



**CSA B109.2:21**  
National Standard of Canada



# Liquefied natural gas vehicle 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 treaty 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 form.

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***

*CSA B109.2:21*

*August 2021*

**Title:** *Liquefied natural gas vehicle installation code*

To register for e-mail notification about any updates to this publication

- go to [www.csagroup.org/store/](http://www.csagroup.org/store/)
- click on **Product Updates**

The **List ID** that you will need to register for updates to this publication is **24291-5**

If you require assistance, please e-mail [techsupport@csagroup.org](mailto:techsupport@csagroup.org) or call 416-747-2233.

Visit CSA Group's policy on privacy at [www.csagroup.org/legal](http://www.csagroup.org/legal) to find out how we protect your personal information.

**Canadian Standards Association (operating as “CSA Group”)**, under whose auspices this National Standard has been produced, was chartered in 1919 and accredited by the Standards Council of Canada to the National Standards system in 1973. It is a not-for-profit, nonstatutory, voluntary membership association engaged in standards development and certification activities.

CSA Group standards reflect a national consensus of producers and users — including manufacturers, consumers, retailers, unions and professional organizations, and governmental agencies. The standards are used widely by industry and commerce and often adopted by municipal, provincial, and federal governments in their regulations, particularly in the fields of health, safety, building and construction, and the environment.

More than 10 000 members indicate their support for CSA Group’s standards development by volunteering their time and skills to Committee work.

CSA Group offers certification and testing services in support of and as an extension to its standards development activities. To ensure the integrity of its certification process, CSA Group regularly and continually audits and inspects products that bear the CSA Group Mark.

In addition to its head office and laboratory complex in Toronto, CSA Group has regional branch offices in major centres across Canada and inspection and testing agencies in fourteen countries. Since 1919, CSA Group has developed the necessary expertise to meet its corporate mission: CSA Group is an independent service organization whose mission is to provide an open and effective forum for activities facilitating the exchange of goods and services through the use of standards, certification and related services to meet national and international needs.

For further information on CSA Group services, write to  
CSA Group  
178 Rexdale Boulevard  
Toronto, Ontario, M9W 1R3  
Canada

A National Standard of Canada is a standard developed by a Standards Council of Canada (SCC) accredited Standards Development Organization, in compliance with requirements and guidance set out by SCC. More information on National Standards of Canada can be found at [www.scc.ca](http://www.scc.ca).

SCC is a Crown corporation within the portfolio of Innovation, Science and Economic Development (ISED) Canada. With the goal of enhancing Canada’s economic competitiveness and social well-being, SCC leads and facilitates the development and use of national and international standards. SCC also coordinates Canadian participation in standards development, and identifies strategies to advance Canadian standardization efforts.

Accreditation services are provided by SCC to various customers, including product certifiers, testing laboratories, and standards development organizations. A list of SCC programs and accredited bodies is publicly available at [www.scc.ca](http://www.scc.ca).

Standards Council of Canada  
600-55 Metcalfe Street  
Ottawa, Ontario, K1P 6L5  
Canada



La norme nationale du Canada n'est disponible qu'en anglais.

*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 to judge its suitability for their particular purpose.*

*\*A trademark of the Canadian Standards Association, operating as “CSA Group”*

*National Standard of Canada*

*CSA B109.2:21*

***Liquefied natural gas vehicle  
installation code***

**IGAC**

*Interprovincial Gas Advisory Council*



*®A trademark of the Canadian Standards Association, operating as "CSA Group"*



*Approved on June 25, 2021 by IGAC*

*Published in August 2021 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 [www.csagroup.org/store/](http://www.csagroup.org/store/)  
or call toll-free 1-800-463-6727 or 416-747-4044.*

*ICS 75.060; 43.060.40*

*ISBN 978-1-4883-3627-0*

*© 2021 Canadian Standards Association*

*All rights reserved. No part of this publication may be reproduced in any form whatsoever  
without the prior permission of the publisher.*

