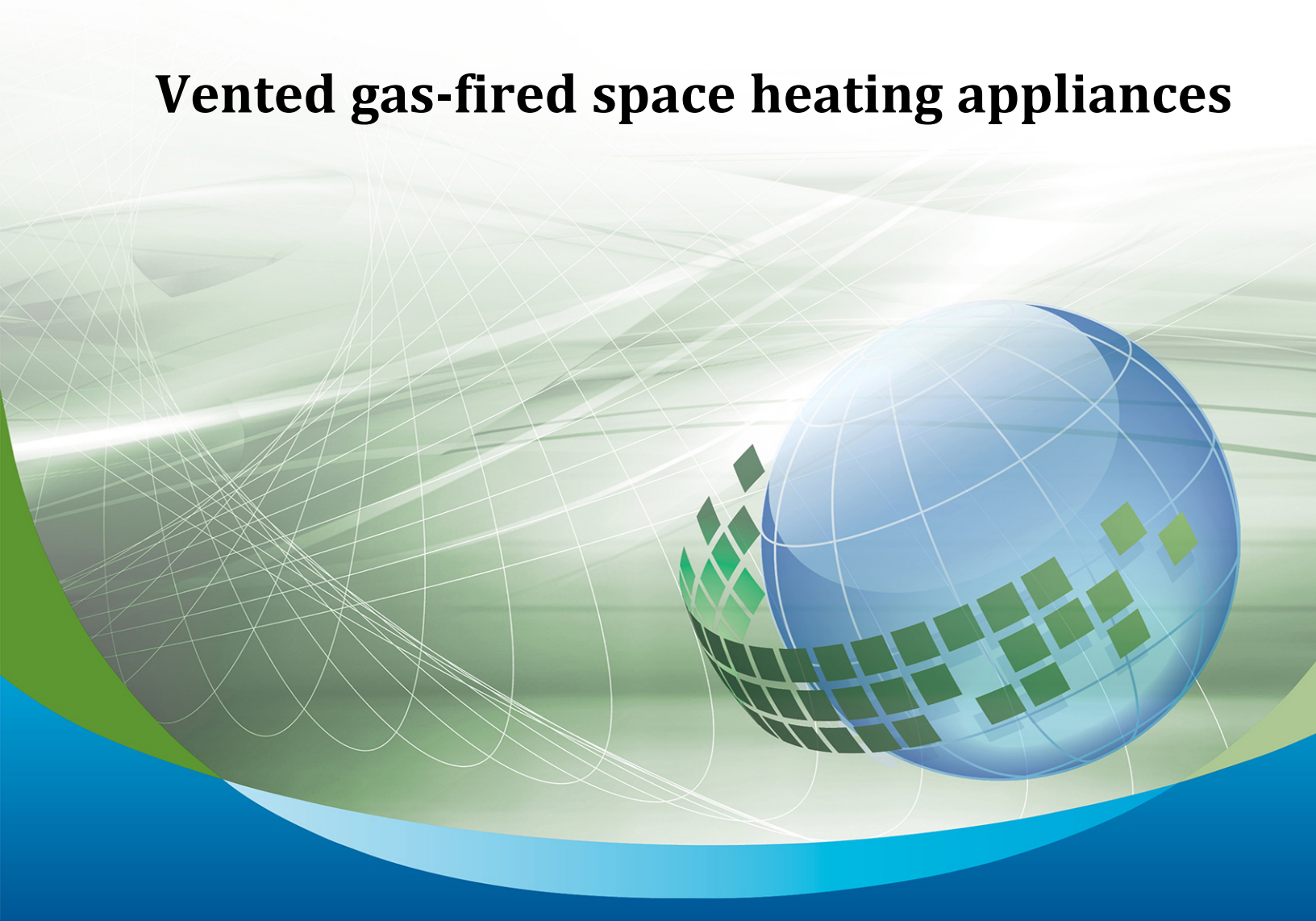




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ANSI Z21.86-2016 • CSA 2.32-2016

Vented gas-fired space heating appliances



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Vented gas-fired space heating
appliances



