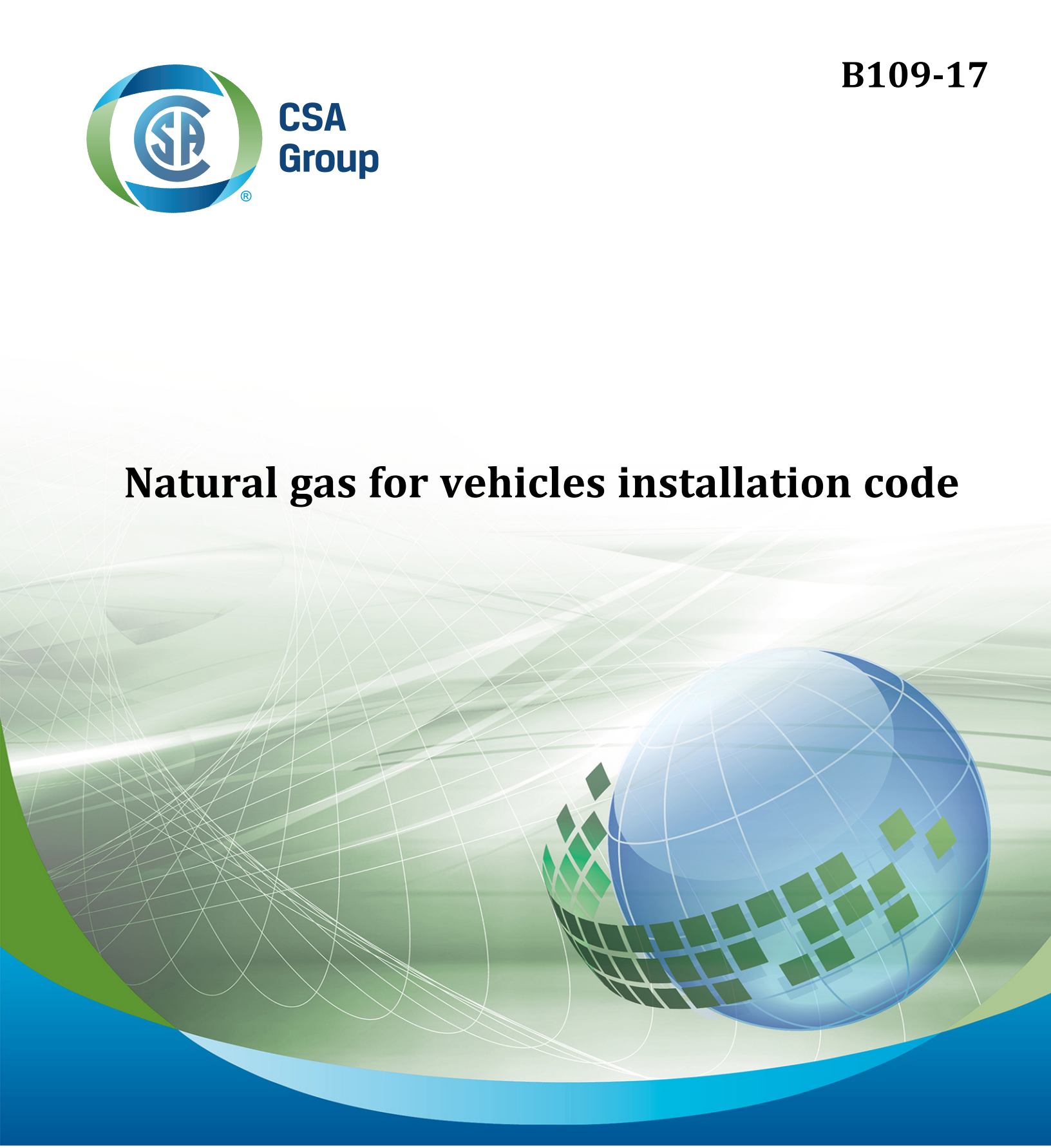
B109-17

# Natural gas for vehicles installation code



# Legal Notice for Standards

Canadian Standards Association (operating as "CSA Group") develops standards through a consensus standards development process approved by the Standards Council of Canada. This process brings together volunteers representing varied viewpoints and interests to achieve consensus and develop a standard. Although CSA Group administers the process and establishes rules to promote fairness in achieving consensus, it does not independently test, evaluate, or verify the content of standards.