# Contents

Interprovincial/Territorial Gas Advisory Council	4
Technical Committee on Natural Gas Transportation	6
Subcommittee on Natural Gas for Vehicles Installation Code	9
Preface	12

## 1 Scope 13

1.1	Application	13
1.2	Exclusions	13
1.3	Units of measure	13
1.4	Pressure references	13
1.5	Mandatory and informative provisions	13

## 2 Reference publications 14

## 3 Definitions 16

## 4 General 19

4.1	Application	19
4.1.1	Document conflict	19
4.1.2	Manufacturer instructions conflict	19
4.1.3	Installer responsibilities	19
4.2	Approvals	19
4.2.1	General approvals	19
4.2.2	Variances	19
4.2.3	Used LNG tanks and NGV components	19

## 5 System requirements 20

5.1	Materials	20
5.1.1	Temperature compatibility	20
5.1.2	Temperature rating	20
5.1.3	Brazing material	20
5.1.4	Oxy-fuel gas welding prohibition	20
5.1.5	Furnace butt-welding prohibition	20
5.2	Avoiding LNG trapping	20
5.3	Alterations prohibited	20
5.4	Repairs	21
5.5	LNG tank(s)	21
5.5.1	In accordance with code	21
5.5.2	Service temperature	21
5.5.3	Appurtenances	21
5.5.4	Vacuum insulation	21
5.5.5	Tank fill level	21
5.5.6	Holding time	21
5.5.7	Hold time tests	22

5.5.8	LNG tank marking	22
5.6	LNG tank isolation	22
5.6.1	LNG tank shutoff valves	22
5.6.2	Other methods of isolation	23
5.7	LNG tank and assembly mounting	23
5.7.1	General	23
5.7.2	Mounting	23
5.7.3	Installation on exterior of vehicle	23
5.7.4	Attachment requirements	23
5.7.5	Attachment hardware and brackets	24
5.7.6	Location of LNG tank	24
5.7.7	LNG tank protection	24
5.8	Fuelling receptacle	24
5.8.1	Fuelling receptacle compliance and specifications	24
5.8.2	Fuelling receptacle installation	25
5.8.3	Fuel backflow prevention	25
5.8.4	Fuelling receptacle clearance	25
5.8.5	Receptacle atmospheric venting prevention	25
5.9	LNG tank pressure relief valves (PRV)	25
5.9.1	LNG pressure relief valve (PRV) placement	25
5.9.2	LNG tank PRV requirements	25
5.10	Defuelling connector	26
5.10.1	Defuelling connector requirements	26
5.10.2	Defuelling connector installation	26
5.11	Fuel system components	27
5.11.1	Components' compliance	27
5.11.2	Isolation from heat sources	27
5.11.3	Isolation from battery terminals	27
5.12	Vent lines and ventilation	27
5.13	Pressure gauges	28
5.14	Pumps	28
5.15	Vaporizers	28
5.16	Pressure regulator	29
5.16.1	Pressure regulator mounting requirements	29
5.16.2	Pressure regulator protection	29
5.16.3	Pressure regulator relief valve	29
5.17	Piping and tubing, hose, and fittings	29
5.17.1	Fuel lines – General requirements	29
5.17.2	Fuel lines upstream of the vaporizer	30
5.17.3	Fuel lines downstream of the vaporizer	30
5.17.4	Fuel connection with towed vehicle	30
5.17.5	Piping and tubing pass through	30
5.17.6	Unacceptable piping, fitting, and joint components	30
5.17.7	Pipe and tube fitting pressure connections	30
5.17.8	Rigid fuel lines	31
5.17.9	Flexible fuel line requirements	31
5.18	System testing	31
5.18.1	Leak testing	31
5.18.2	General requirements	31

