The denatured fuel ethanol component (see 6.16) shall meet the requirements of Type 1 or Type 2 denatured fuel ethanol in CAN/CGSB-3.516.

6.2 The gasoline shall comply with the specified limiting values (6.6 to 6.24). The specified limiting values shall not be changed. This precludes any allowances for the test method precision and for adding or subtracting digits.

6.2.1 For purposes of determining conformance with the specified limiting values, an observed value or a calculated value shall be rounded “to the nearest unit” in the last right-hand digit used in expressing the specified limiting value, in accordance with the rounding method of ASTM E29. There is one exception (see Table 1, Antiknock Index).

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

6.2.3 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 $P = 0.5$.

6.3 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. Multivariate spectroscopic test methods may be used in accordance with ASTM D8340 and D6122. Test methods validated using these practices are referred to as validated test methods.

6.3.1 Differences in precision, sensitivity and bias between the referee test methods referenced in the standard and the validated test methods shall be considered.

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

6.4 In the event of a dispute, the procedures given in 6.2.1, 6.2.2 and 6.2.3 shall be used. 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.

6.5 Differences in precision, sensitivity and bias between the referee test methods and others referenced in the standard shall be considered. When using alternate test methods referenced in this standard, users are cautioned to develop their own supporting data for correlation with the referee test method if the results are outside of the range quoted for the specific alternative test method’s precision and bias.

Property		Specified limiting values			
		All grades		Test methods	
		Min.	Max.	ASTM	CGSB (except 6.7)
6.6	Copper strip corrosion, 3 h at 50 °C	—	No. 1	D130	—
6.7	Corrosion, steel in water	—	B+	D7548	NACE TM-0172[a]
6.8	Solvent washed gum content, mg/100 mL	—	5	D381	—
6.9	Lead content, mg/L[b]	—	5	D3237 D5059	CAN/CGSB-3.0 No. 19.5[a]
6.10	Manganese content, mg/L	—	18	D3831	—
6.11	Oxidation stability:[c] (Induction period) min. or (Induction period) min.	 240. 25	 — —	 D525[a] D7525	—
6.12	Phosphorus content, mg/L	—	1.3	D3231	—
6.13	Silver corrosion (see 9.2), Silver wool or Silver strip	 — —	 B No. 1	 — D7671	CAN/CGSB-3.0 No. 60.32[a]
6.14	Sulphur content, mg/kg (see 6.27)	—	80.	D2622 D3120 D5453[a] D7039 D7220	—
6.15	Oxygen content[d], % by mass		Report	D4815 D5599 D6729 D6730 D8071	CAN/CGSB-3.0 No. 14.3[a]
6.16	Ethanol content[e], % by volume Type A Type B Type C	 1.0 11 -	 10. 15 0.9	D4815 D5599 D6729 D6730 D8071	CAN/CGSB-3.0 No. 14.3[a]
6.17	Methanol content % by volume	—	0.30	D4815 D5599 D6729 D6730 D8071	CAN/CGSB-3.0 No. 14.3[a]
6.18	Antiknock performance	See Table 1		D2699[a] D2700[a] D2885	—

Property		Specified limiting values			
		All grades		Test methods	
		Min.	Max.	ASTM	CGSB (except 6.7)
6.19	Vapour pressure as DVPE	See Tables 3A to 3H		D4953[f] D5191[a] D5482[g] D6378[h]	—
6.20	Driveability index	See Tables 73A to 3H		See Section 3, driveability index	—
6.21	Distillation	See Tables 3A to 3H		D86[a and i] D7345[j]	—
6.21.1	Final boiling point, °C	—	225	D86[a and i] D7345[j]	—
6.22	Benzene content[k] % by volume (see 6.26)	—	1.5	D6729 D8071	CAN/CGSB-3.0 No. 14.3[a]
6.23	BEN (see 6.26)[k]	Report		—	—
6.24	Appearance at 20 to 25 °C, visual haze rating	—	1	D4176 (Proc 2) D8148[l]	CAN/CGSB-3.0 No. 28.8[a]

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

[b] The test methods identified were primarily developed for the determination of lead from alkyl lead addition. Caution is advised in the application of these methods when determining lead contamination which is suspected to originate from non-alkyl lead sources.

[c] Oxidation stability can degrade over time. Suppliers should make appropriate allowances in order that this detailed requirement is met at point of sale.

[d] Small quantities of oxygenates can be used to mitigate problems associated with water contamination. Small quantities of ethanol can be present in Type C gasoline due to distribution practices. The presence of such oxygenates will increase the oxygen content of the gasoline.

[e] Metered (measured) volumes may be used for reporting in place of analytical tests

[f] ASTM D4953 Procedure A reports dry vapour pressure which may be used instead of DVPE in this standard. When using ASTM D4953 Procedure B report DVPE by using the appropriate equation given in the test method.

[g] The DVPE value shall be reported using the appropriate equation given in ASTM D5482. With some instruments the DVPE calculation is done automatically.

[h] The DVPE value shall be reported using the appropriate “Predicted DVPE” equation given in ASTM D6378.

[i] ASTM Test Method D86 utilizes either manual or automated equipment. In cases of dispute, the automated test method shall be selected as the referee test method.

[j] ASTM D7345 showed relative bias for some results versus the automated D86 (the referee test method). Reported results shall be bias-corrected to test method D86 (automated) using the equations and information given in ASTM D7345.

[k] In this standard, benzene content and BEN requirements shall conform to the *Benzene in Gasoline Regulations*, Schedule 1 (Annex B, B.1.6).

[l] An ordinal, whole-number Instrument Haze Rating (IHR) from 1 to 6 is reported by ASTM D8148

6.25 Deposit control additive

All gasoline retailed in Canada shall contain a deposit control additive sufficient to meet either:

a) an intake valve deposit requirement of less than 100 mg average deposit mass per valve after a 16 093.0 km (10 000 miles) driving cycle, or less than 25 mg average deposit mass per valve after a 8046.5 km (5000 miles) driving cycle as specified by ASTM D5500; or

b) an intake valve deposit requirement of less than 135 mg average deposit mass per valve after a 100 h dynamometer test cycle as specified by ASTM D6201.

6.25.1 The addition of a deposit control additive, sometimes referred to as a detergent package, is required to comply with 6.25. Proof of performance shall be provided by:

a) certification by the deposit control additive supplier that the dosage recommended to the gasoline marketer/producer meets or exceeds the minimum as listed with the U.S. EPA; or
b) certification by the marketer/producer that the gasoline meets the intake valve deposit limits given in par. 6.25 for the ASTM D5500 test; or
c) certification by the marketer/producer that the gasoline meets the intake valve deposit limits given in par. 6.25 for the ASTM D6201 test.