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S. Katz	S. Katz and Associates Inc., North Vancouver, British Columbia, Canada	<i>Non-voting</i>
J. Marshall	Technical Standards & Safety Authority (TSSA), Toronto, Ontario, Canada	<i>Non-voting</i>
M. Mausser	Intertek Commercial & Electrical, Cortland, New York, USA	<i>Non-voting</i>
J. Melling	SaskPower, Saskatoon, Saskatchewan, Canada	<i>Non-voting</i>
J. Overall	Toronto, Ontario, Canada	<i>Non-voting</i>
G. Prociw	Union Gas Limited, Chatham, Ontario, Canada <i>Category: User Interest</i>	
B. Swiecicki	National Propane Gas Association, Frankfort, Illinois, USA	<i>Non-voting</i>
M. Thomas	Natural Resources Canada CANMET Energy, Ottawa, Ontario, Canada	<i>Non-voting</i>
M. Travers	Reliance Comfort L.P, Cambridge, Ontario, Canada	<i>Non-voting</i>
P. Verhas	Dettson Industries, Inc., Sherbrooke, Québec, Canada	<i>Non-voting</i>
C. L. Rake	CSA Group, Cleveland, Ohio, USA	<i>Project Manager</i>

Z21/CSA Joint Technical Subcommittee on Standards for Vented Gas-Fired Warm Air Heaters

P. Baker	Maxitrol Company, Hamilton, Ontario, Canada	<i>Chair</i>
T. Stroud	Hearth Patio & Barbecue Association, Seattle, Washington, USA	<i>Vice Chair</i>
G. Achman	Hearth & Home Technologies, Lakeville, Minnesota, USA	
B. Book	Miles Industries Ltd, North Vancouver, British Columbia, Canada	<i>Alternate</i>
T. Campbell	Ironhaus Inc, Hamilton, Montana, USA	
R. Curkeet	Intertek Testing Services NA Inc., Middleton, Wisconsin, USA	
D. Delaquila	Air-Conditioning, Heating, and Refrigeration Institute, Arlington, Virginia, USA	<i>Non-voting</i>
K. Dorrough	Rinnai America Corporation, Peachtree City, Georgia, USA	<i>Alternate</i>
B. Dresner	Empire Comfort Systems, Inc., Belleville, Illinois, USA	
G. Edgar	VenTech Consulting Ltd, Lancaster, Ohio, USA	
Z. Fraczkowski	Technical Standards & Safety Authority (TSSA), Toronto, Ontario, Canada	<i>Non-voting</i>
T. James	Woodbridge Fireplace, Brampton, Ontario, Canada	

R. Jensen	White-Rodgers Division, St. Louis, Missouri, USA	
R. Jordan	Consumer Product Safety Commission, Rockville, Maryland, USA	<i>Non-voting</i>
P. Kelly	Hearth & Home Technologies, Lakeville, Minnesota, USA	<i>Alternate</i>
K. Kirchner	Continental Appliance, Inc. dba Procom, Brea, California, USA	<i>Alternate</i>
K. Leason	Continental Appliance, Inc. dba Procom, Brea, California, USA	
C. Lilley	Wolf Steel Ltd., Barrie, Ontario, Canada	
D. Lyons	Hearth & Home Technologies, Lakeville, Minnesota, USA	<i>Alternate</i>
R. Mateos Martin	Copreci S. Coop, Marietta, Georgia, USA	
P. McConnell	Dometic, LLC, La Grange, Indiana, USA	
M. Miles	Miles Industries Ltd, North Vancouver, British Columbia, Canada	
M. Mulberry	Sure Heat Manufacturing, Bowling Green, Kentucky, USA	<i>Alternate</i>
M. Neufcourt	Air-Conditioning, Heating, & Refrigeration Institute (AHRI), Arlington, Virginia, USA	
J. Nowak	UL, LLC, Northbrook, Illinois, USA	
T. O'Leary	Sky Tech Products Group, Fort Wayne, Indiana, USA	

M. Pennington	Innovative Hearth Products, Nashville, Tennessee, USA	
M. Romanow	Innovative Hearth Products, Auburn, Washington, USA	<i>Alternate</i>
J. Schlachter	Maxitrol Company, Southfield, Michigan, USA	<i>Alternate</i>
D. Shoman	PFS Corporation, Keller, Texas, USA	
R. Smith	Global Engineering Solutions Group, LLC, New Smyrna Beach, Florida, USA	
F. Stanonik	Air-Conditioning, Heating, & Refrigeration Institute (AHRI), Arlington, Virginia, USA	<i>Alternate</i>
C. Suchovsky	Burner Technology Unlimited, Inc, Walton Hills, Ohio, USA	
J. Thomas	Sure Heat Manufacturing, Bowling Green, Kentucky, USA	
W. Thuenemann	Empire Comfort Systems, Inc., Belleville, Illinois, USA	<i>Alternate</i>
J. Vancak	Calcana Industries Ltd., Calgary, Alberta, Canada	
L. Willmore	Southern California Gas Company, Los Angeles, California, USA	
M. Yan	Robert H. Peterson Company, City of Industry, California, USA	
J. York	Rinnai America Corporation, Peachtree City, Georgia, USA	
L. McCourt	CSA Group, Cleveland, Ohio, USA	<i>Project Manager</i>

Preface

This is the sixth edition of ANSI Z21.86 • CSA 2.32, *Vented Gas-Fired Space Heating Appliances*. It supersedes the previous editions published in 2008, 2004, 2000, and 1998.