5.18.3	LNG tank conditioning (cool down)	32
5.18.4	Gas/vapour leak testing	32
5.18.5	Liquid leak testing	32
5.18.6	Pressure measurement	32
<b>6</b>	<b>Vehicle requirements</b>	<b>32</b>
6.1	Labels and vehicle literature	32
6.1.1	Vehicle owner's manual supplement(s)	32
6.1.2	Vehicle labelling	33
6.1.3	External vehicle label requirement	33
6.1.4	Label(s) at the vehicle fill receptacle(s)	33
6.2	Approach, departure, or breakover clearances	33
6.2.1	General	33
6.2.2	Road clearance	33
6.2.3	Clearance for industrial trucks	34
6.3	Maximum weight	34
6.4	Multifuel and dual fuel vehicles	34
6.4.1	Multifuel vehicles	34
6.4.2	Dual fuel vehicles	34
6.5	Wiring and electrical connectors	34
6.6	LNG fuel level indicator	34
6.7	Gas detection for LNG vehicles	35
6.7.1	Methane detection system requirement	35
6.7.2	Methane detection system functionality	35
6.7.3	Methane detection disconnection provisions	35
6.7.4	Methane detection system activation	35
6.7.5	Methane detection system audible alarm	35
6.7.6	Methane detection system visual alarm	35
6.7.7	Methane detection system inspection and maintenance	35
<b>7</b>	<b>Periodic inspection</b>	<b>36</b>
<b>8</b>	<b>Vehicles involved in collision, fire, or explosion</b>	<b>36</b>
<b>9</b>	<b>Personnel safety and training</b>	<b>36</b>
<b>10</b>	<b>Parking of LNG vehicle</b>	<b>36</b>
<hr/>		
Annex A (informative)	— Corrosion and other external exposure	37
Annex B (informative)	— Sample labels	38
Annex C (informative)	— Recommended training	39

# Interprovincial/Territorial Gas Advisory Council

<b>S. C. Manning</b>	Alberta Municipal Affairs Safety Services, Edmonton, Alberta, Canada <i>Category: Regulatory Authority</i>	<i>Chair</i>
<b>D. A. Balcha</b>	Manitoba, Office of the Fire Commissioner, Winnipeg, Manitoba, Canada <i>Category: Regulatory Authority</i>	<i>Vice-Chair</i>
<b>P. Fowler</b>	Department of Labour and Advanced Education, Dartmouth, Nova Scotia, Canada <i>Category: Regulatory Authority</i>	<i>Vice-Chair</i>
<b>N. Armstrong</b>	Office of the Fire Commissioner Inspections and Technical Services, Winnipeg, Manitoba, Canada	<i>Alternate</i>
<b>D. Brockerville</b>	Government of Newfoundland and Labrador/ Service NL, St. John's, Newfoundland and Labrador, Canada <i>Category: Regulatory Authority</i>	
<b>M. E. Davidson</b>	Province of New Brunswick Department of Public Safety, Fredericton, New Brunswick, Canada <i>Category: Regulatory Authority</i>	
<b>Z. J. Fraczkowski</b>	Technical Standards & Safety Authority (TSSA), Toronto, Ontario, Canada <i>Category: Regulatory Authority</i>	
<b>S. Friedt</b>	TSASK, Saskatoon, Saskatchewan, Canada <i>Category: Regulatory Authority</i>	
<b>B. Hamoud Hadj</b>	Régie du bâtiment du Québec, Montréal, Québec, Canada	<i>Alternate</i>
<b>Hauer</b>	Yukon Government, Whitehorse, Yukon Territory, Canada <i>Category: Regulatory Authority</i>	