In any case, the marketer/producer shall maintain records of volumes of gasoline and additives, to show that the gasoline does contain the amount of additive stated.

6.26 Benzene and BEN are controlled by the Federal *Benzene in Gasoline Regulations* (see Annex B, B.1.6). In accordance with the regulation, the maximum benzene content allowed for any batch of complying gasoline is 1.5% by volume at point of final sale; this applies to primary suppliers (manufacturers, importers or blenders) who elect to produce gasoline to an annual pool average of 0.95%. The default compliance option in the regulation is a 1.0% by volume flat limit without any associated yearly pool average. Options exist for the BEN limit; for details consult the *Benzene in Gasoline Regulations.*

6.27 Sulphur is controlled by the Federal *Sulphur in Gasoline Regulations* (see Annex B, B.1.7). In accordance with the regulations, the maximum sulphur content allowed for any batch of complying low-sulphur gasoline is 80 mg/kg. Primary suppliers (refiners, blenders, or importers) may elect to meet an annual pool average of 10 mg/kg. The default compliance option in the regulation is a 12 mg/kg flat limit without any associated yearly pool average. Refer to current regulations for more information regarding the sulphur compliance unit trading system.

7 Inspection

7.1 Sampling

Sampling equipment and procedures shall be designed and used to obtain representative samples of the product. Sampling lines, hose volumes, 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 and are described in ASTM D5842 and D5854. Sampling procedures recommended in ASTM D4057, D4177, D5842 and D5854 are acceptable but may not be applicable to all situations. Alternative procedures, which may be more appropriate, are described in 7.1.2, 7.1.3 and 7.1.4.

7.1.1 Sample volume shall be consistent with the requirements of the testing laboratory and/or the authority having jurisdiction. Unless otherwise specified (see 8.1), a sample of at least 3 L shall be taken.

7.1.2 Storage tanks

7.1.2.1 Closed loop side stream samplers designed to minimize volatile light-end losses during sampling may be used. The sample shall be transferred to the container using the procedures described in ASTM D5842. If the temperature of either the sample or container is above the initial boiling point of the product, precooling of the sample is required.

7.1.2.2 Samples may be taken from tank recirculation loops, provided that the recirculation time and intensity is sufficient to effect complete mixing of the product in the tank. The sampling probe and sample transfer shall be consistent with the requirements in ASTM D5842.

7.1.3 On-line analyses

The sampling system used for ASTM D2885 may also be used for other on-line analyses. Results may be obtained either as volumetric weighted averages of multiple determinations or as single determinations on proportional samples. The sampling system shall be connected to the on-line analyzer in a manner that ensures sample integrity is maintained.

7.1.4 Retail dispensers

Samples taken from retail dispensers shall be taken as described in ASTM D5842[1] to minimize splashing and vapour loss. The hose shall be flushed immediately prior to taking a sample. A minimum flushing volume of 4 L is required to ensure a representative sample is obtained from all types of dispensers.

7.1.5 Samples for visual inspection are prone to failure due to contamination from rain, snow and dust, or from sediment in sampling lines or equipment. If contamination is detected, a subsequent sample shall be taken to ensure that the contamination is not due to the sampling system.

7.1.6 To determine sampling equipment and procedure requirements, refer to local regulations. To determine sample transport requirements, refer to the *Transportation of Dangerous Goods Regulations* (see Annex B, B.1.4).

8 Options

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

a) type (see 4.1.1 and 6.16)

b) grade (see 4.1.2 and Table 1);

c) volatility requirements (see Tables 3A to 3H);

d) sample size, if other than as specified (see 7.1.1).

[1] Ensure that the sample container material is appropriate for the type of analysis to be performed. Guidelines for sample containers are given in ASTM D5842 and D5854.

9 Precautions

9.1 Incorporating additives

The user is cautioned against incorporating additives into the gasoline unless detailed test data are first obtained, confirming that performance is improved without harmful side effects.

9.2 Fuel level sending units

Premature failures of some silver alloy fuel level sending units can relate to reactive sulphur species in gasoline.

9.3 Filtration

It is recommended that all fuel dispensers be equipped with filters of 10 µm or less nominal pore size at point of retail sale to the customer.

9.4 Polymeric contamination

Abnormally high unwashed gums (see ASTM D381), measured prior to the addition of deposit control additives, can provide an indication of contamination by polymeric materials.

9.5 Water tolerance

When gasoline is exposed to a greater amount of water than it can dissolve, it separates into two phases or layers. Gasoline can be exposed to water during supply, such as when transported, off-loaded and stored in tanks. Blends that are essentially hydrocarbons, such as Type C, can only dissolve a very small amount of water which varies with the specific hydrocarbons present and the temperature of the blend. Blends containing ethanol, such as Types A and B, can dissolve a significant amount of water which varies with the amount of ethanol present, the specific hydrocarbons present, and the temperature of the blend. As ethanol is hygroscopic, blends containing ethanol can, over time, absorb moisture from the ambient air.

When blends containing ethanol, such as Types A and B, phase separate a portion of the ethanol will be absorbed into the lower water phase significantly increasing its volume. This lower phase is not suitable for use. The upper hydrocarbon rich phase, with a reduced level of ethanol, will not meet the specification limits in this standard.

Separation can be avoided if fuels are sufficiently water-free initially and care is taken during distribution and use to prevent contact with water. Appearance tests such as CAN/CGSB-3.0 No. 28.8, ASTM D4176 or D8148 can be used to assess susceptibility to phase separation by performing the test at the lowest temperature to which the blended fuel will be exposed.

9.6 Type B gasoline use

Some vehicles, motorcycles, small engines, and equipment were not designed for Type B gasoline (E11 – E15) as defined in this standard and use of such fuel blends could result in unsatisfactory or unsafe operation and engine or equipment damage.