## Disclaimer and exclusion of liability

This document is provided without any representations, warranties, or conditions of any kind, express or implied, including, without limitation, implied warranties or conditions concerning this document's fitness for a particular purpose or use, its merchantability, or its non-infringement of any third party's intellectual property rights. CSA Group does not warrant the accuracy, completeness, or currency of any of the information published in this document. CSA Group makes no representations or warranties regarding this document's compliance with any applicable statute, rule, or regulation.

IN NO EVENT SHALL CSA GROUP, ITS VOLUNTEERS, MEMBERS, SUBSIDIARIES, OR AFFILIATED COMPANIES, OR THEIR EMPLOYEES, DIRECTORS, OR OFFICERS, BE LIABLE FOR ANY DIRECT, INDIRECT, OR INCIDENTAL DAMAGES, INJURY, LOSS, COSTS, OR EXPENSES, HOWSOEVER CAUSED, INCLUDING BUT NOT LIMITED TO SPECIAL OR CONSEQUENTIAL DAMAGES, LOST REVENUE, BUSINESS INTERRUPTION, LOST OR DAMAGED DATA, OR ANY OTHER COMMERCIAL OR ECONOMIC LOSS, WHETHER BASED IN CONTRACT, TORT (INCLUDING NEGLIGENCE), OR ANY OTHER THEORY OF LIABILITY, ARISING OUT OF OR RESULTING FROM ACCESS TO OR POSSESSION OR USE OF THIS DOCUMENT, EVEN IF CSA GROUP HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, INJURY, LOSS, COSTS, OR EXPENSES.

In publishing and making this document available, CSA Group is not undertaking to render professional or other services for or on behalf of any person or entity or to perform any duty owed by any person or entity to another person or entity. The information in this document is directed to those who have the appropriate degree of experience to use and apply its contents, and CSA Group accepts no responsibility whatsoever arising in any way from any and all use of or reliance on the information contained in this document.

CSA Group is a private not-for-profit company that publishes voluntary standards and related documents. CSA Group has no power, nor does it undertake, to enforce compliance with the contents of the standards or other documents it publishes.

## Intellectual property rights and ownership

As between CSA Group and the users of this document (whether it be in printed or electronic form), CSA Group is the owner, or the authorized licensee, of all works contained herein that are protected by copyright, all trade-marks (except as otherwise noted to the contrary), and all inventions and trade secrets that may be contained in this document, whether or not such inventions and trade secrets are protected by patents and applications for patents. Without limitation, the unauthorized use, modification, copying, or disclosure of this document may violate laws that protect CSA Group's and/or others' intellectual property and may give rise to a right in CSA Group and/or others to seek legal redress for such use, modification, copying, or disclosure. To the extent permitted by licence or by law, CSA Group reserves all intellectual property rights in this document.

## Patent rights

Attention is drawn to the possibility that some of the elements of this standard may be the subject of patent rights. CSA Group shall not be held responsible for identifying any or all such patent rights. Users of this standard are expressly advised that determination of the validity of any such patent rights is entirely their own responsibility.

## Authorized use of this document

This document is being provided by CSA Group for informational and non-commercial use only. The user of this document is authorized to do only the following:

If this document is in electronic form:

- load this document onto a computer for the sole purpose of reviewing it;
- search and browse this document; and
- print this document if it is in PDF format.

Limited copies of this document in print or paper form may be distributed only to persons who are authorized by CSA Group to have such copies, and only if this Legal Notice appears on each such copy.

In addition, users may not and may not permit others to

- alter this document in any way or remove this Legal Notice from the attached standard;
- sell this document without authorization from CSA Group; or
- make an electronic copy of this document.

If you do not agree with any of the terms and conditions contained in this Legal Notice, you may not load or use this document or make any copies of the contents hereof, and if you do make such copies, you are required to destroy them immediately. Use of this document constitutes your acceptance of the terms and conditions of this Legal Notice.

# *Standards Update Service*

## *B109-17*
## *August 2017*

**Title:** *Natural gas for vehicles installation code*

To register for e-mail notification about any updates to this publication
- go to **shop.csa.ca**
- click on **CSA Update Service**

The **List ID** that you will need to register for updates to this publication is **2425399**.

