



CSA B149.1:20
National Standard of Canada



Natural gas and propane installation code



Standards Council of Canada
Conseil canadien des normes

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.





Gas Trade Practice Exam

Updated to the 2020 edition of CSA B149.1. The Gas Trade Practice Exam is an extension of the CSA Gas Trade training materials and is geared to helping Gas Technicians/Fitters pass the certification exam.

Learn More



For more information or to purchase the Gas Trade Practice Exam, phone 1 800 463 6727 or visit store.csagroup.org

- Includes over 1,400 sample exam questions.
- This unique prep tool allows students to both test their acquired technical knowledge and practice writing a mock exam.
- Ideal for users of CSA B149.1 and the Gas Trade 3, Gas Trade 2 or Gas Fitter B programs.
- Wrong answer report provides correct answers and highlights code requirements.
- Available in iOS, android or desktop.

Standards Update Service

CSA B149.1:20 January 2020

Title: *Natural gas and propane installation code*

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

- go to store.csagroup.org
- click on **Product Updates**

The **List ID** that you will need to register for updates to this publication is **2427296**.

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.

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.

Individuals, companies, and associations across Canada indicate their support for CSA Group's standards development by volunteering their time and skills to Committee work and supporting CSA Group's objectives through sustaining memberships. The more than 7000 committee volunteers and the 2000 sustaining memberships together form CSA Group's total membership from which its Directors are chosen. Sustaining memberships represent a major source of income for CSA Group's standards development activities.

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 eight 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.

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.

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



Standards Council of Canada
Conseil canadien des normes

Cette Norme Nationale du Canada est disponible en versions française et anglaise.

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 B149.1:20 **Natural gas and propane installation code**

IGAC

Interprovincial Gas Advisory Council



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



*Approved on November 16, 2019 by IGAC
Published in January 2020 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 store.csagroup.org
or call toll-free 1-800-463-6727 or 416-747-4044.

ICS 75.060
ISBN 978-1-4883-2264-8

© 2020 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 Gas Advisory Council	6
Technical Committee on Installation Code for Natural Gas and Propane Appliances	8
Preface	13
0 Introduction	15
1 Scope	15
2 Reference publications	16
3 Definitions	22
4 General	36
4.1 Application	36
4.2 Approval of appliances, accessories, components, equipment, and material	37
4.3 Responsibilities of the installer	37
4.4 Training and quality of labour	38
4.5 Suitability of use	38
4.6 Meter and service regulator installations	39
4.7 Electrical connections and components	39
4.8 Mobile homes and recreational vehicles	40
4.9 Hazardous and corrosive locations	40
4.10 Smoking	41
4.11 Isolation of safety devices	41
4.12 Leak detection	41
4.13 Appliance clearances to combustible material	41
4.14 Accessibility	46
4.15 Outdoor installations	47
4.16 Appliances in garages	47
4.17 Appliance ductwork connections	47
4.18 Combined heating systems	48
4.19 Appliances protected by automatic fire-extinguishing systems	48
4.20 Control of appliances with self-energizing pilots	48
4.21 Defective heat exchangers	49
4.22 High-altitude installations	49
4.23 Protection of appliances from physical damage	49
4.24 Odorization	49
4.25 Mobile homes and recreational vehicles	50
5 Pressure controls	52
5.1 Delivery pressure	52
5.2 Pressure regulators	54
5.2.1 General	54
5.2.2 Additional requirements for delivery pressures of 2 psig (14 kPa) or less	55
5.2.3 Additional requirements for delivery pressures greater than 2 psig (14 kPa)	56