Figure 1 – Map of Geographic Zones – Canada Overview

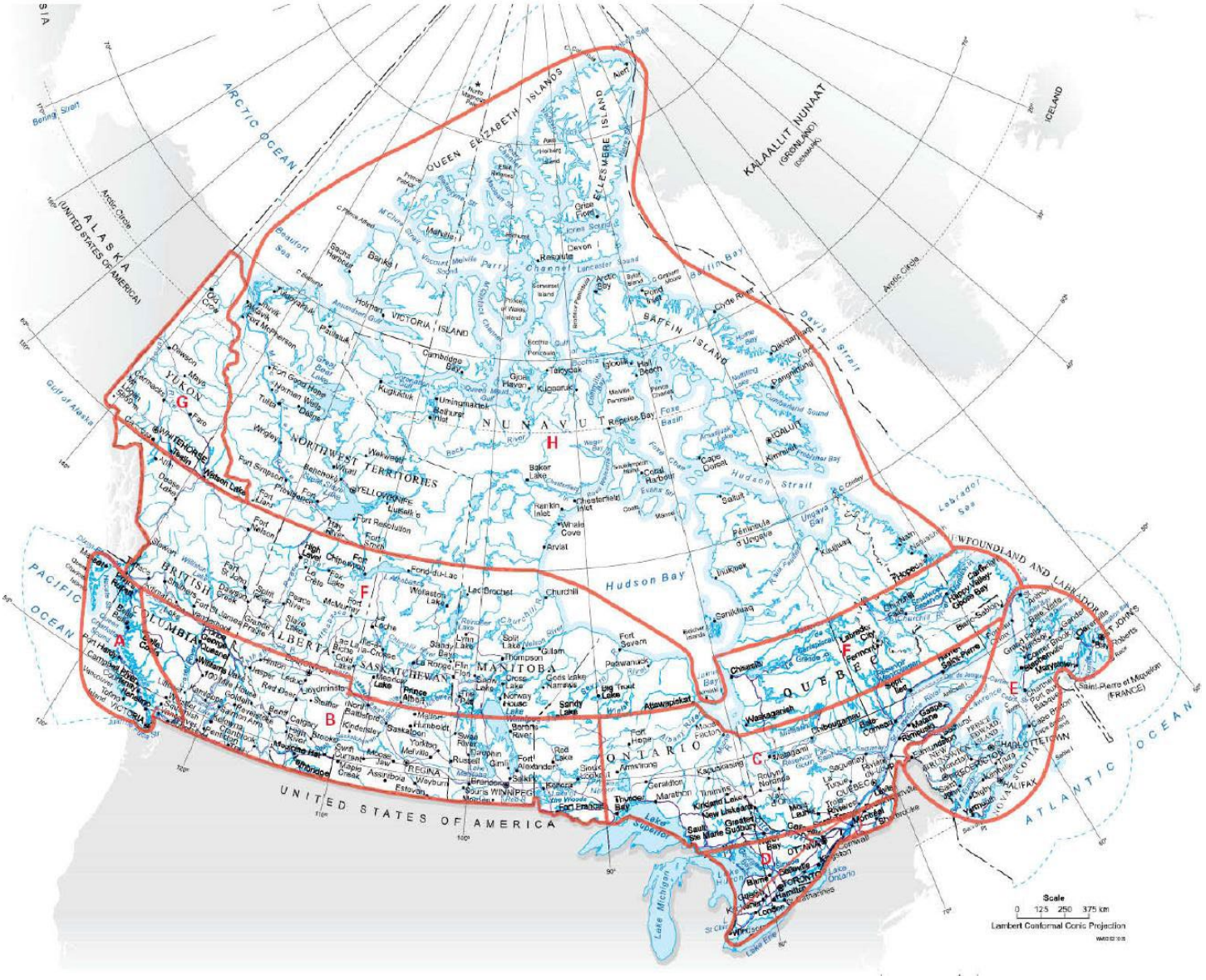

Figure 2 – Map of Geographic Zones – Western Canada

Figure 3 — Map of Geographic Zones — Eastern Canada

Table 1 – Gasoline antiknock performance

Grade	Antiknock index[a] (*RON* + *MON*)/2 Min.	Motor octane number (*MON*) Min.
Grade 1 — Regular	87.0	82.0
Grade 2 — Mid-grade	89.0	—
Grade 3 — Premium	91.0	—
Grade 4 — Super-premium	93.0	—

[a] The antiknock index shall be reported to the nearest 0.1 unit at point of manufacture or point of import and to the nearest 0.5 unit at the point of sale using the rounding method described in ASTM E29 (see 6.2.1).

Table 2 — Geographic zone definitions

Zone	Short description	Definition[a]
A	Coastal British Columbia	All the islands off the coast of British Columbia, the Lower Fraser Valley (LFV)[b] and that portion of the mainland within a nominal 100 km of the west coast of British Columbia between latitudes 49° 30’ North and 54° North[c].
B	South Western Canada	The portions of Ontario west of 90° West longitude and south of latitude 53° North, Manitoba south of latitude 53° North, Saskatchewan south of latitude 53° North, Alberta south of latitude 54° North, British Columbia south of latitude 54° North excluding Zone A (Coastal British Columbia).
C	Northern Ontario and Central Quebec	The portions of Ontario north of latitude 46° North, south of latitude 53° North and east of 90° West longitude and Quebec north of latitude 46° North and south of latitude 51° North.
D	Southern Ontario and Southern Quebec	The portions of Ontario and Quebec south of latitude 46° North, including the Seaway Corridor Sub Zone (SCSZ)[d].
E	Atlantic Canada	The island of Newfoundland, the provinces of New Brunswick, Nova Scotia, and Prince Edward Island and les Îles-de-la-Madeleine.
F	Northern Canada	The portions of British Columbia and Alberta north of latitude 54° North, Saskatchewan, Manitoba, and Ontario north of latitude 53° North; Quebec between latitudes 51° North and 55° North; and Labrador South of latitude 55° North.
G	Yukon	The Territory of the Yukon.
H	Arctic Canada	All of the Northwest Territories, Nunavut and the portions of Quebec (Nunavik) and Labrador north of latitude 55° North.

[a] See Figures 1, 2 and 3 for the approximate locations of the Geographic zones.

[b] The Lower Fraser Valley sub-zone means that part of British Columbia is bounded on the north by latitude 49°30’, on the west by longitude 123°20’, and on the east by longitude 121°15’. It is defined in the BC *Cleaner Gasoline Regulation* (see Annex B, B.2.2.1).

[c] Zone A includes the towns of Whistler and Pemberton. The town of Bella Coola may be supplied with either Zone A or Zone B quality.

[d] The Seaway Corridor Sub-Zone (SCSZ) is defined in two parts:

1) That part of Ontario that lies south of a straight line passing through Arnprior and Grand Bend. Where the line so described runs across a local municipality, the entire local municipality is part of the sub-zone. This is defined by the *Ontario Regulation* (see Annex B, B.2.7.1).
2) That part of Southwestern Quebec defined in the *Québec Petroleum Products Regulation* (see Annex B, B.2.9.1) as the “Outaouais-Montréal Corridor”.