If you require assistance, please e-mail **techsupport@csagroup.org** or call 416-747-2233.

Visit CSA Group's policy on privacy at **www.csagroup.org/legal** to find out how we protect your personal information.

# *B109-17*
# *Natural gas for vehicles installation code*

# IGAC

*Interprovincial Gas Advisory Council*



*Approved on July 18, 2017 by IGAC*
*Effective in Canada December 2018*
*Published in August 2017 by CSA Group*
*A not-for-profit private sector organization*
*178 Rexdale Boulevard, Toronto, Ontario, Canada M9W 1R3*

*To purchase standards and related publications, visit our Online Store at **shop.csa.ca***
*or call toll-free 1-800-463-6727 or 416-747-4044.*

*ISBN 978-1-4883-0872-7*

# Contents

Technical Committee on Natural Gas Powered Vehicles and Fuelling 5

Subcommittee on Natural Gas for Vehicles Installation Code 7

Preface 10

**B109-17, Part 1, *Compressed natural gas***

**1 Scope** 12

**2 Reference publications** 13

**3 Definitions** 17

**4 General** 19
4.1 Application 19
4.2 Approvals 19
4.2.1 General 19
4.2.2 Variances 19
4.2.3 Used fuel containers and components 20

**5 System requirements** 20
5.1 CNG fuel containers and assemblies 20
5.1.1 Service pressure 20
5.1.2 Permitted types 20
5.2 Alterations prohibited 20
5.3 CNG fuel container isolation and pressure relief device 20
5.3.1 Fuel container shut-off valves 20
5.3.2 Fueling receptacle isolation 21
5.3.3 Pressure relief devices (PRD) 21
5.4 CNG fuel container and assembly mounting 21
5.4.1 General 21
5.4.2 Fuel container high location mounting 22
5.4.3 General exterior mounting requirements 22
5.4.4 Approach, departure, breakover and road clearances 22
5.4.5 Attachment hardware and brackets 23
5.4.6 Fuel container protection 23
5.4.7 Large fuel containers 24
5.4.8 Maximum weight 24
5.5 CNG vent lines and ventilation 24
5.5.1 Vent lines 24
5.5.2 Venting from vehicle compartments 25
5.5.3 Interior mounted fuel container ventilation requirements 25
5.6 Fuel system components 25
5.6.1 Component requirements 25
5.6.2 Automatic shut-off valve 25
5.6.3 Fueling receptacle 25

5.6.4 Multifuel and dual fuel vehicles *26*
5.6.5 CNG fuel level indicator *26*
5.6.6 Wiring and electrical connectors *26*
5.6.7 Pressure regulator *26*
5.6.8 Isolation from heat sources *27*
5.6.9 Isolation from battery terminals *27*
5.7 Piping and tubing, hose, and fittings *27*
5.7.1 General requirements *27*
5.7.2 Rigid fuel lines *27*
5.7.3 Copper tubing *27*
5.7.4 Flexible fuel line requirements *28*
5.7.5 Acceptable piping, fitting, and joint components *28*
5.7.6 Fuel lines *28*
5.8 Labels and vehicle literature *29*
5.8.1 Vehicle owner's manual supplement(s) *29*
5.8.2 Vehicle labelling *29*
5.8.3 External vehicle label requirement *29*
5.8.4 Label(s) at the vehicle fill receptacle *29*

**6 Inspection and testing of converted vehicles** *30*
6.1 Vehicle conversions *30*
6.1.1 Protection from collision and impact *30*
6.1.2 Structural alterations to a vehicle during conversion *30*
6.1.3 Relocation of existing components during conversion *30*
6.1.4 Quality of work *30*
6.1.5 Vehicles involved in collision, fire, or explosion *30*
6.1.6 Training and licensing *30*
6.2 Leak testing of containers, piping, tubing, hose, and fitting assemblies *30*
6.2.1 General leak test requirements *30*
6.2.2 Inert gas leak testing (optional) *31*
6.2.3 Natural gas leak testing (mandatory) *31*
6.2.4 Production leak testing *32*
6.2.5 Pressure measurement *32*
6.2.6 Periodic in-service inspections *32*