<b>D. N. Hird</b>	TSASK, Regina, Saskatchewan, Canada	<i>Alternate</i>
<b>T. Holley</b>	Nova Scotia Department of Labour and Advanced Education, Dartmouth, Nova Scotia, Canada	<i>Alternate</i>
<b>J. Lackey</b>	Technical Safety BC, Victoria, British Columbia, Canada <i>Category: Regulatory Authority</i>	
<b>J. Lalande</b>	Health Canada, Ottawa, Ontario, Canada <i>Category: Regulatory Authority</i>	
<b>M. LeBlanc</b>	Province of New Brunswick Department of Public Safety, Grand Falls, New Brunswick, Canada	<i>Alternate</i>
<b>R. MacCormack</b>	Province of PEI, Souris, Prince Edward Island, Canada <i>Category: Regulatory Authority</i>	
<b>M. Mailman</b>	Government of the Northwest Territories, Yellowknife, Northwest Territories, Canada <i>Category: Regulatory Authority</i>	
<b>J. Renaud</b>	Régie du bâtiment du Québec, Montréal, Québec, Canada <i>Category: Regulatory Authority</i>	
<b>S. Sadeghi</b>	TSAC, Stouffville, Ontario, Canada	<i>Non-voting</i>
<b>C. R. Valliere</b>	Government of Alberta, Municipal Affairs, Edmonton, Alberta, Canada	<i>Alternate</i>
<b>M. A. Wai</b>	Government of Nunavut Department of Community and Government Svcs, Iqaluit, Nunavut, Canada <i>Category: Regulatory Authority</i>	
<b>B. Zinn</b>	Technical Safety BC, Vancouver, British Columbia, Canada	<i>Alternate</i>

# ***Technical Committee on Natural Gas Transportation***

<b>J. F. Jordan</b>	Hexagon Agility, Cook, Minnesota, USA <i>Category: User Interest</i>	<i>Chair</i>
<b>G. Meadows</b>	Westport Fuel Systems Canada Inc., Cambridge, Ontario, Canada <i>Category: Producer Interest</i>	<i>Vice-Chair</i>
<b>G. Barker</b>	ANGI Energy Systems, Janesville, Wisconsin, USA	<i>Non-voting</i>
<b>R. Boyd</b>	Boyd Hydrogen, LLC, Napa, California, USA <i>Category: General Interest</i>	
<b>J. P. Cohen</b>	Air Products and Chemicals Inc., Allentown, Pennsylvania, USA	<i>Non-voting</i>
<b>J. E. Eihusen</b>	Hexagon Lincoln Inc., Lincoln, Nebraska, USA	<i>Non-voting</i>
<b>V. Fe</b>	FortisBC Energy Inc. (FEI), Surrey, British Columbia, Canada <i>Category: Gas Supplier</i>	
<b>E. Girouard</b>	Emcara Gas Development Inc., Guelph, Ontario, Canada <i>Category: Producer Interest</i>	
<b>D. Goldin</b>	Global Gas Mobility, La Lucila, Buenos Aires, Argentina <i>Category: General Interest</i>	
<b>M. Gust</b>	Quantum Fuel Systems LLC, Lake Forest, California, USA <i>Category: Producer Interest</i>	
<b>P. Horacek</b>	Powertech Labs Inc., Surrey, British Columbia, Canada <i>Category: Producer Interest</i>	

<b>A. Hoskin</b>	Natural Resources Canada, Ottawa, Ontario, Canada	<i>Non-voting</i>
<b>S. Katz</b>	S. Katz and Associates Inc., North Vancouver, British Columbia, Canada <i>Category: General Interest</i>	
<b>C. Kroecker</b>	NW Natural Gas, Portland, Oregon, USA <i>Category: Gas Supplier</i>	
<b>S. Lajoie</b>	Énergir, Montréal, Québec, Canada <i>Category: Gas Supplier</i>	
<b>P. Lam</b>	Quantum Fuel Systems LLC, Irvine, California, USA	<i>Non-voting</i>
<b>A. Lanier Papageorge</b>	Southern Company Gas, Atlanta, Georgia, USA <i>Category: Gas Supplier</i>	
<b>G. Lengle</b>	FortisBC Energy Inc. (FEI), Surrey, British Columbia, Canada	<i>Non-voting</i>
<b>R. Milligan</b>	Technical Safety BC, Victoria, British Columbia, Canada <i>Category: General Interest</i>	
<b>N. L. Newhouse</b>	Hexagon Lincoln Inc., Lincoln, Nebraska, USA <i>Category: Producer Interest</i>	
<b>D. Niemiec</b>	Swagelok, Solon, Ohio, USA <i>Category: Producer Interest</i>	
<b>A. Nurgel</b>	Technical Standards and Safety Authority (TSSA), Toronto, Ontario, Canada <i>Category: General Interest</i>	
<b>D. Patel</b>	ANGI Energy Systems, Janesville, Wisconsin, USA <i>Category: Producer Interest</i>	