Table 3A — Volatility requirements for Zone A (Coastal British Columbia)

Zone volatility limits		Coastal British Columbia All the islands off the coast of British Columbia, the Lower Fraser Valley (LFV)[a] and that portion of the mainland within a nominal 100 km of the west coast of British Columbia between latitudes 49° 30' North and 54° North.								
		DVPE			T10 Evaporation		T50 Evaporation		T90 Evaporation	Driveability index
Month	Dates	Min. (kPa)	Max.[b] (kPa)	Max.[b] (kPa) LFV	Min. (°C)	Max. (°C)	Min. (°C)	Max. (°C)	Max. (°C)	Max.[c] (°C)
January	1 - 15	45	110.		-	60.	60.	120.	190.	575
January	16 - 31	45	110.		-	60.	60.	120.	190.	575
February	1 - 15	45	110.		-	60.	60.	120.	190.	575
February	16 – 28 (29)	45	110.		-	60.	60.	120.	190.	575
March	1 - 15	45	110.		-	60.	60.	120.	190.	575
March	16 - 31	35	110.		-	70.	60.	120.	190.	590.
April	1 - 15	35	110.		-	70.	60.	120.	190.	590.
April	16 - 30	35	100.	72[d]	-	70.	60.	120.	190.	590.
May	1 - 15	35	100.	72	-	70.	60.	120.	190.	590.
May	16 - 31	35	90.	72	-	70.	62	120.	190.	590.
June	1 - 15	35	72	62	-	70.	62	120.	190.	590.
June	16 - 30	35	72	62	-	70.	62	120.	190.	590.
July	1 - 15	35	72	62	-	70.	62	120.	190.	590.
July	16 - 31	35	72	55	35	70.	64	120.	190.	590.
August	1 - 15	35	72	55[d]	-	70.	62	120.	190.	590.
August	16 - 31	35	72	62[d]	-	70.	62	120.	190.	590.
September	1 - 15	35	90.	72	-	70.	62	120.	190.	590.
September	16 - 30	35	100.		-	70.	60.	120.	190.	590.
October	1 - 15	35	110.		-	70.	60.	120.	190.	590.
October	16 - 31	35	110.		-	70.	60.	120.	190.	590.
November	1 - 15	35	110.		-	70.	60.	120.	190.	590.
November	16 - 30	45	110.		-	60.	60.	120.	190.	575
December	1 - 15	45	110.		-	60.	60.	120.	190.	575
December	16 - 31	45	110.		-	60.	60.	120.	190.	575

[a] The Lower Fraser Valley sub-zone means that part of British Columbia is bounded on the north by latitude 49°30', on the west by longitude 123°20', and on the east by longitude 121°15'. It is defined in the BC Cleaner Gasoline Regulation (see Annex B, B.2.2.1).

[b] See 5.3.1.

[c] If the required maximum DVPE is less than 72 kPa then the maximum DI shall be 597.

[d] LFV: 72 kPa maximum applies starting April 16, 55 kPa maximum only applies ending August 14, 62 kPa maximum applies starting August 15. From July 16 to August 14, a 7 kPa waiver on maximum DVPE is allowed for specific ethanol blends under the BC Cleaner Gasoline Regulation (see Annex B, B.2.2.1).

Table 3B — Volatility requirements for Zone B (South Western Canada)

Zone volatility limits		South Western Canada The portions of Ontario west of 90° West longitude and south of latitude 53° North, Manitoba south of latitude 53° North, Saskatchewan south of latitude 53° North, Alberta south of latitude 54° North, British Columbia south of latitude 54° North excluding Zone A (Coastal British Columbia).							
		DVPE		T10 Evaporation		T50 Evaporation		T90 Evaporation	Driveability index
Month	Dates	Min. (kPa)	Max.[a] (kPa)	Min. (°C)	Max. (°C)	Min. (°C)	Max. (°C)	Max. (°C)	Max. (°C)
January	1 – 15	65	110.	-	50.	60.	110.	185	550.
January	16 – 31	65	110.	-	50.	60.	110.	185	550.
February	1 – 15	65	110.	-	50.	60.	110.	185	550.
February	16 – 28 (29)	65	110.	-	50.	60.	110.	185	550.
March	1 – 15	65	110.	-	50.	60.	110.	185	550.
March	16 – 31	50.	110.	-	55	60.	110.	185	560.
April	1 – 15	45	100.	-	60.	60.	120.	190.	575
April	16 – 30	45	90.	-	60.	62	120.	190.	575
May	1 – 15	35	90.	-	70.	62	120.	190.	590.
May	16 – 31	35	90.	-	70.	62	120.	190.	590.
June	1 – 15	35	72	-	70.	62	120.	190.	590.
June	16 – 30	35	72	35	70.	64	120.	190.	590.
July	1 - 15	35	72	35	70.	66	120.	190.	590.
July	16 - 31	35	72	35	70.	66	120.	190.	590.
August	1 - 15	35	72	35	70.	66	120.	190.	590.
August	16 - 31	35	72	35	70.	64	120.	190.	590.
September	1 - 15	35	80.[b]	35	70.	64	120.	190.	590.
September	16 - 30	35	90.	-	70.	62	120.	190.	590.
October	1 - 15	45	100.	-	60.	60.	120.	190.	575
October	16 - 31	45	100.	-	60.	60.	120.	190.	575
November	1 - 15	45	110.	-	60.	60.	120.	190.	575
November	16 - 30	50.	110.	-	55	60.	110.	185	560.
December	1 - 15	65	110.	-	50.	60.	110.	185	550.
December	16 - 31	65	110.	-	50.	60.	110.	185	550.

[a] See 5.3.1.

[b] The Ontario Volatility Regulation sets a maximum limit of 72 kPa starting June 1 and ending on either August 31 or September 15, depending upon specific conditions and locations (see Annex B, B.2.7.1).

Table 3C — Volatility requirements for Zone C (Northern Ontario and Central Quebec)