This Standard was prepared by the Z21/CSA Joint Technical Subcommittee on Standards for Vented Gas-Fired Warm Air Heaters, under the jurisdiction of the Z21/83 Technical Committee on Performance and Installation of Gas Burning Appliances and Related Accessories, the Canadian Technical Committee on Gas Appliances and Related Accessories, and the Strategic Steering Committee on Standards for Fuel Burning Equipment, and had been formally approved by the Technical Committees, American National Standards Institute, and the Interprovincial Gas Advisory Council.

Interpretations: The Strategic Steering Committee on Standards for Fuel Burning Equipment has provided the following direction for the interpretation of standards under its jurisdiction: “The literal text shall be used in judging compliance of products with the safety requirements of this Standard. When the literal text cannot be applied to the product, such as for new materials or construction, and when a relevant committee interpretation has not already been published, CSA Group's procedures for interpretation shall be followed to determine the intended safety principle.”

Notes:

- 1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*
- 2) *This Standard contains SI (Metric) units corresponding to the yard/pound quantities, the purpose being to allow the standard to be used in SI (Metric) units. (IEEE/ASTM SI 10, American National Standard for Metric Practice, or ISO 80000-1:2009, Quantities and units – Part 1: General, is used as a guide in making metric conversion from yard/pound quantities.) If a value for a measurement and a corresponding value in other units are stated, the first stated value is to be regarded as the requirement. The given corresponding value may be approximate. If a value for a measurement and a corresponding value in other units are both specified as a quoted marking requirement, the first stated unit, or both, are to be provided.*
- 3) *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.*
- 4) *This publication 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 publication.*
- 5) *This Standard is subject to review at least every five years; 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.*
- 6) *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.*
- 7) *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.*

History of the development of the Standard for Vented Gas-Fired Space Heating Appliances

Note: *This History is informative and is not part of the standard.*

With the onset of the Free Trade Agreement between the United States and Canada on January 2, 1988, significant attention was given to the harmonization of the United States and Canadian safety standards addressing gas-fired equipment for residential, commercial, and industrial applications. It was believed that the elimination of the differences between the standards would remove potential trade barriers and provide an atmosphere in which North American manufacturers could market more freely in the United States and Canada. The harmonization of these standards was also seen as a step toward harmonization with international standards. Joint subcommittees were established to facilitate the standards harmonization process between the United States and Canada.

At its August 12-13, 1992 meeting, the Z21/CGA Joint Subcommittee on Standards for Vented Gas-Fired Warm Air Heaters formed a working group to prepare a draft bi-national standard to encompass all the gas space heating product standards. A letter ballot dated January 25, 1996 was issued for joint subcommittee approval to send the draft standard for public review and comment.

The first draft harmonized standard was based on coverage from the American National Standard for Gas-Fired Room Heaters, Volume I, Vented Room Heaters, ANSI Z21.11.1-1991, Addenda ANSI Z21.11.1a-1993, and Addenda ANSI Z21.11.1b-1995; the American National Standard for Gas-Fired Gravity and Fan-type Direct Vent Wall Furnaces, ANSI Z21.44-1995; the American National Standard for Gas-Fired Gravity and Fan-type Vented Wall Furnaces, ANSI Z21.49-1992, Addenda ANSI Z21.49a 1993 and Addenda ANSI Z21.49b-1995; the American National Standard for Gas-Fired Gravity and Fan-type Floor Furnaces, ANSI Z21.48-1992, Addenda ANSI Z21.48a-1993 and Addenda ANSI Z21.48b-1995; the National Standard of Canada for Gas-Fired Room Heaters, CAN1-2.1-M86, Amendment "a" dated August 1986 and Amendment "2" dated January 1989; the Canadian National Standard for Gas-Fired Gravity and Fan-type Direct Vent Wall Furnaces, CAN1-2.19-M81; and the National Standard of Canada for Gas-Fired Gravity and Fan-type Vented Wall Furnaces, CAN/CGA-2.5-M86, Amendment "1" dated August 1986 and Amendment "2" dated January 1989. The first draft was issued for review and comment in February 1996.

