CSA GROUP™

CSA/ANSI Z21.13:22 • CSA 4.9:22
National Standard of Canada
American National Standard

Gas-fired low-pressure steam and hot water boilers

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American National Standard

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Interprovincial Gas Advisory Council

American National Standards Institute, Inc.

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B. Zinn	Technical Safety BC, Vancouver, British Columbia, Canada	*Alternate*

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R. Carroll	Hearth Patio & Barbecue Association, Arlington, Virginia, USA	*Alternate*
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Marthasville, Missouri, USA
Category: Producer Interest

J. A. Ranfone American Gas Association Inc.,
Washington, District of Columbia, USA
Category: Gas Supplier

I. Sargunam Bloomington, Indiana, USA
Category: General Interest

A. B. Sherwin St. Louis Community College,
St. Louis, Missouri, USA
Category: User Interest

M. Skierkiewicz Underwriters Laboratories Inc.,
Melville, New York, USA
Category: Research/Testing

D. Snyder American Water Heater Company,
Johnson City, Tennessee, USA
Category: Producer Interest

C. Souhrada North American Association of Food Equipment Manufacturers,
Chicago, Illinois, USA
Category: Producer Interest

C. Suchovsky Appliance Engineering, Inc.,
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B. J. Swiecicki National Propane Gas Association,
Tinley Park, Illinois, USA
Category: Gas Supplier

T. A. Williams Natural Gas Direct, LLC,
Arlington, Virginia, USA
Category: User Interest

M. B. Williams Association of Home Appliance Manufacturers (AHAM),
Washington, District of Columbia, USA
Category: Producer Interest

D. Jeremic Nikolic	CSA Group, Toronto, Ontario, Canada	*Project Manager*
B. Owlam	CSA Group, Toronto, Ontario, Canada	*Project Manager*

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G. Fabbruzzo	Enbridge Gas Inc., Toronto, Ontario, Canada *Category: User Interest*	*Chair*
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P. Verhas	Dettson Industries, Inc., Sherbrooke, Québec, Canada *Category: Producer Interest*	
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M. W. Wilber	ESi (Engineering Systems, Inc.), Plymouth, Minnesota, USA	
S. Worthington	Global Power Technologies, Calgary, Alberta, Canada	*Non-voting*
D. Jeremic Nikolic	CSA Group, Toronto, Ontario, Canada	*Project Manager*
B. Owlam	CSA Group, Toronto, Ontario, Canada	*Project Manager*

Z21/CSA Joint Subcommittee on Standards on Gas-Fired Low-Pressure Steam and Hot Water Boilers

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P. Anderson	Resideo, Golden Valley, Minnesota, USA	
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G. Baker	Beckett Gas Inc., North Ridgeville, Ohio, USA	
R. Beard	CSA Group, Toronto, Ontario, Canada	
D. Bereiter	Resideo Technologies, Golden Valley, Minnesota, USA	
J. Boros	Rheem Sales Co. Inc. AKA Rheem Manufacturing Co., Montgomery, Alabama, USA	
N. Butt	Weil-McLain, A division of the Marley-Wylain company, Michigan City, Indiana, USA	
K. J. Carlisle	Karl Dungs Inc., Blaine, Minnesota, USA	

R. Choi	KD Navien America, Inc., Irvine, California, USA
J. Cika	Heat Transfer Products Inc., New Bedford, Massachusetts, USA
S. M. Corcoran	American Gas Association, Washington, District of Columbia, USA
D. C. Delaquila	Aquila Consulting, LLC, Warren, Ohio, USA
J. Derksen	Enercare Home and Commercial Services, Markham, Ontario, Canada
K. S. Dorrough	Rinnai America Corporation, Peachtree City, Georgia, USA
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C. Eshenaur	U.S Boiler Company Inc., Lancaster, Pennsylvania, USA
Z. J. Fraczkowski	Technical Standards & Safety Authority (TSSA), Toronto, Ontario, Canada
L. Garas	DDR Americas Inc., Cambridge, Ontario, Canada
L. Gill	IPEX Management Inc., Oakville, Ontario, Canada
A. Gould	Reliance Comfort LP, Cambridge, Ontario, Canada
C. Grider	Intertek, Plano, Texas, USA
R. Hardesty	Weil-McLain, A division of the Marley-Wylain company, Michigan City, Indiana, USA

