

**ANSI Z21.13-2010**  
**CSA 4.9-2010**

American National Standard/  
CSA Standard For  
**Gas-Fired Low Pressure  
Steam And Hot Water  
Boilers**

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AMERICAN NATIONAL STANDARD  
ANSI Z21.13-2010

CSA STANDARD  
CSA 4.9-2010

Third Edition - 2010  
This Standard is based on the Standard for  
Gas-Fired Low Pressure Steam and Hot Water Boilers  
ANSI Z21.13-2004 • CSA 4.9-2004  
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# Preface

This publication represents a basic standard for safe operation, substantial and durable construction, and acceptable performance of gas-fired low pressure steam and hot water boilers. It is the result of years of experience in the manufacture, testing, installation, maintenance, inspection and research on gas-fired low pressure steam and hot water boilers designed for utilization of gas. There are risks of injury to persons inherent in appliances that, if completely eliminated, would defeat the utility of the appliance. The provisions in this standard are intended to help reduce such risks while retaining the normal operation of the appliance.

Nothing in this standard is to be considered in any way as indicating a measure of quality beyond compliance with the provisions it contains. It is designed to allow compliance of gas-fired low pressure steam and hot water boilers, the safety construction and performance of which may exceed the various provisions specified herein. In its preparation, recognition has been given to possibilities of improvement through ingenuity of design. As progress takes place, revisions may become necessary. When they are believed desirable, recommendations or suggestions should be forwarded to the Chairman of the Z21/83 Committee, CSA America, 8501 East Pleasant Valley Road, Cleveland; Ohio 44131, or the Chairman of the CSA Technical Committee on Gas Appliances and Related Accessories, CSA, 5060 Spectrum Way, Suite 100, Mississauga, Ontario, Canada L4W 5N6.

Safe and satisfactory operation of gas-fired low pressure steam and hot water boilers depends to a great extent upon its proper installation, use and maintenance. It should be installed, as applicable, in accordance with the *National Fuel Gas Code, ANSI Z223.1/NFPA 54*, the *Natural Gas and Propane Installation Code, CSA B149.1*.

Users of this American National Standard/CSA Standard are advised that the devices, products and activities within its scope may be subject to regulation at the Federal, Territorial, Provincial, state or local level. Users are strongly urged to investigate this possibility through appropriate channels. In the event of a conflict with this standard, the Federal, Territorial, Provincial, state or local regulation should be followed.

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# ***History Of The Development Of Standards For Gas-Fired Low-Pressure Steam And Hot Water Boilers***

(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.

The first draft of this harmonized standard was based on current coverage from the American National Standard for Gas-Fired Low-Pressure Steam and Hot Water Boilers, Z21.13-1991, Z21.13a-1993, Z21.13b-1994, 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 the American National Standard/CSA Standard for Gas-Fired Low-Pressure Steam and Hot Water Boilers was approved by the Canadian Interprovincial Gas Advisory Council on May 18, 2004, and by the American National Standards Institute, Inc., on June 23, 2004.

This the third edition of the American National Standard/CSA Standard for Gas-Fired Low-Pressure Steam and Hot Water Boilers was approved by the Canadian Interprovincial Gas Advisory Council on January 4, 2010, and by the American National Standards Institute, Inc., on October 30, 2009.

The previous edition of the Gas-Fired Low-Pressure Steam and Hot Water Boilers standard, and addenda thereto, approved by the Interprovincial Gas Advisory Council and American National Standards Institute, Inc. are as follows:

ANSI Z21.13-2000 • CSA 4.9-2000  
ANSI Z21.13a-2002 • CSA 4.9a-2002  
ANSI Z21.13b-2003 • CSA 4.9b-2003

ANSI Z21.13-2004 • CSA 4.9-2004  
ANSI Z21.13a-2005 • CSA 4.9a-2005  
ANSI Z21.13b-2007 • CSA 4.9b-2007

The following identifies the designation and year of this edition of the standard:

ANSI Z21.13-2010 • CSA 4.9-2010

*Note: This edition of Z21.13 • CSA 4.9 incorporates changes to the 2004 edition and addenda thereto. Changes other than editorial are noted by a vertical line in the margin.*

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## **NOTE**

*This standard contains SI (Metric) equivalents to the yard/pound quantities, the purpose being to allow the standard to be used in SI (Metric) units. (IEEE/ASTM-SI-10 or CAN/CSA Z234.1 are used as a guide in making metric conversion from yard/pound quantities.) If a value for a measurement and an equivalent value in other units, the first stated is to be regarded as the requirement. The given equivalent value may be approximate. If a value for a measurement and an equivalent value in other units, are both specified as a quoted marking requirement, the first stated unit, or both shall be provided.*

# ***American National Standard/CSA Standard For Gas-Fired Low Pressure Steam And Hot Water Boilers***

## ***Part I: Construction***

### **1.1 Scope**

#### **1.1.1**

This standard applies to newly produced gas-fired low-pressure steam and hot water boilers with gas inlet pressure ratings not exceeding  $\frac{1}{2}$  psi (3.5 kPa) and having input ratings of less than 12,500,000 Btu/hr (3 663 389 W) (see Part IV, Definitions), hereinafter referred to as boilers\*, constructed entirely of new unused parts and materials, for operation at or below the following pressures and temperatures:

Steam heating boilers

15 psi (103.42 kPa) steam pressure

Hot water heating boilers

160 psi (1.10 MPa) water pressure

250°F (121°C) water temperature

Hot water supply boilers

160 psi (1.10 MPa) water pressure

250°F (121°C) water temperature

- a. For use with natural gas;
- b. For use with manufactured gas;
- c. For use with mixed gas;
- d. For use with liquefied petroleum gases; and
- e. For use with LP gas-air mixtures.

The construction of boilers for use with the above-mentioned gases is covered under Part I.

The performance of boilers for use with the above-mentioned gases is covered under Part II.

#### **1.1.2**

This standard applies to indoor type boilers, of other than the direct vent which are categorized according to vent pressure and temperature as either Category I, Category II, Category III or Category IV (see Part IV, Definitions), and to outdoor type boilers.

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\* See Exhibit E (E2.1) for boilers covered in Canada which exceed the above limits in gas inlet pressure and/or input ratings.