5.2.4	Additional requirements for pressure regulators for natural gas applications	57
5.3	Overpressure protection devices	57
5.4	Hydrostatic relief devices for propane applications	58
5.5	Venting of pressure control devices	59
5.5.1	Venting of pressure control devices other than overpressure relief devices	59
5.5.2	Venting of overpressure relief devices	59
5.5.3	Additional requirements for venting of propane pressure control devices	60
5.5.4	Venting exemptions for line pressure regulators	60
5.6	Termination of vents	61
5.7	Appliance and pilot pressure regulators	62
5.7.1	Appliance and pilot pressure regulators in propane applications	62
5.7.2	Appliance and pilot pressure regulators in natural gas applications	62
6	Gas piping systems	63
6.1	General	63
6.2	Material	63
6.3	Size	65
6.4	Volume of gas to be used for sizing gas piping systems	67
6.5	Allowable pressure and pressure drop	67
6.6	Extensions	68
6.7	Location	68
6.8	Piping practices	69
6.9	Joints and connections	70
6.10	Branch piping outlets	71
6.11	Appliance connections	72
6.12	Piping outlets	72
6.13	Drip and dirt pockets	73
6.14	Prohibited practices	74
6.15	Underground piping and tubing	74
6.16	Protection of piping and tubing	76
6.17	Identification of piping or tubing	77
6.18	Manual shut-off valves	78
6.19	Manual-reset valves	79
6.20	Gas hose and fittings	79
6.21	Gas connectors	81
6.22	Testing of piping, tubing, hose, and fittings	82
6.23	Purging of gas piping systems after leak testing	84
6.24	Purging gas from a piping or tubing system	86
6.25	Rooftop gas piping systems	86
6.26	Inspection	86
6.27	Highway vehicles, recreational vehicles, mobile outdoor food service units, and wash-mobiles	86
7	Installation of specific types of appliances	87
7.1	Boilers	87
7.2	Generators, compressors/pressure boosters, engines, and turbines	88
7.2.1	General requirements	88
7.2.2	Compressors/pressure boosters	89
7.2.3	Emergency generators	90

7.2.4	Non-motive engines and turbines	90
7.2.5	Additional requirements for gas engines and turbines in buildings	91
7.3	Carbon dioxide generators	92
7.4	Commercial-type clothes dryers	92
7.5	Domestic-type clothes dryers	93
7.6	Conversions	94
7.7	Conversion burners	94
7.8	Conversion of warm air furnaces	95
7.9	Conversion of ranges	96
7.10	Counter appliances	96
7.11	Direct-vent appliances	96
7.12	Furnaces used with cooling units	96
7.13	Central furnaces	97
7.14	Downflow furnaces	98
7.15	Duct furnaces	98
7.16	Horizontal furnaces	99
7.17	Wall furnaces (recessed heaters)	99
7.18	Construction heaters and torches	99
7.19	Direct-fired door air heaters	100
7.20	Direct-fired make-up air heaters (DFMAH)	101
7.21	Non-recirculating direct gas-fired industrial air heaters (DFIAH)	103
7.22	Direct gas-fired process air heaters (DFPAH)	104
7.23	Infrared heaters	107
7.24	Room heaters	108
7.25	Decorative appliances and gas logs	109
7.26	Pool heaters	110
7.27	Water heaters	111
7.28	Unit heaters	111
7.29	Hotplates	112
7.30	Incinerators	112
7.31	Lighting	113
7.32	Commercial cooking appliances	113
7.33	Residential-type ranges	114
7.34	Refrigerators	115
7.35	Operation of appliances at shows, exhibitions, or other similar events	115
8	Venting systems and air supply for appliances	115
8.1	General	115
8.2	Air-supply determination for central-heating furnaces, boilers, and hot-water heaters	116
8.3	Air-supply openings and ducts	123
8.4	Air-supply requirements for appliances having a total input exceeding 400 000 Btu/h (120 kW) (see Clause 8.1.4)	124
8.5	Air-supply dampers, louvres, and grilles	125
8.6	Conditions created by exhaust fans, air-supply fans, circulating fans, or fireplaces	125
8.7	Engineered installations	126
8.8	Air supply by mechanical means	126
8.9	Appliance venting	126
8.10	Methods of venting appliances	127
8.11	Vent and chimney requirements	129