Following reconsideration and modification of the proposed draft standard, in light of comments received, the joint vented heater subcommittee at its April 30-May 1, 1996 meeting, recommended the proposed draft standard to Accredited Standards Committee Z21 and the CGA Standard Steering Committee for approval.

The proposed draft of the harmonized standard for vented gas-fired space heating appliances, as modified by the joint subcommittee, was approved by the Z21 Committee by letter ballot dated October 14, 1996, and by the CGA Standards Steering Committee by letter ballot dated February, 1997.

The first edition of the American National Standard/CSA Standard for Gas-Fired Vented Space Heating Appliances was approved by the Canadian Interprovincial Gas Advisory Council (IGAC) on November 25, 1997, and by the American National Standards Institute, Inc. (ANSI), on January 28, 1998.

Following the procedures outlined above, further revisions to this standard, Z21.86 • CSA 2.32, were made in line with industry developments. The second edition of the American National Standard/CSA Standard for Gas-Fired Vented Space Heating Appliances was approved by the Canadian IGAC on August 7, 1998, and by ANSI, on September 10, 1998.

Following the procedures outlined above, further revisions to this standard, Z21.86 • CSA 2.32, were made in line with industry developments. The third edition of the American National Standard/CSA Standard for Gas-Fired Vented Space Heating Appliances was approved by the Canadian IGAC on August 22, 2000, and by ANSI, on November 15, 2000.

The fourth edition of the harmonized gas-fired vented space heating appliances standard was approved by the IGAC on January 15, 2004 and ANSI on July 11, 2003.

The fifth edition of the harmonized gas-fired vented space heating appliances standard was approved by the IGAC on April 3, 2008, and ANSI on March 28, 2008.

This, the sixth edition of the harmonized gas-fired vented space heating appliances standard was distributed for industry review during March 2012, September 2012, July 2013, November 2013, July 2014, December 2014, and March 2016. This edition has been formally approved by the Z21/83 Technical Committee on Performance and Installation of Gas Burning Appliances and Related Accessories on October 8, 2012 and October 21, 2016; the CSA Technical Committee on Gas Appliances and Related Accessories on April 18, 2012, August 14, 2016 and October 21, 2016; ANSI on December 21, 2016; and the IGAC on November 21, 2016.

Previous editions of the harmonized gas-fired vented space heating appliances standard, and addenda thereto, approved by the Interprovincial Gas Advisory Council and the American National Standards Institute are as follows:

ANSI Z21.86-1998 • CSA 2.32-M98

ANSI Z21.86a-1998 • CSA 2.32a-M98

ANSI Z21.86b-1998 • CSA 2.32b-M98

ANSI Z21.86-1998 • CSA 2.32-M98

ANSI Z21.86a-1999 • CSA 2.32a-M99

ANSI Z21.86b-1999 • CSA 2.32b-M99

ANSI Z21.86-2000 • CSA 2.32-2000

ANSI Z21.86a-2002 • CSA 2.32a-2002

ANSI Z21.86b-2002 • CSA 2.32b-2002

ANSI Z21.86-2004 • CSA 2.32-2004

ANSI Z21.86a-2005 • CSA 2.32a-2005

ANSI Z21.86b-2007 • CSA 2.32b-2007

ANSI Z21.86-2008 • CSA 2.32-2008

Note: This edition of ANSI Z21.86 • CSA 2.32 incorporates changes to the 2008 edition. All changes other than editorial are denoted by a delta in the margin.

ANSI Z21.86-2016 • CSA 2.32-2016

Vented gas-fired space heating appliances

1 Scope

Δ 1.1

This Standard applies to newly produced vented gas-fired space heating appliances (see Clause 3, Definitions), hereinafter referred to as appliance(s), constructed entirely of new, unused parts and materials, and having input ratings up to and including 400,000 Btu/hr (117 228 W).

These appliances are for use with:

- a) natural gas;
- b) manufactured gas;
- c) mixed gas;
- d) propane gas [also see Clause 5.2(e)]; and
- e) LP gas-air mixtures.

The construction of vented gas-fired space heating appliances for use with the above-mentioned gases is covered in Clause 4.

The performance of vented gas-fired space heating appliances for use with the above-mentioned gases is covered in Clause 5.

1.2

This Standard applies only to the following appliance types, as defined in Clause 3, Definitions:

- a) gravity vented wall furnace;
- b) fan-type vented wall furnace;
- c) fan-type vented wall furnace with cooling unit;
- d) vented room heater;
- e) gravity direct vent wall furnace;
- f) fan-type direct vent wall furnace; and
- g) floor furnace.