Zone volatility limits		Northern Ontario and Central Quebec The portions of Ontario lying north of latitude 46° North, south of latitude 53° North and east of 90° West longitude and Quebec lying north of latitude 46° North and south of latitude 51° North.							
		DVPE		T10 Evaporation		T50 Evaporation		T90 Evaporation	Driveability index
Month	Dates	Min. (kPa)	Max.[a] (kPa)	Min. (°C)	Max. (°C)	Min. (°C)	Max. (°C)	Max. (°C)	Max. (°C)
January	1 – 15	85	110.	-	50.	60.	110.	185	540.
January	16 – 31	85	110.	-	50.	60.	110.	185	540.
February	1 – 15	85	110.	-	50.	60.	110.	185	540.
February	16 – 28 (29)	65	110.	-	50.	60.	110.	185	550.
March	1 – 15	65	110.	-	50.	60.	110.	185	550.
March	16 – 31	50.	110.	-	55	60.	110.	185	560.
April	1 – 15	45	110.	-	60.	60.	120.	190.	575
April	16 – 30	45	100.	-	60.	60.	120.	190.	575
May	1 – 15	45	90.	-	70.	62	120.	190.	590.
May	16 – 31	35	90.	-	70.	62	120.	190.	590.
June	1 – 15	35	72	-	70.	62	120.	190.	590.
June	16 – 30	35	72	-	70.	62	120.	190.	590.
July	1 – 15	35	72	-	70.	62	120.	190.	590.
July	16 – 31	35	72	-	70.	62	120.	190.	590.
August	1 – 15	35	72	-	70.	62	120.	190.	590.
August	16 – 31	35	72	-	70.	60.	120.	190.	590.
September	1 – 15	35	100.[b]	-	70.	60.	120.	190.	590.
September	16 – 30	35	100.	-	70.	60.	120.	190.	590.
October	1 – 15	45	110.	-	60.	60.	120.	190.	575
October	16 – 31	45	110.	-	60.	60.	120.	190.	575
November	1 – 15	45	110.	-	60.	60.	120.	190.	575
November	16 – 30	50.	110.	-	55	60.	110.	185	560.
December	1 – 15	65	110.	-	50.	60.	110.	185	550.
December	16 – 31	65	110.	-	50.	60.	110.	185	550.

[a] See 5.3.1

[b] The Ontario Volatility Regulation sets a maximum limit of 72 kPa starting June 1 and ending on either August 31 or September 15, depending upon specific conditions and locations (see Annex B, B.2.7.1).

Table 3D — Volatility requirements for Zone D (Southern Ontario and Southern Quebec)

Zone volatility limits		Southern Ontario and Southern Quebec The portions of Ontario and Quebec south of latitude 46° North, including the Seaway Corridor Sub Zone (SCSZ)[a]								
		DVPE		SCSZ DVPE	T10 Evaporation		T50 Evaporation		T90 Evaporation	Driveability index
Month	Dates	Min. (kPa)	Max.[b] (kPa)	Max.[b] (kPa)	Min. (°C)	Max. (°C)	Min. (°C)	Max. (°C)	Max. (°C)	Max.[c] (°C)
January	1 – 15	65	110.		-	50.	60.	110.	185	550.
January	16 – 31	65	110.		-	50.	60.	110.	185	550.
February	1 – 15	65	110.		-	50.	60.	110.	185	550.
February	16 – 28 (29)	65	110.		-	50.	60.	110.	185	550.
March	1 – 15	50.	110.		-	55	60.	110.	185	560.
March	16 - 31	45	110.		-	60.	60.	120.	190.	575
April	1 - 15	45	100.		-	60.	60.	120.	190.	575
April	16 - 30	35	100.		-	70.	60.	120.	190.	590.
May	1 - 15	35	90.		-	70.	62	120.	190.	590.
May	16 - 31	35	90.[d]		-	70.	62	120.	190.	590.
June	1 - 15	35	72	62	-	70.	62	120.	190.	590.
June	16 - 30	35	72	62	-	70.	62	120.	190.	590.
July	1 - 15	35	72	62	-	70.	62	120.	190.	590.
July	16 - 31	35	72	62	-	70.	62	120.	190.	590.
August	1 - 15	35	72	62	-	70.	62	120.	190.	590.
August	16 - 31	35	72	62	-	70.	62	120.	190.	590.
September	1 - 15	35	90.[d]		-	70.	62	120.	190.	590.
September	16 - 30	35	100.		-	70.	60.	120.	190.	590.
October	1 - 15	35	100.		-	70.	60.	120.	190.	590.
October	16 - 31	45	110.		-	60.	60.	120.	190.	575
November	1 - 15	45	110.		-	60.	60.	120.	190.	575
November	16 - 30	45	110.		-	60.	60.	120.	190.	575
December	1 – 15	50.	110.		-	55	60.	110.	185	560.
December	16 – 31	50.	110.		-	55	60.	110.	185	560.

[a] The Seaway Corridor Sub-Zone (SCSZ) is defined in two parts:
1) That part of Ontario that lies south of a straight line passing through Arnprior and Grand Bend. Where the line so described runs across a local municipality, the entire local municipality is part of the sub-zone. This is defined by the Ontario Volatility Regulation (see Annex B, B.2.7.1).
2) That part of Southwestern Quebec defined in the *Québec Petroleum Products Regulation* (see Annex B, B.2.9.1) as the “Outaouais-Montréal Corridor".

[b] See 5.3.1.

[c] If the required maximum DVPE is less than 72 kPa, then the maximum DI shall be 597.

[d] In the Ontario portion of the SCSZ the Ontario Volatility Regulation sets a maximum limit of 62 kPa starting on either May 16 or June 1 and ending on September 15, depending upon specific conditions and locations (see Annex B, B.2.7.1).

Table 3E — Volatility requirements for Zone E (Atlantic)

Zone volatility limits		Atlantic Canada The island of Newfoundland, the provinces of New Brunswick, Nova Scotia and Prince Edward Island and les Îles-de-la-Madeleine.							
		DVPE		T10 Evaporation		T50 Evaporation		T90 Evaporation	Driveability index
Month	Dates	Min. (kPa)	Max.[b] (kPa)	Min. (°C)	Max. (°C)	Min. (°C)	Max. (°C)	Max. (°C)	Max. (°C)
January	1 – 15	65	110.	-	50.	60.	110.	185	550.
January	16 – 31	65	110.	-	50.	60.	110.	185	550.
February	1 – 15	65	110.	-	50.	60.	110.	185	550.
February	16 – 28 (29)	65	110.	-	50.	60.	110.	185	550.
March	1 – 15	50.	110.	-	55	60.	110.	185	560.
March	16 – 31	45	110.	-	60.	60.	120.	190.	575
April	1 - 15	45	110.	-	60.	60.	120.	190.	575
April	16 - 30	45	100.	-	60.	60.	120.	190.	575
May	1 - 15	35	100.[a]	-	70.	60.	120.	190.	590.
May	16 - 31	35	100.	-	70.	60.	120.	190.	590.
June	1 - 15	35	72	-	70.	60.	120.	190.	590.
June	16 - 30	35	72	-	70.	62	120.	190.	590.
July	1 - 15	35	72	-	70.	62	120.	190.	590.
July	16 - 31	35	72	-	70.	62	120.	190.	590.
August	1 - 15	35	72	-	70.	62	120.	190.	590.
August	16 - 31	35	72	-	70.	62	120.	190.	590.
September	1 - 15	35	100.[a]	-	70.	60.	120.	190.	590.
September	16 - 30	35	100.	-	70.	60.	120.	190.	590.
October	1 - 15	45	110.	-	60.	60.	120.	190.	575
October	16 - 31	45	110.	-	60.	60.	120.	190.	575
November	1 – 15	45	110.	-	60.	60.	120.	190.	575
November	16 – 30	45	110.	-	60.	60.	120.	190.	575
December	1 – 15	50.	110.	-	55	60.	110.	185	560.
December	16 – 31	50.	110.	-	55	60.	110.	185	560.

