



CSA/ANSI Z21.88:19 • CSA 2.33:19
National Standard of Canada
American National Standard



Vented gas fireplace heaters



Standards Council of Canada
Conseil canadien des normes

REVISED FEBRUARY 20

This is a preview. [Click here to purchase the full publication.](#)

Legal Notice for Standards

Canadian Standards Association and CSA America Standards, Inc. (operating as “CSA Group”) develop standards through a consensus standards development process approved by the Standards Council of Canada and the American National Standards Institute. 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.



This is a preview. [Click here to purchase the full publication.](#)

Revision History

CSA/ANSI Z21.88:19 • CSA 2.33:19, Vented gas fireplace heaters

Errata — February 2021	Revision symbol (in margin)
Clause 4.10.1	ΔΔ

Revision from previous edition	Revision symbol (in margin)
Clauses 1.3 , 3 , 4.12.1 , 4.33.1 , 4.34.2 , 4.34.3 , 4.34.4 , 4.34.5 , 4.34.7 , 4.34.16 , 5.10.8 , and 5.12.5 Annexes A , C , and D	Δ

Standards Update Service

CSA/ANSI Z21.88:19 • CSA 2.33:19 November 2019

Title: *Vented gas fireplace heaters*

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

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

The **List ID** that you will need to register for updates to this publication is **2427668**.

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 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”*

This is a preview. Click here to purchase the full publication.

CSA Group

The 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,
Canada M9W 1R3

American National Standards Institute

The American National Standards Institute (ANSI), Inc. is the nationally recognized coordinator of voluntary standards development in the United States through which voluntary organizations, representing virtually every technical discipline and every facet of trade and commerce, organized labor and consumer interests, establish and improve the some 10,000 national consensus standards currently approved as American National Standards.

ANSI provides that the interests of the public may have appropriate participation and representation in standardization activity, and cooperates with departments and agencies of U.S. Federal, state and local governments in achieving compatibility between government codes and standards and the voluntary standards of industry and commerce.

ANSI represents the interests of the United States in international nontreaty organizations such as the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC). The Institute maintains close ties with regional organizations such as the Pacific Area Standards Congress (PASC) and the Pan American Standards Commission (COPANT). As such, ANSI coordinates the activities involved in the U.S. participation in these groups.

ANSI approval of standards is intended to verify that the principles of openness and due process have been followed in the approval procedure and that a consensus of those directly and materially affected by the standards has been achieved. ANSI coordination is intended to assist the voluntary system to ensure that national standards needs are identified and met with a set of standards that are without conflict or unnecessary duplication in their requirements.

Responsibility of approving American standards rests with the
American National Standards Institute, Inc.
25 West 43rd Street, Fourth floor
New York, NY 10036

*National Standard of Canada
American National Standard*

*CSA/ANSI Z21.88:19 • CSA 2.33:19
Vented gas fireplace heaters*



*®A trademark of the Canadian Standards Association
and CSA America Standards Inc., operating as "CSA Group"*

IGAC

*Interprovincial
Gas Advisory Council*



*American National
Standards Institute, Inc.*

*Approved on July 22, 2019 by ANSI
Approved on May 31, 2019 by IGAC
Effective in Canada May 1, 2021
Published in November 2019 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/
or call toll-free 1-800-463-6727 or 416-747-4044.*

*ICS 97.100.20
ISBN 978-1-4883-2239-6*

*© 2019 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.*

[This is a preview. Click here to purchase the full publication.](#)

Contents

Interprovincial Gas Advisory Council	4
Canadian Technical Committee on Gas Appliances and Related Accessories	6
Z21/83 Technical Committee on Performance and Installation of Gas Burning Appliances and Related Accessories	9
Joint Technical Subcommittee on Vented Gas-Fired Warm Air Heaters	12
Preface	16
1 Scope	19
2 Reference publications	20
3 Definitions	24
4 Construction	35
4.1 General construction and assembly	35
4.2 Accessibility	38
4.3 Thickness of materials	39
4.4 Evaluation of combustion/venting side sealing materials	42
4.5 Glass fronts	42
4.6 Combustion air and ventilation	43
4.7 Main burners	44
4.8 Primary air adjustment means	46
4.9 Orifice spuds and orifice fittings	46
4.10 Automatic gas ignition systems	47
4.11 Flame spreaders	50
4.12 Appliance main gas valves	50
4.13 Gas supply lines	51
4.14 Bleeds and vents	54
4.15 Thermostats	55
4.16 Automatic valves	55
4.17 Gas appliance pressure regulators	56
4.18 Adjustment of minimum input rating	56
4.19 Pilot gas filters	57
4.20 Fan and limit controls	57
4.21 Joints in heating surfaces	57
4.22 Appliance openings	59
4.23 Direct vent-air intake pipes	59
4.24 Venting (other than direct vent types)	61
4.25 Flue collars and flue outlets (other than direct vent types)	61
4.26 Draft hoods	62
4.27 Automatic vent damper devices	63
4.28 Manually operated vent dampers	63
4.29 Electrical equipment and wiring	64