<b>D. Rea</b>	Quantum Fuel Systems LLC, Irvine, California, USA	<i>Non-voting</i>
<b>B. Richard</b>	Natural Resources Canada, Ottawa, Ontario, Canada	<i>Non-voting</i>
<b>P. Sandsted</b>	NGVAmerica, Washington, District of Columbia, USA	<i>Non-voting</i>
<b>R. Service</b>	Enbridge Gas Distribution, Toronto, Ontario, Canada <i>Category: Gas Supplier</i>	
<b>G. R. Smith</b>	Change Energy Services Inc., Oakville, Ontario, Canada <i>Category: General Interest</i>	
<b>M. A. Tremayne</b>	ComTech Energy, Milton, Ontario, Canada <i>Category: Producer Interest</i>	
<b>C. R. Valliere</b>	Alberta Municipal Affairs Safety Services, Edmonton, Alberta, Canada <i>Category: General Interest</i>	
<b>M. Veenstra</b>	Ford Motor Company, Dearborn, Michigan, USA <i>Category: User Interest</i>	
<b>C. Webster</b>	Testnet Canada Inc., Langley, British Columbia, Canada <i>Category: General Interest</i>	
<b>C. Wertz</b>	Waste Management, Houston, Texas, USA <i>Category: User Interest</i>	
<b>T. A. Williams</b>	Natural Gas Direct, LLC, Arlington, Virginia, USA	<i>Non-voting</i>
<b>J. Cairns</b>	CSA Group, Cleveland, Ohio, USA	<i>Project Manager</i>

# ***Subcommittee on Natural Gas for Vehicles Installation Code***

<b>J. F. Jordan</b>	Hexagon Agility, Cook, Minnesota, USA	<i>Chair</i>
<b>E. Girouard</b>	Emcara Gas Development Inc., Guelph, Ontario, Canada	<i>Vice-Chair</i>
<b>M. Baril</b>	Société de l'Assurance Automobile du Québec, Québec, Québec, Canada	
<b>M. Beauchemin</b>	Énergir, Montréal, Québec, Canada	
<b>D. Byerly</b>	Hexagon Lincoln Inc., Lincoln, Nebraska, USA	
<b>N. Clavette</b>	National Energy Equipment Inc., Mississauga, Ontario, Canada	
<b>D. Ducasse</b>	Énergir, Montréal, Québec, Canada	
<b>V. Fe</b>	FortisBC Energy Inc. (FEI), Surrey, British Columbia, Canada	
<b>R. Grimard</b>	FortisBC Energy Inc. (FEI), Surrey, British Columbia, Canada	
<b>M. Grossman</b>	Shell Canada Limited, Calgary, Alberta, Canada	
<b>M. Gust</b>	Quantum Fuel Systems LLC, Lake Forest, California, USA	
<b>K. Hendershot</b>	Transport Canada, Ottawa, Ontario, Canada	
<b>R. Hoffman</b>	Intertek, Arlington Heights, Illinois, USA	