8.12	Chimneys	129
8.13	Vent and chimney sizing	131
8.14	Vent and chimney termination	131
8.15	Vent and chimney support	136
8.16	Vents and chimneys serving two or more appliances	136
8.17	Vents outside buildings	137
8.18	Vent connectors	137
8.19	Chimney connections	141
8.20	Size and height of interconnected vent connectors	141
8.21	Multi-storey venting	141
8.22	Dampers and attachments	142
8.23	Draft hoods	143
8.24	Venting arrangements	143
8.25	Draft regulators	144
8.26	Automatic vent damper or automatic flue damper	144
8.27	Manually operated flue dampers	145
8.28	Installation of draft-control devices	145
8.29	Induced- or forced-draft devices	146
8.30	Venting of appliances into canopies	146
8.31	Heat reclaimers	146
9	Natural gas compressors and cylinders	147
9.1	Installation of compressors	147
9.2	Requirements for cylinders	147
9.3	Cylinder filling and cylinders	148
9.4	Cylinder storage	149
9.5	Cylinders connected for use	149
10	Residential fuelling appliances (RFAs) and vehicle fueling appliances (VFAs) used for natural gas without storage	150
10.1	Installation	150
10.2	Pressure relief devices and other vents and vent lines	151
10.3	Piping, tubing, and hose	151
10.4	Testing of piping, tubing, hose, and fittings	152
10.5	Installation of safety equipment, signs, and/or symbols	152
10.6	Refuelling of vehicles	152
<hr/>		
Annex A (informative)	— Sizing and capacities of piping and tubing for natural gas	153
Annex B (informative)	— Sizing and capacities of piping and tubing for propane	220
Annex C (informative)	— Vent sizing tables for Category I natural gas and propane appliances	271
Annex D (informative)	— Customer's meter and service regulator installations	334
Annex E (informative)	— Example of piping design sizing (imperial and metric)	336
Annex F (informative)	— Suggested general dimensions for draft hoods	339
Annex G (informative)	— Piping expansion and flexibility	343
Annex H (normative)	— Purging of piping and tubing systems where a readily accessible burner is not available or where an appliance is not equipped with a continuous pilot	345
Annex I (informative)	— General information	348
Annex J (normative)	— Acceptance criteria for visual inspection of welds	357
Annex K (informative)	— Pressure regulators and overpressure protection devices	360

- Annex L (informative) — Recommended requirements for automatic safety shut-off valves and automatic vent valves installed on gas turbines having capacities greater than 12.5 MMBtu/h (3.66 MW) and inlet pressures greater than 150 PSI 367
- Annex M (normative) — Requirements for the operation of appliances at shows, exhibitions, or other similar events 368
- Annex N (informative) — Generators, compressors/pressure boosters, engines, and turbines 370

Interprovincial Gas Advisory Council

J. R. Marshall	Technical Standards & Safety Authority (TSSA), Toronto, Ontario, Canada <i>Category: Regulatory Authority</i>	<i>Chair</i>
M. E. Davidson	Province of New Brunswick Department of Public Safety, Fredericton, New Brunswick, Canada <i>Category: Regulatory Authority</i>	<i>Vice-Chair</i>
J. Renaud	Régie du bâtiment du Québec, Montréal, Québec, Canada <i>Category: Regulatory Authority</i>	<i>Vice-Chair</i>
A. Ali	SaskPower, Regina, Saskatchewan, Canada <i>Category: Regulatory Authority</i>	
N. Armstrong	Office of the Fire Commissioner Inspections and Technical Services, Winnipeg, Manitoba, Canada	<i>Alternate</i>
D. A. Balcha	Manitoba, Office of the Fire Commissioner, Winnipeg, Manitoba, Canada <i>Category: Regulatory Authority</i>	
P. Fowler	Dept. of Labour and Advanced Education, Dartmouth, Nova Scotia, Canada <i>Category: Regulatory Authority</i>	
Z. J. Fraczkowski	Technical Standards & Safety Authority (TSSA), Toronto, Ontario, Canada	<i>Alternate</i>
S. Friedt	Government of Northwest Territories, Yellowknife, Northwest Territories, Canada <i>Category: Regulatory Authority</i>	
B. Hamou L'Hadj	Régie du Bâtiment du Québec, Montréal, Québec, Canada	<i>Alternate</i>
S. Hauer	Yukon Government, Whitehorse, Yukon Territory, Canada <i>Category: Regulatory Authority</i>	