4.30	Motors and blowers	64
4.31	Cooling section of vented gas fireplace heaters with cooling units	64
4.32	Heating elements located downstream from refrigeration coils	65
4.33	Instructions	65
4.34	Markings	77
5	Performance	88
5.1	General	88
5.2	Test gases	90
5.3	Test pressure and burner adjustments	91
5.4	Category determination	93
5.5	Combustion	97
5.6	Appliance and burner durability test	98
5.7	Burner operating characteristics	98
5.8	Loose burner materials	100
5.9	Pilot operating characteristics	101
5.10	Pilot burners and safety shut-off devices	102
5.11	Direct ignition systems	107
5.12	Proved igniter systems	109
5.13	Combustion chamber relief for gravity vented gas fireplace heaters	112
5.14	Delayed ignition and integrity tests for direct vent gas fireplace heaters	113
5.15	Glass fronts	117
5.16	Burn hazard potential	123
5.17	Main burner and flame spreader temperatures	127
5.18	Non-load-bearing flue gas baffle temperatures	129
5.19	Appliance main gas valves	130
5.20	Gas appliance pressure regulators	131
5.21	Automatic valves	131
5.22	Safety circuit analysis	131
5.23	Manifold and control assembly capacity	131
5.24	Temperature at discharge air opening	132
5.25	Wall, floor, and ceiling temperatures	135
5.26	Flue gas temperatures	143
5.27	Surface temperatures	144
5.28	Evaluation of clothing ignition potential	149
5.29	Venting	150
5.30	Draft hoods	151
5.31	Draft tests for appliances not equipped with draft hoods	154
5.32	Vent safety shut-off systems	154
5.33	Wind tests (side wall termination)	156
5.34	Wind test (vertical termination)	158
5.35	Vent and vent-air intake terminal assemblies	161
5.36	Joints in direct vent systems	174
5.37	Allowable vent pipe, heating element, and load-bearing flue gas baffle temperatures	176
5.38	Automatic vent damper devices	178
5.39	Cooling section of appliances with cooling units	178
5.40	Heating elements located downstream from refrigeration coils	178
5.41	Marking material adhesion and legibility	178

6 Vented condensing gas fireplace heaters (construction) 179

- 6.1 Scope 179
- 6.2 General construction and assembly 179
- 6.3 Vent-air intake pipes 180
- 6.4 Condensate disposal 180
- 6.5 Condensate pumps 181

7 Vented condensing gas fireplace heaters (performance) 181

- 7.1 General 181
- 7.2 Venting systems for Category II or IV appliances 181
- 7.3 Corrosion resistance 182
- 7.4 Condensate disposal systems 182
- 7.5 Condensate drain system located in blower compartment 183

8 Production and manufacturing tests 184**9 Items unique to the United States 185**

- 9.1 Electrical equipment and wiring 185
- 9.2 Electrical diagrams 195
- 9.3 Motors and blowers 196

10 Items unique to Canada 197

-
- Annex A (normative) — Automatic intermittent pilot ignition or on-demand pilot ignition systems for field installation 218
 - Annex B (normative) — Provisions for listed gas appliance conversion kits (optional) 223
 - Annex C (normative) — Outline of lighting instructions for appliances equipped with continuous or manual on-demand pilots 226
 - Annex D (normative) — Outline of operating instructions for appliances equipped with automatically controlled on-demand pilot systems 229
 - Annex E (normative) — Outline of operating instructions for appliances equipped with intermittent pilot or interrupted pilot systems 232
 - Annex F (normative) — Outline of operating instructions for appliances equipped with direct ignition systems 235
 - Annex G (normative) — Delayed ignition test using a stoichiometric gas-air mixture for natural gas direct vent fireplaces 238
 - Annex H (normative) — Sample failure modes and effects analysis for component miswiring* 241
 - Annex I (normative) — Glass temperature calculation 242
 - Annex J (normative) — Annual inspection list for determining safe operation of a direct vent gas fireplace 246
 - Annex K (normative) — Corrosion resistance criteria and test method for condensing appliances 247
 - Annex L (normative) — Recommended wire color usage 259
 - Annex M (informative) — Pertinent references to ANSI Y14.15 260
 - Annex N (informative) — Wire color designations 261
 - Annex O (informative) — Preferred graphic symbols of commonly used items, extracted from the Standard ANSI/IEEE 315, *Graphic Symbols for Electrical and Electronics Diagrams*, and abbreviations for these items 262
 - Annex P (informative) — Table of conversion factors 264