[a] In Nova Scotia and New Brunswick there are limitations on gasoline with a DVPE exceeding 72 kPa from May 15 to September 15 (see Annex B, B.2.4 and B.2.6).

[b] See 5.3.1.

Table 3F — Volatility requirements for Zone F (Northern Canada)

Zone Volatility Limits[a]		Northern Canada The portions of British Columbia and Alberta north of latitude 54° North; Saskatchewan, Manitoba and Ontario north of latitude 53°North; Quebec lying between latitudes 51° North and 55° North; and Labrador south of latitude 55° North.							
		DVPE		T10 Evaporation		T50 Evaporation		T90 Evaporation	Driveability index
Month	Dates	Min. (kPa)	Max.[b] (kPa)	Min. (°C)	Max. (°C)	Min. (°C)	Max. (°C)	Max. (°C)	Max. (°C)
January	1 – 15	85	110.	-	50.	60.	110.	185	540.
January	16 - 31	85	110.	-	50.	60.	110.	185	540.
February	1 – 15	85	110.	-	50.	60.	110.	185	540.
February	16 – 28 (29)	85	110.	-	50.	60.	110.	185	540.
March	1 - 15	85	110.	-	50.	60.	110.	185	540.
March	16 - 31	65	110.	-	50.	60.	110.	185	550.
April	1 - 15	50.	100.	-	55	60.	110.	185	560.
April	16 - 30	45	100.	-	60.	60.	120.	190.	575
May	1 - 15	45	100.	-	60.	60.	120.	190.	575
May	16 - 31	45	90.	-	60.	62	120.	190.	575
June	1 - 15	45	90.	-	60.	62	120.	190.	575
June	16 - 30	35	90.	-	70.	62	120.	190.	590.
July	1 - 15	35	90.	-	70.	62	120.	190.	590.
July	16 - 31	35	90.	-	70.	62	120.	190.	590.
August	1 - 15	35	90.	-	70.	62	120.	190.	590.
August	16 - 31	35	90.	-	70.	62	120.	190.	590.
September	1 - 15	35	100.	-	70.	60.	120.	190.	590.
September	16 - 30	35	100.	-	70.	60.	120.	190.	590.
October	1 - 15	45	110.	-	60.	60.	120.	190.	575
October	16 - 31	45	110.	-	60.	60.	120.	190.	575
November	1 - 15	50.	110.	-	55	60.	110.	185	560.
November	16 - 30	65	110.	-	50.	60.	110.	185	550.
December	1 - 15	85	110.	-	50.	60.	110.	185	540.
December	16 - 31	85	110.	-	50.	60.	110.	185	540.

[a] Where fuel cannot be supplied in all seasons, it will generally not be possible to meet the zone volatility limits throughout the year. In these cases, different volatility requirements may be established between the fuel supplier and customer. To ensure cold start and warm-up performance during winter, meeting the volatility requirements for the December 1 to March 15 period is recommended.

[b] The Ontario Volatility Regulation sets a maximum limit of 72 kPa starting June 1 and ending on either August 31 or September 15, depending upon specific conditions and locations (see Annex B, B.2.7.1).

Table 3G — Volatility requirements for Zone G (Yukon)

Zone volatility limits[a]		Yukon The Territory of the Yukon							
		DVPE		T10 Evaporation		T50 Evaporation		T90 Evaporation	Driveability Index
Month	Dates	Min. (kPa)	Max. (kPa)	Min. (°C)	Max. (°C)	Min. (°C)	Max. (°C)	Max. (°C)	Max. (°C)
January	1 - 15	85	110.	-	50.	60.	110.	185	540.
January	16 - 31	85	110.	-	50.	60.	110.	185	540.
February	1 - 15	85	110.	-	50.	60.	110.	185	540.
February	16 – 28 (29)	85	110.	-	50.	60.	110.	185	540.
March	1 - 15	85	110.	-	50.	60.	110.	185	540.
March	16 - 31	65	110.	-	50.	60.	110.	185	550.
April	1 - 15	65	110.	-	50.	60.	110.	185	550.
April	16 - 30	50.	110.	-	55	60.	110.	185	560.
May	1 - 15	45	110.	-	60.	60.	120.	190.	575
May	16 - 31	35	100.	-	70.	60.	120.	190.	590.
June	1 - 15	35	100.	-	70.	60.	120.	190.	590.
June	16 - 30	35	90.	-	70.	62	120.	190.	590.
July	1 - 15	35	100.	-	70.	60.	120.	190.	590.
July	16 - 31	35	90.	-	70.	62	120.	190.	590.
August	1 - 15	35	100.	-	70.	60.	120.	190.	590.
August	16 - 31	35	110.	-	70.	60.	120.	190.	590.
September	1 - 15	45	110.	-	60.	60.	120.	190.	575
September	16 - 30	45	110.	-	60.	60.	120.	190.	575
October	1 - 15	50.	110.	-	55	60.	110.	185	560.
October	16 - 31	65	110.	-	50.	60.	110.	185	550.
November	1 - 15	85	110.	-	50.	60.	110.	185	540.
November	16 - 30	85	110.	-	50.	60.	110.	185	540.
December	1 - 15	85	110.	-	50.	60.	110.	185	540.
December	16 - 31	85	110.	-	50.	60.	110.	185	540.

[a] Where fuel is normally delivered in the summer or fall for use during the following winter the delivered fuel shall meet the volatility requirements for the November 1 to March 15 period. The intent is to ensure cold start and warm-up performance during winter.