T. F. Hardin	Underwriters Laboratories Inc., Research Triangle Pk, North Carolina, USA
R. Jensen	Emerson Climate Technologies, St. Louis, Missouri, USA
C. Johnson	A.O. Smith Corporation, Ashland City, Tennessee, USA
R. A. Jordan	Consumer Product Safety Commission, Rockville, Maryland, USA
L. D. Kidd	Rheem Water Heating Division, Montgomery, Alabama, USA
T. Kwon	Air-Conditioning, Heating, and Refrigeration Institute, Arlington, Virginia, USA
G. Lloyd	Sempra Energy Utility, Los Angeles, California, USA
A. Lord	Laars Heating System, Rochester, New Hampshire, USA
R. Mata	American Society of Plumbing Engineers, Mentor, Ohio, USA
T. McNulty	U.S. Draft Co., Fort Worth, Texas, USA
M. Menotti	Intertek Testing Services NA, Inc., USA
P. Naculich	ECR International, Inc., Utica, New York, USA
J. Nanni	Consumers Union, Yonkers, New York, USA
D. J. Nethercot	Hart & Cooley Inc., Grand Rapids, Michigan, USA

D. Noyes	PB Heat, LLC, Bally, Pennsylvania, USA
S. O'Leary	Honeywell International Inc., Golden Valley, Minnesota, USA
M. Pablo	Orkli, S. Coop, Ordizia-Gipuzkoa, Spain
K. Pirotin	Navien, Inc., Irvine, California, USA
N. W. Rolph	Lochinvar, LLC, Lebanon, Tennessee, USA
M. Sanz	Enbridge Gas Distribution, Oshawa, Ontario, Canada
R. Savadekar	Beckett Gas Inc., North Ridgeville, Ohio, USA
P. Sohler	Crown Boiler Company, Philadelphia, Pennsylvania, USA
P. W. Stephens	Weil-McLain, A division of the Marley-Wylain company, Michigan City, Indiana, USA
C. Suchovsky	Appliance Engineering, Inc., Twinsburg, Ohio, USA
M. Travers	Reliance Comfort L.P, Cambridge, Ontario, Canada
J. Van Beurden	Airmax Technologies Inc., Concord, Ontario, Canada
P. V. Villaume	Patterson-Kelley, LLC, Easton, Pennsylvania, USA
C. Weiss	Field Controls LLC, Kinston, North Carolina, USA

J. York	Rinnai America Corporation, Peachtree City, Georgia, USA	
D. Jeremic Nikolic	CSA Group, Toronto, Ontario, Canada	*Project Manager*
B. Owlam	CSA Group, Toronto, Ontario, Canada	*Project Manager*

Preface

This is the seventh edition of CSA/ANSI Z21.13 • CSA 4.9, *Gas-fired low-pressure steam and hot water boilers*. It supersedes the previous editions published in 2017, 2014, 2013, 2010, 2004, and 2000.

The major changes to this edition include the following:

a) updated the reference publications;
b) deleted coverage for manufactured and mixed natural gases;
c) addition of coverage for boilers designed for installation in a recreational vehicle (RV), as well as boilers having a 12 VDC power supply;
d) replacement of the term "input rating" with "maximum input rating" or "minimum input rating", as appropriate, to clarify requirements applicable to boilers having more than one input rating;
e) elimination of the 5 000 000 BTU/h input rating limit on the use of direct ignition systems for some types of boilers (Clause 4.8.2);
f) removal of the requirement that a manually operated shut-off valve be present downstream of the safety shut-off valves on boilers having a maximum input rating over 400 000 BTU/h (note that a means of testing the safety shut-off valves is still required) (Clause 4.10);
g) added an appliance pressure regulator requirement for recreational vehicles convertible boilers (Clause 4.10.7);
h) added construction and performance requirements for corrugated metal tubing used as gas conduit (Clauses 4.11.11 and 5.31);
i) modified requirements for nonferrous semi-rigid tubing used as gas conduit (Clause 4.11.11);
j) removed references to Type T wire (Clause 4.23.1);
k) revisions to safety circuit wiring requirements (Clause 4.23.10);
l) addition of a requirement for language in both in installation and user's manuals requiring the boiler installer to verify that at least one carbon monoxide alarm has been properly installed when a boiler is installed inside a residential living space (Clauses 4.33.1 and 4.34);
m) clarification of requirements for flame illustrations in the installation manual (Clause 4.33.1);
n) clarification that a Class IIA-1 labeling system (metal plate secured by mechanical means) is to be used for rating plates that are shipped detached (Clause 4.35.2);
o) added detailed method for input measurement and also excepted boilers with negative pressure regulators from manifold pressure tolerance requirement (Clause 5.3.3 and Annex J);
p) modified requirements for adjustment of minimum test input rate (Clause 5.3.4);
q) clarified when input rate should be verified, and when adjustments should be made, during the course of testing (Clause 5.3.5);
r) added an equation for the calculation of air-free carbon monoxide level and defined ultimate CO_2 values to use in these calculations (Clause 5.5.1.1);
s) various changes to burner operating characteristics performance requirements, intended to improve clarity. This includes clarification that tests at 1/3 of maximum input rating only apply to boilers having a manual valve, downstream of the inlet test pressure location, that can be set to a position other than fully open or fully closed (Clause 5.6);
t) clarified that flame roll-out shut-off construction requirement does not apply to boilers having a sealed combustion chamber which inherently prevents rollout. Option of performing the flame rollout shut-off test by disconnecting the motor on an induced draft boiler has also been eliminated (Clauses 4.1.6 and 5.10);
u) eliminated "equivalent CO" calculations in blocked vent, blocked inlet, and blocked condensate drain tests for boilers having a minimum input rating less than 20% of their maximum input rating. These calculations were unnecessary, given the 1000 PPM air-free limit at minimum input rating for such boilers (Clauses 5.23.2.3, 5.25.6.2.3, and 5.28.2.2);