**Annexes**
Annex A (informative) — Service, collision repair, or fuel container retesting *33*
Annex B (informative) — Depressurization of vehicle fuel containers *35*
Annex C (informative) — Sample labels *36*
Annex D (informative) — Vehicle checklist *39*
Annex E (informative) — Curbstone clearance, approach, departure, and ramp breakover angles *42*
Annex F (informative) — Corrosion and other external exposure *43*
Annex G (informative) — Contact information for publication organizations *44*
Annex H (normative) — Abbreviations for units of measurement *45*

**B109-17, Part 2, *Liquefied natural gas***

**1 Scope** *47*

**2 Reference publications** *48*

**3 Definitions** *50*

**4 General** *52*
4.1 Application *52*
4.2 Approvals *53*
4.2.1 General *53*
4.2.2 Variances *53*
4.2.3 Used LNG tanks and NGV components *53*

**5 System requirements** *53*
5.1 Materials *53*
5.2 Avoid LNG trapping *54*
5.3 Alterations prohibited *54*
5.4 Repairs *54*
5.5 LNG tank(s) *54*
5.5.1 In accordance with code *54*
5.5.2 Service temperature *54*
5.5.3 Appurtenances *55*
5.5.4 Vacuum insulation *55*
5.5.5 Tank fill level *55*
5.5.6 Holding time *55*
5.5.7 Hold time tests *55*
5.5.8 LNG tank marking *55*
5.6 LNG tank isolation *56*
5.6.1 LNG tank shutoff valves *56*
5.6.2 Other methods of isolation *56*
5.7 LNG tank and assembly mounting *56*
5.7.1 General *56*
5.7.2 Mounting *56*
5.7.3 Installation on exterior of vehicle *56*
5.7.4 Attachment requirements *57*
5.7.5 Attachment hardware and brackets *57*
5.7.6 Location of LNG tank *57*
5.7.7 LNG tank protection *58*
5.8 Fueling receptacle *58*
5.9 LNG tank pressure relief valves (PRV) *58*
5.10 Fuel system components *59*
5.10.1 Component requirements *59*
5.10.2 While engine not running *59*
5.10.3 Isolation from heat sources *59*
5.10.4 Isolation from battery terminals *59*
5.11 Vent lines and ventilation *60*
5.12 Pressure gauges *60*
5.13 Pumps *60*
5.14 Vaporizers *61*
5.15 Pressure regulator *61*
5.16 Piping and tubing, hose, and fittings *61*

5.16.1 General requirements *61*
5.16.2 Upstream of the vaporizer *62*
5.16.3 Downstream of the vaporizer *62*
5.16.4 Towed vehicle *62*
5.16.5 Piping and tubing passing through *62*
5.16.6 Unacceptable piping, fitting, and joint components *62*
5.16.7 Joints *63*
5.16.8 Rigid fuel lines *63*
5.16.9 Flexible fuel line requirements *63*
5.17 System testing *63*
5.17.1 Leak testing *63*
5.17.2 General requirements *64*
5.17.3 LNG tank conditioning (cool down) *64*
5.17.4 Gas/vapor leak testing *64*
5.17.5 Liquid leak testing *64*
5.17.6 Pressure measurement *64*

**6 Vehicle requirements** *65*
6.1 Labels and vehicle literature *65*
6.1.1 Vehicle owner's manual supplement(s) *65*
6.1.2 Vehicle labelling *65*
6.1.3 External vehicle label requirement *65*
6.1.4 Label(s) at the vehicle fill receptacle *65*
6.2 Approach, departure, or breakover clearances *65*
6.2.1 General *65*
6.2.2 Road clearance *65*
6.2.3 Clearance for industrial trucks *66*
6.3 Maximum weight *66*
6.4 Multifuel and dual fuel vehicles *66*
6.4.1 Multifuel vehicles *66*
6.4.2 Dual fuel vehicles *66*
6.5 Wiring and electrical connectors *66*
6.6 LNG fuel level indicator *67*
6.7 Gas detection for LNG vehicles *67*

**7 Periodic inspection** *68*

**8 Vehicles involved in collision, fire or explosion** *68*

**9 Personnel safety and training** *68*

**10 Parking of LNG vehicles** *68*

**Annexes**
Annex A (informative) — Corrosion and other external exposure *69*
Annex B (informative) — Sample labels *70*
Annex C (informative) — Recommended training *71*
Annex D (informative) — Contact information for publication organizations *72*
Annex E (normative) — Abbreviations for units of measurement *73*