1.3

This Standard covers thermal efficiency and related markings of only those appliances whose efficiencies are not regulated in the U.S.A. by the Energy Policy and Conservation Act of 1975 and the National Energy Conservation Policy Act of 1978,* or covered in Canada by Clause 18, Items unique to Canada.

** At the time of this printing, the above acts regulate the thermal efficiency (heating capacity) of vented appliances. For information, contact the U.S. Department of Energy, Conservation and Solar Applications, Consumer Products Efficiency Branch, 20 Massachusetts Avenue, N.W., Washington, DC 20545.*

1.4

If a value of measurement as shown in this Standard is followed by an equivalent value in other units, the first stated value is to be regarded as the specification.

1.5

All references to psi throughout this Standard are to be considered gauge pressures unless otherwise specified.

Δ 1.6

All vented gas-fired space heating appliances conform to the applicable requirements under Clauses 4 and 5. In addition, for requirements specific to product type also see:

- a) Clause 6, Vented room heaters construction, Clause 7, Vented room heaters performance;
- b) Clause 8, Gravity and fan-type direct vent wall furnaces construction, Clause 9, Gravity and fan-type direct vent wall furnaces performance;
- c) Clause 10, Gravity and fan-type wall furnaces construction, Clause 11, Gravity and fan-type wall furnaces performance;
- d) Clause 12, Gravity and fan-type floor furnaces construction (United States only), Clause 13, Gravity and fan-type floor furnaces performance (United States only); and
- e) Clause 14, Vented condensing gas-fired space heating appliances construction, Clause 15, Vented condensing gas-fired space heating appliances performance.

1.7

Clause 17, Items unique to the United States, contains clauses that are unique to the United States.

1.8

Clause 18, Items unique to Canada, contains clauses that are unique to Canada.

1.9

Special construction clauses applicable to vented space heating appliances designed for use with an optional design-certified conversion kit are outlined under Annex H, Provisions for listed gas appliance conversion kits (optional).

1.10

Clause 2 contains a list of standards specifically referenced in this Standard, and sources from which these referenced standards may be obtained.

1.11

In this Standard, “shall” is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the standard; “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 Standard.

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 (nonmandatory) to define their application.

2 Reference publications

This Standard refers to the following publications, and where such reference is made, it shall be to the edition listed below.

Note: *CGA Standards, Recommended Practices, and Codes are published by CSA Group.*

CSA Group

ANSI Z21.11.2-2013

Gas-Fired Room Heaters, Volume II, Unvented Room Heaters

ANSI Z21.12-1990 (R2000), and Addenda ANSI Z21.12a-1993 (R2000) and ANSI Z21.12b-1994 (R2000)
Draft Hoods

ANSI Z21.15-2009 (R2014) • CSA 9.1-2009 (R2014) and Addenda ANSI Z21.15a-2012 (R2014) • CSA 9.1a-2012 (R2014) and ANSI Z21.15b-2013 (R2014) • CSA 9.1b-2013 (R2014)

Manually Operated Gas Valves for Appliances, Appliance Connector Valves and Hose End Valves

ANSI Z21.18-2007 (R2012) • CSA 6.3-2007 (R2012) and Addenda ANSI Z21.18a-2010 (R2012) • CSA 6.3a-2010 (R2012)

Gas Appliance Pressure Regulators

ANSI Z21.20-2014 • CAN/CSA C22.2 No. 60730-2-5-14

Automatic Electrical Controls for Household and Similar Use-Part 2-5: Particular Requirements for Automatic Electrical Burner Control Systems

ANSI Z21.21-2015 • CSA 6.5-2015

Automatic Valves for Gas Appliances

ANSI Z21.23-2010

Gas Appliance Thermostats

ANSI Z21.35-2005 • CSA 6.8-2005 (R2015)

Pilot Gas Filters

ANSI Z21.50-2014 • CSA 2.22-2014

Vented gas fireplaces

ANSI Z21.66-2015 • CGA 6.14-2015

Automatic Vent Damper Devices for Use with Gas-Fired Appliances

ANSI Z21.77-2005 • CSA 6.23-2005 (R2015)

Manually Operated Piezo-Electric Spark Gas Ignition Systems and Components

ANSI Z21.78-2010 • CSA 6.20-2010 (R2015)

Combination Gas Controls for Gas Appliances

B52-13

Mechanical Refrigeration Code

B149.1-15

Natural Gas and Propane Installation Code