Table 3H — Volatility requirements for Zone H (Arctic Canada)

Zone volatility limits[a]		Arctic Canada All of the Northwest Territories, Nunavut, and the portions of Quebec, Nunavik and Labrador north of latitude 55° North.							
		DVPE		T10 Evaporation		T50 Evaporation		T90 Evaporation	Driveability index
Month	Dates	Min. (kPa)	Max. (kPa)	Min. (°C)	Max. (°C)	Min. (°C)	Max. (°C)	Max. (°C)	Max. (°C)
January	1 - 15	85	110.	-	50.	60.	110.	185	540.
January	16 - 31	85	110.	-	50.	60.	110.	185	540.
February	1 - 15	85	110.	-	50.	60.	110.	185	540.
February	16 – 28 (29)	85	110.	-	50.	60.	110.	185	540.
March	1 - 15	85	110.	-	50.	60.	110.	185	540.
March	16 - 31	85	110.	-	50.	60.	110.	185	540.
April	1 - 15	85	110.	-	50.	60.	110.	185	540.
April	16 - 30	65	110.	-	50.	60.	110.	185	550.
May	1 - 15	50.	100.	-	55	60.	110.	185	560.
May	16 - 31	45	100.	-	60.	60.	120.	190.	575
June	1 - 15	45	100.	-	60.	60.	120.	190.	575
June	16 - 30	45	90.	-	60.	62	120.	190.	575
July	1 - 15	35	90.	-	70.	62	120.	190.	590.
July	16 - 31	35	90.	-	70.	62	120.	190.	590.
August	1 - 15	45	100.	-	60.	60.	120.	190.	575
August	16 - 31	45	110.	-	60.	60.	120.	190.	575
September	1 - 15	45	110.	-	60.	60.	120.	190.	575
September	16 - 30	50.	110.	-	55	60.	110.	185	560.
October	1 - 15	65	110.	-	50.	60.	110.	185	550.
October	16 - 31	65	110.	-	50.	60.	110.	185	550.
November	1 - 15	85	110.	-	50.	60.	110.	185	540.
November	16 - 30	85	110.	-	50.	60.	110.	185	540.
December	1 - 15	85	110.	-	50.	60.	110.	185	540.
December	16 - 31	85	110.	-	50.	60.	110.	185	540.

[a] Where fuel is normally delivered in the summer or fall for use during the following winter, the delivered fuel shall meet the volatility requirements for the November 1 to April 15 period. The intent is to ensure cold start and warm-up performance during winter.

Annex A
(normative)
Referenced ASTM International publications (see 2.2)

A.1 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 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 D2622 — Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry

ASTM D2699 — Standard Test Method for Research Octane Number of Spark-Ignition Engine Fuel

ASTM D2700 — Standard Test Method for Motor Octane Number of Spark-Ignition Engine Fuel

ASTM D2885 — Standard Test Method for Determination of Octane Number or Spark-Ignition Engine Fuels by On-Line Direct Comparison Technique

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

ASTM D3231 — Standard Test Method for Phosphorus in Gasoline

ASTM D3237 — Standard Test Method for Lead in Gasoline by Atomic Absorption Spectroscopy

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 D3831 — Standard Test Method for Manganese in Gasoline by Atomic Absorption Spectroscopy

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

ASTM D4176 — Standard Test Method for Free Water and Particulate Contamination in Distillate Fuels (Visual Inspection Procedures)

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

ASTM D4815 — Standard Test Method for Determination of MTBE, ETBE, TAME, DIPE, tertiary-Amyl Alcohol and C1 to C4 Alcohols in Gasoline by Gas Chromatography

ASTM D4953 — Standard Test Method for Vapor Pressure of Gasoline and Gasoline-Oxygenate Blends (Dry Method)

ASTM D5059 — Standard Test Methods for Lead and Manganese in Gasoline by X-Ray Fluorescence Spectroscopy

ASTM D5191 — Standard Test Method for Vapor Pressure of Petroleum Products and Liquid Fuels (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 and Liquid Fuels (Mini Method-Atmospheric)

ASTM D5500 — Standard Test Method for Vehicle Evaluation of Unleaded Automotive Spark-Ignition Engine Fuel for Intake Valve Deposit Formation

ASTM D5599 — Standard Test Method for Determination of Oxygenates in Gasoline by Gas Chromatography and Oxygen Selective Flame Ionization Detection

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 D6122 — Standard Practice for Validation of the Performance of Multivariate Online, At-Line, Field and Laboratory Infrared Spectrophotometer, and Raman Spectrometer Based Analyzer Systems

ASTM D6201 — Standard Test Method for Dynamometer Evaluation of Unleaded Spark-Ignition Engine Fuel for Intake Valve Deposit Formation

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-Meter Capillary High Resolution Gas Chromatography

ASTM D6730 — Standard Test Method for Determination of Individual Components in Spark Ignition Engine Fuels by 100-Metre Capillary (with Precolumn) High-Resolution Gas Chromatography

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 D7220 — Standard Test Method for Sulfur in Automotive, Heating, and Jet Fuels by Monochromatic Energy 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 D7525 — Standard Test Method for Oxidation Stability of Spark Ignition Fuel—Rapid Small Scale Oxidation Test (RSSOT)

ASTM D7548 — Standard Test Method for Determination of Accelerated Iron Corrosion in Petroleum Products

ASTM D7671 — Standard Test Method for Corrosiveness to Silver by Automotive Spark - Ignition Engine Fuel — Silver Strip Method

ASTM D8071 — Standard Test Method for Determination of Hydrocarbon Group Types and Select Hydrocarbon and Oxygenate Compounds in Automotive Spark-Ignition Engine Fuel Using Gas Chromatography with Vacuum Ultraviolet Absorption Spectroscopy Detection (GC-VUV)

ASTM D8148 — Standard Test Method for Spectroscopic Determination of Haze in Fuels

ASTM D8340 — Standard Practice for Performance-Based Qualification of Spectroscopic Analyzer Systems

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

Annex B

(informative)

Federal, provincial and territorial acts and regulations applicable to automotive gasoline (see 2.2)[2]

B.1 Federal acts and regulations[3]

B.1.1 *Fuels Information Regulations, No. 1* (C.R.C., c.407 as amended by SOR/79-280, 80-138, 2000-105)

These regulations require producers and importers to submit information on sulphur and additive contents (other than lead).

B.1.2 *Gasoline Regulations* (SOR/90-247)

These regulations limit the lead content in unleaded gasoline, restrict leaded gasoline use, and require reporting of lead used in gasoline production. They also limit phosphorus content in gasoline. See 6.9 and 6.12.

B.1.3 *Contaminated Fuel Regulations* (SOR/91-486)

These regulations prohibit the importation of fuels that have been contaminated with hazardous wastes.

B.1.4 *Transportation of Dangerous Goods Regulations* (SOR/2001-286)

These regulations give detailed packaging, labelling and documentation requirements for transporting gasoline samples within Canada.

B.1.5 *Clean Fuel Regulations* (SOR/2022-140)

These regulations define the renewable fuel content and carbon intensity reduction requirements for gasoline and diesel and replace the *Renewable Fuel Regulations* (SOR/2010-189).

B.1.6 *Benzene in Gasoline Regulations* (SOR/97-493)

These regulations establish the limits for benzene and BEN in gasoline and benzene in oxygenates (see 6.22 and 6.23).

B.1.7 *Sulphur in Gasoline Regulations* (SOR/99-236)

These regulations establish the limits for sulphur in gasoline and in oxygenates (see 6.14 and 6.27).