D. N. Hird	SaskPower, Regina, Saskatchewan, Canada	<i>Alternate</i>
J. Jachniak	ENEFEN Energy Efficiency Engineering Ltd, Leduc, Alberta, Canada	<i>Non-voting</i>
J. Ludgate	Government of Prince Edward Island, Charlottetown, Prince Edward Island, Canada <i>Category: Regulatory Authority</i>	
S. C. Manning	Alberta Municipal Affairs Safety Services, Edmonton, Alberta, Canada <i>Category: Regulatory Authority</i>	
C. R. Valliere	Alberta Municipal Affairs Safety Services, Edmonton, Alberta, Canada	<i>Alternate</i>
M. A. Wani	Government of Nunavut Department of Community & Government Services, Iqaluit, Nunavut, Canada <i>Category: Regulatory Authority</i>	
B. Zinn	Technical Safety BC, Coquitlam, British Columbia, Canada <i>Category: Regulatory Authority</i>	

Technical Committee on Installation Code for Natural Gas and Propane Appliances

D. B. Evans	Bruce Sutherland Associates Ltd., Dartmouth, Nova Scotia, Canada <i>Category: User Interest</i>	<i>Chair</i>
I. Turnbull	FortisBC Energy Inc. (FEI), Surrey, British Columbia, Canada <i>Category: User Interest</i>	<i>Vice-Chair</i>
K. J. Carlisle	Karl Dungs Inc., Blaine, Minnesota, USA <i>Category: Producer Interest</i>	<i>Vice-Chair</i>
J. L. Adams	SLEEGERS Engineered Products Inc., London, Ontario, Canada	<i>Non-voting</i>
A. Ali	SaskPower, Regina, Saskatchewan, Canada	<i>Non-voting</i>
P. A. Baker	Maxitrol Company, Port Dover, Ontario, Canada <i>Category: Producer Interest</i>	
D. A. Balcha	Manitoba, Office of the Fire Commissioner, Winnipeg, Manitoba, Canada <i>Category: Regulatory Authority</i>	
R. Barrow	Eco-Pro Services Inc., Aidrie, Alberta, Canada <i>Category: Producer Interest</i>	
M. Bezeau	MBEZ Inc., Chateauguay, Québec, Canada	<i>Non-voting</i>
G. R. Bradley	Honeywell HTS, Calgary, Alberta, Canada <i>Category: Producer Interest</i>	
R. Charbonneau	P38 Energy Inc. / Budget Propane, Valleyfield, Québec, Canada <i>Category: User Interest</i>	

V. Cherniak	QPS Evaluation Services Inc., Toronto, Ontario, Canada	<i>Non-voting</i>
C. Côté	Énergir, Montréal, Québec, Canada <i>Category: User Interest</i>	
M. E. Davidson	Province of New Brunswick Department of Public Safety, Fredericton, New Brunswick, Canada <i>Category: Regulatory Authority</i>	
T. Evans	Underwriters Laboratories Inc., Toronto, Ontario, Canada	<i>Non-voting</i>
G. Fabbruzzo	Enbridge Gas Distribution, Toronto, Ontario, Canada <i>Category: User Interest</i>	
N. Farahani	QPS Evaluation Services Inc., Toronto, Ontario, Canada	<i>Non-voting</i>
P. Fowler	Dept. of Labour and Advanced Education, Dartmouth, Nova Scotia, Canada <i>Category: Regulatory Authority</i>	
Z. J. Fraczkowski	Technical Standards & Safety Authority (TSSA), Toronto, Ontario, Canada	<i>Non-voting</i>
S. Friedt	Government of Northwest Territories, Yellowknife, Northwest Territories, Canada <i>Category: Regulatory Authority</i>	
K. R. Gillis	Superior Propane, Belleville, Ontario, Canada <i>Category: User Interest</i>	
A. Gould	Reliance Comfort LP, Cambridge, Ontario, Canada <i>Category: User Interest</i>	
B. Hamou L'Hadj	Régie du bâtiment du Québec, Montréal, Québec, Canada	<i>Non-voting</i>