# *Technical Committee on Natural Gas Powered Vehicles and Fuelling*

| | | |
|---|---|---|
| **M.A. Tremayne** | Enbridge Gas Distribution,<br>Toronto, Ontario, Canada<br>*Category: User Interest* | *Chair* |
| **D. Davis** | Transport Canada,<br>Ottawa, Ontario, Canada<br>*Category: Government and/or Regulatory Authority* | |
| **D. Ducasse** | Gaz Métro Plus,<br>Boucherville, Québec, Canada<br>*Category: User Interest* | |
| **V. Fe** | FortisBC Energy Inc. (FEI),<br>Surrey, British Columbia, Canada<br>*Category: Producer Interest* | |
| **B. Gillis** | Technical Standards & Safety Authority (TSSA),<br>Toronto, Ontario, Canada<br>*Category: Government and/or Regulatory Authority* | |
| **A. Hoskin** | Natural Resources Canada,<br>Ottawa, Ontario, Canada | *Associate* |
| **J. Jordan** | Agility Fuel Systems,<br>Cook, Minnesota, USA<br>*Category: Producer Interest* | |
| **S. Katz** | S. Katz and Associates Inc.,<br>North Vancouver, British Columbia, Canada<br>*Category: General Interest* | |
| **S. Kay** | Union Gas Limited,<br>Chatham, Ontario, Canada<br>*Category: User Interest* | |
| **S. Lajoie** | Gaz Métro Plus,<br>Boucherville, Québec, Canada<br>*Category: Producer Interest* | |
| **W.C. LaRose** | Edmonton, Alberta, Canada<br>*Category: General Interest* | |

| | | |
|---|---|---|
| **G. Lengle** | FortisBC Energy Inc. (FEI),<br>Surrey, British Columbia, Canada<br>*Category: Producer Interest* | |
| **D. Patel** | Kraus Global Ltd.,<br>Winnipeg, Manitoba, Canada<br>*Category: Producer Interest* | |
| **R. Smith** | Change Energy Services,<br>Oakville, Ontario, Canada<br>*Category: General Interest* | |
| **B. Wyatt** | British Columbia Safety Authority,<br>Kelowna, British Columbia, Canada<br>*Category: Government and/or Regulatory Authority* | |
| **J. Cairns** | CSA Group,<br>Cleveland, Ohio, USA | *Project Manager* |

# *Subcommittee on Natural Gas for Vehicles Installation Code*

| | | |
|---|---|---|
| **J.F. Jordan** | Agility Fuel Systems,<br>Cook, Minnesota, USA | *Chair* |
| **C. Atkinson** | Saskatchewan Government Insurance AutoFund,<br>Regina, Saskatchewan, Canada | |
| **M. Baril** | Société de l'Assurance Automobile du Québec,<br>Québec, Québec, Canada | |
| **S. Bayne** | Natural Resources Canada CANMET Energy,<br>Ottawa, Ontario, Canada | |
| **M. Beauchemin** | Gaz Métro,<br>Montréal, Québec, Canada | |
| **D. Byerly** | Hexagon Lincoln Inc. ,<br>Lincoln, Nebraska, USA | |
| **G. Chirdon** | CSA Group,<br>Charlotte, North Carolina, USA | |
| **E. Clarke** | HX-5,<br>Las Cruces, New Mexico, USA | |
| **Y. Coy** | Agility Fuel Systems,<br>Santa Ana, California, USA | |
| **D. Davis** | Transport Canada,<br>Ottawa, Ontario, Canada | |
| **D. Denny** | Legato Engineering,<br>Surrey, British Columbia, Canada | |
| **D. Ducasse** | Gaz Métro,<br>Montréal, Québec, Canada | |
| **V. Fe** | FortisBC Energy Inc. (FEI),<br>Surrey, British Columbia, Canada | |