B.1.8 *Denatured and Specially Denatured Alcohol Regulations* (SOR/2005-22*)*

This regulation is made under the *Excise Act, 2001, Denatured and Specially Denatured Alcohol Regulations*, P.C. 2005-45, 2005-02-01

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[2] The regulations listed are subject to revision by the relevant authority. The user should consult the relevant authority to confirm the current regulations. The information provided about the regulations is for information only. In case of conflict, the text of the regulation takes precedence. If any of the Web sites referenced become inoperative, regulations can also be found at the Web site www.canlii.org.

[3] These regulations can be obtained from the Department of Justice Canada (see 2.3.1).

B.2 Provincial and territorial regulations

B.2.1 Alberta

B.2.1.1 Renewable fuels requirements

Renewable fuel requirements, including those for ethanol, are controlled under the *Renewable Fuels Standard Regulation*, Regulation 29/2010.

B.2.2 British Columbia

B.2.2.1 General requirements and vapour pressure

Vapour pressure is controlled under the *Environmental Management Act* and the *Cleaner Gasoline Regulation* (BC Reg. 498/95)[4].

B.2.2.2 Low carbon and renewable fuel requirements

The requirements for the supply of low carbon and renewable fuels are controlled under the Low Carbon Fuels (General) Regulation (BC Reg 282/2023) and the Low Carbon Fuels (Technical) Regulation (BC Reg 295/2023)[4].

Note: The *Low Carbon Fuels (Technical) Regulation* specifies, in Part 2, that fuel containing more than 10% ethanol must be appropriately labelled.

B.2.3 Manitoba

B.2.3.1 General requirements

General requirements are controlled under the *Dangerous Goods Handling and Transportation Act*, including the *Dangerous Goods Handling and Transportation Regulation* (55/2003) and the *Storage and Handling of Petroleum Products and Allied Products Regulation* (188/2001). [5] However, these two regulations do not address fuel quality.

B.2.3.2 Ethanol requirements

Ethanol requirements, including maximum vapour pressure limits for “splash” blends are controlled under the *Ethanol General Regulation*, Regulation 165/2007, as amended by M.R. 118/2011 and M.R. 149/20. This Regulation does refer to gasoline complying with CAN/CGSB-3.5 with respect to “splash” blending.

B.2.4 New Brunswick

B.2.4.1 Vapour pressure

Vapour pressure is controlled under the *Clean Air Act* and Regulations — *Air Quality Regulation* (N.B. Reg. 97-133).

B.2.5 Newfoundland and Labrador

B.2.5.1 Gasoline requirements

[4] Available from the Government of British Columbia at www.bclaws.gov.bc.ca.

[5] Available from the Government of Manitoba at https://web2.gov.mb.ca/laws/regs/.

Gasoline requirements are controlled under the *Environmental Protection Act*, *Air Pollution Control Regulations*, 2022, Newfoundland and Labrador Regulation 11/22. This regulation cites CAN/CGSB-3.5-2021, as amended from time to time, in the section on gasoline volatility control.

B.2.6 Nova Scotia

B.2.6.1 Vapour pressure

Vapour pressure is controlled under the *Environment Act* and Regulations — *Air Quality Regulations* (N.S. Reg. 28/2005 as amended by N.S. Reg. 8/2020).

B.2.7 Ontario

B.2.7.1 Vapour pressure

Vapour pressure is controlled under *Ontario Regulation 271/91, Gasoline Volatility*, as amended by *Ontario Regulations 335/24* and *33/25.*[6]

B.2.7.2 Fuel products

Definitions (as per CGSB standards) listed under the latest revision of the *Technical Standards and Safety Act — Liquid Fuels Handling Code.*

B.2.7.3 Bio-based content requirements

Bio-based content requirements are controlled under *Ontario Regulation 663/20, Cleaner Transportation Fuels*: *Renewable Content Requirements for Gasoline and Diesel Fuels*. This Regulation refers to a Guideline entitled "Technical Guideline: Cleaner Transportation Fuels" published by the Ontario Ministry of Environment, Conservation and Parks. The Guideline requires "blended gasoline" sold in Ontario to meet the relevant CGSB Standards: CAN/CGSB-3.5, CAN/CGSB-3.511 or CAN/CGSB-3.512.

B.2.8 Prince Edward Island

B.2.8.1 General requirements

General requirements are controlled under the *Petroleum Products Act Regulations* (EC38/91).

B.2.9 Quebec

B.2.9.1 General requirements

The general requirements are controlled under the *Loi sur les produits pétroliers*, RLQR, c. P-30.1, *Règlement sur les produits pétroliers*, RLRQ, c P30.01 r.2 or *Petroleum Products Act*, CQLR, c. P-30.01, *Petroleum Products Regulation,* CQLR, c. P-30.01 r.2[7]. This regulation lists Quebec quality requirements for aviation gasolines, aviation turbine fuels, automotive gasolines, gasolines containing denatured fuel ethanol for use in automotive spark ignition fuels, diesel fuels, diesel fuels containing biodiesel (B100) for blending in middle distillate fuels and

[6] Available from the Ontario e-Laws Ontario Statutes and Regulations Web site at http://www.e-laws.gov.on.ca.

[7] Available from Les Publications du Québec, telephone: 1-800-463-2100 or 418-643-5150. Fax: 1-800-561-3479 or 418-643-6177. Also available on-line at https://www.legisquebec.gouv.qc.ca/en/document/cs/P-30.01%20/. Regulations and orders mentioned in B.2.9.1 and B.2.9.2 are accessible through the web page link "Regulations."

fuel oils. Amendments and editions published apply only 90 days after the last day of the month that the French text of the amendments or editions were published. The Direction générale des combustibles propres et des réservoirs of the Ministère de l'Économie, de l'Innovation et de l'Énergie is responsible for the application and revision of this regulation.

B.2.9.2 Low-carbon-intensity fuel content and carbon intensity requirements

Requirements for low-carbon-intensity fuel content volumes and reduction of fuel carbon intensity are controlled under the Regulation respecting the integration of low-carbon-intensity fuel content into gasoline and diesel fuel and the Order of the Minister concerning the measurement methods and tools for the purposes of the Regulation respecting the integration of low-carbon-intensity fuel content into gasoline and diesel fuel.

B.2.10 Saskatchewan

B.2.10.1 Ethanol requirements

Ethanol requirements are controlled under the *Ethanol Fuel (General) Regulations, RRS c E-11.1 Reg 1.*

B.2.11 Yukon

B.2.11.1 General requirements

General requirements are controlled under the *Gasoline Handling Act* and Regulations — *Gasoline Handling Regulations* (O. C. 1972/137).