D. N. Hird	SaskPower, Regina, Saskatchewan, Canada <i>Category: Regulatory Authority</i>	
G. Ianiro	Cummins Eastern Canada LP, Mississauga, Ontario, Canada	<i>Non-voting</i>
J. Jachniak	ENEFEN Energy Efficiency Engineering Ltd., Leduc, Alberta, Canada	<i>Non-voting</i>
S. Katz	S. Katz and Associates Inc., North Vancouver, British Columbia, Canada <i>Category: User Interest</i>	
M. Kulik	Technical Standards & Safety Authority (TSSA), Toronto, Ontario, Canada <i>Category: Regulatory Authority</i>	
W. C. LaRose	Edmonton, Alberta, Canada <i>Category: User Interest</i>	
M. LeBlanc	Government of New Brunswick, Grand Falls, New Brunswick, Canada	<i>Non-voting</i>
C. Li	CF Industries (Port Neal Nitrogen Complex), Sergeant Bluff, Iowa, USA	<i>Non-voting</i>
J. Ludgate	Government of Prince Edward Island, Charlottetown, Prince Edward Island, Canada <i>Category: Regulatory Authority</i>	
C. MacLean	C. MacLean Heating Company Ltd., Hillsborough, New Brunswick, Canada <i>Category: User Interest</i>	
S. C. Manning	Alberta Municipal Affairs Safety Services, Edmonton, Alberta, Canada <i>Category: Regulatory Authority</i>	
J. R. Marshall	Technical Standards & Safety Authority (TSSA), Toronto, Ontario, Canada	<i>Non-voting</i>
H. S. Nachaj	Le Groupe Charbonneau Inc., Montréal, Québec, Canada <i>Category: Producer Interest</i>	

L. Neumeister	Spartan Controls Ltd., Edmonton, Alberta, Canada	<i>Non-voting</i>
T. Olechna	Electrical Safety Authority, Mississauga, Ontario, Canada	<i>Non-voting</i>
P. Osborne	Enercare Home and Commercial Services, North York, Ontario, Canada <i>Category: User Interest</i>	
A. Peters	Manitoba, Office of the Fire Commissioner, Winnipeg, Manitoba, Canada	<i>Non-voting</i>
G. J. Potter	Heater Technologies, LLC, Marthasville, Missouri, USA <i>Category: Producer Interest</i>	
T. W. Poulin	A. O. Smith Enterprises Ltd., Fergus, Ontario, Canada <i>Category: Producer Interest</i>	
G. B. Prociw	Enbridge Gas Inc., Chatham, Ontario, Canada <i>Category: User Interest</i>	
V. Quiring	Engineered Air, Calgary, Alberta, Canada <i>Category: Producer Interest</i>	
J. Renaud	Régie du bâtiment du Québec, Montréal, Québec, Canada <i>Category: Regulatory Authority</i>	
M. Richard	Énergir, Montréal, Québec, Canada <i>Category: User Interest</i>	
T. Rostant	Rheem Canada Ltd/Ltee, Mississauga, Ontario, Canada	<i>Non-voting</i>
P. Seager	H. H. Angus & Associates Ltd., Toronto, Ontario, Canada <i>Category: User Interest</i>	