| | |
|---|---|
| **B. Gillis** | Technical Standards & Safety Authority (TSSA),<br>Toronto, Ontario, Canada |
| **E. Girouard** | Emcara Gas Development,<br>Guelph, Ontario, Canada |
| **R. Grimard** | FortisBC Energy Inc. (FEI),<br>Surrey, British Columbia, Canada |
| **M. Grossman** | Shell Canada Ltd.,<br>Calgary, Alberta, Canada |
| **R. Herrington** | Columbia Safety Authority,<br>Westminster, British Columbia, Canada |
| **R. Hoffman** | Intertek,<br>Arlington Heights, Illinois, USA |
| **A. Hoskin** | Natural Resources Canada,<br>Ottawa, Ontario, Canada |
| **R. Jones** | VOSS Automotive Inc.,<br>Fort Wayne, Indiana, USA |
| **I. Jorgensen** | Kenworth Truck Co.,<br>Kirkland, Washington, USA |
| **S. Katz** | S. Katz and Associates Inc.,<br>North Vancouver, British Columbia, Canada |
| **R.C. Kauling** | KauliNG Solutions,<br>Whitby, Ontario, Canada |
| **D. Kayes** | Daimler Trucks North America LLC,<br>Portland, Oregon, USA |
| **R. Kempf** | Navistar, Inc.,<br>Lisle, Illinois, USA |
| **R. Kiff** | 1106499 Ontario Limited o/a Kiff Auto,<br>Peterborough, Ontario, Canada |
| **W.C. LaRose** | Edmonton, Alberta, Canada |

| | | |
|---|---|---|
| **S.C. Manning** | Alberta Municipal Affairs Safety Services,<br>Edmonton, Alberta, Canada | |
| **Y. Maurais** | Robert Transport,<br>Rougemont, Québec, Canada | |
| **P. Murray** | Chart, Inc.,<br>Ball Ground, Georgia, USA | |
| **N.L. Newhouse** | Hexagon Lincoln Inc.,<br>Lincoln, Nebraska, USA | |
| **T. Sloan** | Agility Fuel Systems,<br>Kelowna, British Columbia, Canada | |
| **M. Ursan** | Westport Power Inc,<br>Vancouver, British Columbia, Canada | |
| **T.G. Williams** | Ford Motor Co. of Canada, Limited,<br>Oakville, Ontario, Canada | |
| **B. Wyatt** | British Columbia Safety Authority,<br>Kelowna, British Columbia, Canada | |
| **T. Yoder** | NASA/WSTF,<br>Las Cruces, New Mexico, USA | |
| **J. Cairns** | CSA Group,<br>Cleveland, Ohio, USA | *Project Manager* |

# Preface

This is the third edition of CSA B109, *Natural gas for vehicles installation code*. It supersedes the previous edition published in 2014 under the same title and the 2001 edition, published under the title *Natural gas for vehicles installation code — Part 1 Compressed natural gas*.

This Code consists of the following:
a) CSA B109, Part 1 — *Compressed natural gas*; and
b) CSA B109, Part 2 — *Liquefied natural gas*.

Changes in this edition include the following:
a) separated CNG and LNG coverage into standalone distinct sections (Part 1—CNG; Part 2—LNG);
b) added coverage for dual fuel vehicles to recognize emerging technology;
c) removed allowance of ISO 11439 containers since these are not recognized by Transport Canada; and
d) changed protection from heat sources from a prescriptive requirement to a performance requirement

This Code was prepared by the Subcommittee on Natural Gas for Vehicles Installation Code, under the jurisdiction of the Technical Committee on Natural Gas Powered Vehicles and Fuelling under the jurisdiction of the Strategic Steering Committee on Transportation and has been formally approved by the Technical Committee and the Interprovincial Gas Advisory Council.

**Notes:**
1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*
2) *Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.*
3) *This Standard was developed by consensus, which is defined by* CSA Policy governing standardization — Code of good practice for standardization *as "substantial agreement. Consensus implies much more than a simple majority, but not necessarily unanimity". It is consistent with this definition that a member may be included in the Technical Committee list and yet not be in full agreement with all clauses of this Standard.*
4) *To submit a request for interpretation of this Standard, please send the following information to inquiries@csagroup.org and include "Request for interpretation" in the subject line:*
   a) *define the problem, making reference to the specific clause, and, where appropriate, include an illustrative sketch;*
   b) *provide an explanation of circumstances surrounding the actual field condition; and*
   c) *where possible, phrase the request in such a way that a specific "yes" or "no" answer will address the issue.*