<b>A. Holbert</b>	Hanwha Advanced Materials, Twinsburg, Ohio, USA
<b>A. Hoskin</b>	Natural Resources Canada, Ottawa, Ontario, Canada
<b>R. J. Jones</b>	VOSS Automotive Inc., Fort Wayne, Indiana, USA
<b>I. Jorgensen</b>	Kenworth Truck Co., Kirkland, Washington, USA
<b>S. Katz</b>	S. Katz and Associates Inc., North Vancouver, British Columbia, Canada
<b>D. Kayes</b>	Daimler Trucks North America LLC, Portland, Oregon, USA
<b>R. Kempf</b>	Navistar, Inc., Lisle, Illinois, USA
<b>R. Kiff</b>	1106499 Ontario Limited o/a Kiff Auto, Peterborough, Ontario, Canada
<b>S. Lajoie</b>	Énergir, Montréal, Québec, Canada
<b>S. C. Manning</b>	Alberta Municipal Affairs Safety Services, Edmonton, Alberta, Canada
<b>R. Milligan</b>	Technical Safety BC, Victoria, British Columbia, Canada
<b>P. Murray</b>	Chart, Inc., Ball Ground, Georgia, USA
<b>N. L. Newhouse</b>	Hexagon Lincoln Inc., Lincoln, Nebraska, USA
<b>N. Shroff</b>	Heil Environmental, Fort Payne, Alabama, USA

<b>T. Sloan</b>	Agility Fuel Systems, Kelowna, British Columbia, Canada	
<b>M. Ursan</b>	Burnaby, British Columbia, Canada	
<b>N. Victor</b>	Fortis BC, Abbotsford, British Columbia, Canada	
<b>S. Wheaton</b>	Intertek, Calgary, Alberta, Canada	
<b>T. A. Williams</b>	Natural Gas Direct, LLC, Arlington, Virginia, USA	
<b>T. Yoder</b>	NASA/WSTF, Las Cruces, New Mexico, USA	
<b>J. Cairns</b>	CSA Group, Cleveland, Ohio, USA	<i>Project Manager</i>

# Preface

This is the first edition of CSA B109.2, *Liquefied natural gas vehicle installation code*. It supersedes the previous editions published in 2017 and 2014 as Part 2 of CSA B109, *Natural gas for vehicles installation code*.

CSA B109.1 is applicable to compressed natural gas (CNG). CSA B109.2 is applicable to liquefied natural gas (LNG).

Changes in this edition include the following:

- a) revisions to clarify wording and references, tables, and figures;
- b) resolved conflicts identified with other documents;
- c) provided consistency and clarification between this Code and CSA B109.1;
- d) corrected metrication values; and
- e) harmonized definitions with other industry codes and standards.

CSA Group acknowledges that the development of this Code was made possible, in part, by the financial support of Natural Resources Canada.

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

This Code has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.

## 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 Code is stated in its Scope, it is important to note that it remains the responsibility of the users of the Code to judge its suitability for their particular purpose.*
- 3) *This Code 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 Code.*
- 4) *To submit a request for interpretation of this Code, please send the following information to [inquiries@csagroup.org](mailto: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.*
  - d) *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](http://standardsactivities.csa.ca).*
- 5) *This Code 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](mailto:inquiries@csagroup.org) and include “Proposal for change” in the subject line:*
  - a) *Code designation (number);*
  - b) *relevant clause, table, and/or figure number;*
  - c) *wording of the proposed change; and*
  - d) *rationale for the change.*

# CSA B109.2:21

## ***Liquefied natural gas vehicle installation code***

### **1 Scope**

#### **1.1 Application**

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 liquefied natural gas (LNG). This includes fuel systems on self-propelled vehicles for the provision of motive power.

Federal or provincial regulatory requirements might supersede the requirements of this Code.

#### **1.2 Exclusions**

This Code does not apply to

- a) stationary engines;
- b) mobile equipment using natural gas as a fuel for other than propulsion;
- c) electronic components of a fuel management system;
- d) storage or utilization of natural gas on marine vessels or rail vehicles or transportation by tanker truck;
- e) recreational all-terrain vehicles; and
- f) motorcycles.

#### **1.3 Units of measure**

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 L water capacity.*

#### **1.4 Pressure references**

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

#### **1.5 Mandatory and informative provisions**

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.