F. Shingleton	Viega, LLC, Broomfield, Colorado, USA <i>Category: User Interest</i>	
W. A. Simpson	North American Standards Assessment Corp., Sherwood Park, Alberta, Canada <i>Category: User Interest</i>	
C. R. Valliere	Alberta Municipal Affairs Safety Services, Edmonton, Alberta, Canada	<i>Non-voting</i>
R. Vlasic	Enbridge Gas Inc., London, Ontario, Canada	<i>Non-voting</i>
M. A. Wani	Government of Nunavut Department of Community & Government Services, Iqaluit, Nunavut, Canada <i>Category: Regulatory Authority</i>	
G. Warkentin	Manitoba Hydro, Winnipeg, Manitoba, Canada <i>Category: User Interest</i>	
D. J. Weishuhn	Blue Flame Heating & Air Conditioning, Toronto, Ontario, Canada <i>Category: Producer Interest</i>	
E. Young	IREC Thermal Group Ltd., Edmonton, Alberta, Canada	<i>Non-voting</i>
B. Zinn	Technical Safety BC, Coquitlam, British Columbia, Canada	<i>Non-voting</i>
C. Moorhouse	CSA Group, Toronto, Ontario, Canada	<i>Project Manager</i>

This edition of CSA B149.1 is dedicated to the life of our friend, colleague, and previous Chair, David Stainrod.

Preface

This is the sixteenth edition of CSA B149.1, *Natural gas and propane installation code*. It supersedes the previous editions, published in 2015, 2010, 2005, and 2000 by CSA Group (CSA) as CAN/CSA-B149.1, in 1995, 1991, 1986, 1980, 1978, 1976, and 1974 by the Canadian Gas Association (CGA), and in 1971, 1966, 1962, and 1958 by CSA Group.

The major changes from the previous edition include the following:

- Updated Scope exclusions (Clause [1.2](#)).
- Updated reference publications (Clause [2](#)).
- Updated definitions (Clause [3](#)).
- Updated requirements for electrical connections and components (Clauses [4.7.3](#) and [4.7.4](#)).
- Updated requirements for high-altitude installations (Clause [4.22](#)).
- Updated requirements for delivery pressure (Clause [5.1](#)).
- Updated requirements for pressure regulators (Clause [5.2](#)).
- Updated requirements for overpressure protection devices (Clause [5.3](#)).
- Updated requirements for venting of pressure control devices and added requirements for venting exemptions for line pressure regulators (Clauses [5.5.2](#), [5.5.3](#), and [5.5.4](#)).
- Added new Clause [5.6](#) for termination of vents.
- Updated requirements for material (Clauses [6.2.2](#), [6.2.3](#), and [6.2.5](#)).
- Updated requirements for size (Clauses [6.3.2](#) and [6.3.3](#)).
- Updated requirements for piping practices (Clause [6.8.10](#)).
- Updated requirements for joints and connections (Clauses [6.9.1](#) and [6.9.4](#)).
- Updated requirements for manual shut-off valves (Clause [6.18.1](#)).
- Updated requirements for gas connectors (Clauses [6.21.8](#) and [6.21.9](#)).
- Updated requirements for purging of gas piping systems after leak testing (Clause [6.23](#)).
- Updated requirements for compressors/pressure boosters (Clause [7.2.2](#)).
- Updated requirements for emergency generators (Clause [7.2.3](#)).
- Updated requirements for non-motive engines and turbines (Clause [7.2.4](#)).
- Updated requirements for additional requirements for gas engines and turbines in buildings (Clauses [7.2.5.1](#) and [7.2.5.3](#)).
- Updated requirements for direct gas-fired process air heaters (DFPAH) (Clauses [7.22.6](#), [7.22.7](#), [7.22.8](#), [7.22.9](#), [7.22.11](#), [7.22.12](#), [7.22.13](#), [7.22.16](#), [7.22.17](#), and [7.22.18](#)).
- Updated requirements for lighting (Clause [7.31.4](#)).
- Added requirements for operation of appliances at shows, exhibitions, or other similar events (Clause [7.35](#)).
- Updated requirements for air-supply requirements for appliances having a total input exceeding 400 000 Btu/h (120 kW) (Clauses [8.4.2](#), [8.4.3](#), and [8.4.4](#)).
- Updated requirements for air-supply dampers, louvres, and grilles (Clauses [8.5.4](#) and [8.5.6](#)).
- Updated requirements for cylinder storage (Clauses [9.4.3](#) and [9.4.4](#)).
- Updated requirements for residential fuelling appliances (RFAs) and vehicle fuelling appliances (VFAs) used for natural gas without storage (Clauses [10.1.1](#), [10.1.2](#), and [10.1.3](#)).
- Added new Annex [J](#) for acceptance criteria for visual inspection of welds.
- Added new Annex [K](#) for pressure regulators and overpressure protection devices.
- Added new Annex [L](#) for recommended requirements for automatic safety shut-off valves and automatic vent valves installed on gas turbines having capacities greater than 12.5 MMBtu/h (3.66 MW) and inlet pressures greater than 150 PSI.