   *Committee interpretations are processed in accordance with the* CSA Directives and guidelines governing standardization *and are available on the* Current Standards Activities *page at* ***standardsactivities.csa.ca****.*
5) *This Standard is subject to review within five years from the date of publication. Suggestions for its improvement will be referred to the appropriate committee. To submit a proposal for change, please send the following information to inquiries@csagroup.org and include "Proposal for change" in the subject line:*
   a) *Standard designation (number);*
   b) *relevant clause, table, and/or figure number;*
   c) *wording of the proposed change; and*
   d) *rationale for the change.*

# *B109-17, Part 1*
# ***Compressed natural gas***

IGAC

*Interprovincial Gas Advisory Council*



*Approved on July 18, 2017 by IGAC*
*Effective in Canada December 2018*
*Published in August 2017 by CSA Group*
*A not-for-profit private sector organization*
*178 Rexdale Boulevard, Toronto, Ontario, Canada M9W 1R3*

*To purchase standards and related publications, visit our Online Store at **shop.csa.ca***
*or call toll-free 1-800-463-6727 or 416-747-4044.*

*ISBN 978-1-4883-0872-7*

# *B109-17, Part 1*
# *Compressed natural gas*

## 1 Scope

### 1.1
This Code applies to the installation, inspection, repair, and maintenance of the fuel storage and delivery system installed in powered industrial truck applications and vehicles for use with compressed natural gas (CNG). This includes fuel systems on self-propelled vehicles for the provision of motive power.

Regulatory requirements might supersede the requirements of this Code.

### 1.2
This Code does not apply to
a) stationary engines;
b) mobile equipment using natural gas as a fuel for other than propulsion;
c) LNG fuel storage systems*;
d) electronic components of a fuel management system;
e) storage or utilization of natural gas on marine vessels or rail vehicles;
f) recreational all terrain vehicles;
g) motorcycles; and
h) vehicles (including their containers) qualified under the Canadian *Motor Vehicle Safety Regulations*.

* *Part 2 of this Code covers LNG fuel systems.*

### 1.3
The values given in SI units are the units of record for the purposes of this Code. The values given in parentheses are for information and comparison only.

**Notes:**
1) *IEEE/ASTM SI 10 or ISO 80000-1 can be used as a guide when converting Imperial units to metric units.*
2) *Where the word "gallon" is used in this Code, it indicates a U.S. gallon equivalent to 3.785 liters water capacity.*

### 1.4
All references to "psi" throughout this Code are to be considered gauge pressures, unless otherwise specified.

See Annex H for additional information about the units of measurement used in this Code.

### 1.5
In this Code, "shall" is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the Code; "should" is used to express a recommendation or that which is advised but not required; and "may" is used to express an option or that which is permissible within the limits of the Code.

Notes accompanying clauses do not include requirements or alternative requirements; the purpose of a note accompanying a clause is to separate from the text explanatory or informative material.

Notes to tables and figures are considered part of the table or figure and may be written as requirements.

Annexes are designated normative (mandatory) or informative (non-mandatory) to define their application.

## 2 Reference publications

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

**Note:** *Users of this Code should consult with the authority having jurisdiction regarding which edition to reference.*

**CSA Group**

B51 (Part 2)
*Boiler, pressure vessel, and pressure piping code; Part 2: High-pressure cylinders for the on-board storage of natural gas and hydrogen as fuels for automotive vehicles*

EXP2.1
*Best practice for defueling, decommissioning, and disposal of compressed natural gas vehicle fuel containers*

ANSI NGV 1/CSA NGV 1
*Compressed natural gas vehicle (NGV) fueling connection devices*

CSA/ANSI NGV 2
*Compressed natural gas vehicle fuel containers*

ANSI NGV 3.1/CSA 12.3
*Fuel system components for compressed natural gas powered vehicles*

ANSI/CSA PRD 1
*Pressure relief devices for natural gas vehicle (NGV) fuel containers*

**ASME (The American Society of Mechanical Engineers)**

B1.20.1
*Pipe Threads, General Purpose (Inch)*

**ASTM International**

IEEE/ASTM SI 10
*American National Standard for Metric Practice*

A269/A269M
*Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service*

A632
*Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing (Small-Diameter) for General Service*