v) modified wind test performance requirements for boilers other than those supplied with a power burner or operating under forced or induced draft (Clauses 5.25.5.1 and 5.27.5.1);
w) added manufacturing and production test requirements for corrugated metal tubing used as gas conduit (Clause 6.4); and
x) elimination of flue loss calculation coverage and AFUE requirements. Measurement of boiler efficiency is covered by other standards.

This Standard is considered suitable for use for conformity assessment within the stated scope of the Standard.

This Standard was prepared by the Z21/CSA Joint Subcommittee on Standards on Gas-Fired Low-Pressure Steam and Hot Water Boilers under the jurisdiction of the Technical Committee on Gas Appliances and Related Accessories, the Z21/83 Technical Committee on Performance and Installation of Gas-Burning Appliances and Related Accessories, and the Fuels and Appliances Strategic Steering Committee, and had been formally approved by the Technical Committees and the Interprovincial/ Territorial 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.

This Standard has been approved by the American National Standards Institute (ANSI) as an American National Standard.

Interpretations: The Fuels and Appliances Strategic Steering Committee 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 CSA 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) *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.*
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   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/ANSI Z21.13:22 • CSA 4.9:22
Gas-fired low-pressure steam and hot water boilers

0 Introduction

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.

The first draft of this harmonized standard was based on current coverage from ANSI Z21.13-1991, Z21.13a-1993, Z21.13b-1994, *American National Standard for Gas-fired low-pressure steam and hot water boilers*, and the Canadian Gas Association Standards CGA 3.3-1976, *Industrial and commercial atmospherically fired vertical flue boilers and hot water supply heaters*, and CGA 4.9-1969, *Gas-Fired Steam and Hot Water Boilers*.

Following reconsideration and modification of the proposed draft standard, in light of comments received, the joint subcommittee at its December 2, 1998 meeting, recommended the proposed draft standard to Accredited Standards Committee Z21/83 and the (Interim CSA) Standards Steering Committee for approval.

The proposed draft of the harmonized standard for gas-fired low-pressure steam and hot water boilers, as modified by the joint subcommittee, was approved by the Z21/83 Committee at its April 15, 1999 meeting, and by the CSA Standards Steering Committee on Gas Appliances and Related Accessories by letter ballot dated April 9, 1999.

The second edition of this Standard was approved by IGAC on May 18, 2004, and by ANSI on June 23, 2004.

The third edition of this Standard was approved by IGAC on January 4, 2010, and by ANSI on October 30, 2009.

The fourth edition of this Standard was approved by IGAC on March 13, 2013, and by ANSI on March 7, 2013.

The fifth edition of this Standard was approved by IGAC on February 24, 2014, and by ANSI on November 26, 2013.

The sixth edition of this Standard was approved by IGAC on April 22, 2017, and by ANSI on May 11, 2017.

This, the seventh edition of this Standard was approved by IGAC on May 27, 2022, and by ANSI on June 2, 2022.