- Added new Annex [M](#) requirements for the operation of appliances at shows, exhibitions, or other similar events.
- Added new Annex [N](#) for generators, compressors/pressure boosters, engines, and turbines.

This Code was prepared by the Technical Committee on Installation Code for the Natural Gas and Propane Appliances, under the Strategic Committee on Fuels and Appliances, and has been formally approved by the Technical Committee and the Interprovincial Gas Advisory Council.

This Standard 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 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.*

CSA B149.1:20

Natural gas and propane installation code

0 Introduction

In 1958, CSA Group published the first edition of CSA B149, *Installation Code for Gas Burning Appliances and Equipment*. It was superseded by later editions in 1962, 1966, and 1971. Following the publication of the 1966 edition, the decision was made to split the Code into two parts: B149.1, dealing with the installation of appliances and equipment burning natural gas, and B149.2, dealing with the installation of appliances and equipment burning propane. As a first step, B149.2 was prepared and first published in 1969.

The Canadian Gas Association was accredited by the Standards Council of Canada as the standards development organization responsible for preparing standards for gas-burning appliances and equipment, and in this connection took over responsibility for the B149 Code in 1974. New editions of the Code were subsequently published in 1974, 1976, 1978, 1980, 1986, 1991, and 1995.

On June 30, 1997, CSA Group acquired International Approval Services (IAS), which was until then a joint venture of the American Gas Association (AGA) and the Canadian Gas Association. Under this agreement, CSA Group acquired the complete range of IAS standards administration, certification, and registration products and services for appliances and accessories fuelled by natural and liquefied petroleum gases. In 1998, the CSA B149 Installation Code Committee agreed to publish a Natural Gas and Propane Installation Code that would amalgamate the first seven sections of CAN/CGA-B149.1 and CAN/CGA-B149.2 to become CAN/CSA-B149.1-00. This amalgamation was in response to the trend among the authorities having jurisdiction of combining licensing and training for natural gas and propane. The remaining Clauses 8 to 14 of CAN/CGA-B149.2 became CAN/CSA-B149.2-00, *Propane Storage and Handling Code*.

1 Scope

1.1

This Code applies to the installation of

- a) appliances, equipment, components, and accessories where gas is to be used for fuel purposes;
- b) piping and tubing systems extending from the termination of the utility installation or from the distributor's propane tank;
- c) vehicle-refuelling appliances and associated equipment meeting the requirements of a general-purpose appliance to fill a natural-gas-fuelled vehicle; and
- d) stationary gas engines and turbines.

1.2

This Code does not apply to

- a) marine or pipeline terminals;
- b) gas where used as a feedstock in petroleum refineries or chemical plants;
- c) utility pipeline distribution and transmission pipelines;
- d) storage and handling of liquefied natural gas or underground formations for natural gas;
- e) the installation of NGV fuel systems, containers, and refuelling stations;