*ANSI Z83.8-2009*
*CSA 2.6-2009*

American National Standard/
CSA Standard for

# Gas Unit Heaters, Gas Packaged Heaters, Gas Utility Heaters and Gas-Fired Duct Furnaces

AMERICAN NATIONAL STANDARD
ANSI Z83.8-2009

CSA STANDARD
CSA 2.6-2009

Fourth Edition - 2009
This Standard is based on the Standard for
Gas Unit Heaters And Gas-Fired Duct Furnaces
ANSI Z83.8-2006 • CSA 2.6-2006
and Addenda ANSI Z83.8a-2009 • CSA 2.6a-2009

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The Canadian Standards Association (CSA), 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 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.

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The Association 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, the Association regularly and continually audits and inspects products that bear the CSA Mark.

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L'Association canadienne de normalisation (CSA), sous les auspices de laquelle cette Norme nationale a été préparée, a reçu ses lettres patentes en 1919 et son accréditation au sein du Système de Normes nationales par le Conseil canadien des normes en 1973. Association d'affiliation libre, sans but lucratif ni pouvoir de réglementation, elle se consacre à l'élaboration de normes et à la certification.

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***For further information on CSA services, write to***

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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.

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# *Preface*

This publication represents a basic standard for safe operation, substantial and durable construction, and acceptable performance of a gas unit heater, gas packaged heater, gas utility heater, or gas-fired duct furnace. It is the result of years of experience in the manufacture, testing, installation, maintenance, inspection and research on a gas unit heater, gas packaged heater, gas utility heater, or gas-fired duct furnace 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 a gas unit heater, gas packaged heater, gas utility heater, or gas-fired duct furnace, 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 CSA America, 8501 East Pleasant Valley Road, Cleveland, Ohio 44131, or the CSA Technical Committee on Gas Appliances and Related Accessories, 5060 Spectrum Way, Suite 100, Mississauga, Ontario, Canada L4W 5N6.

Safe and satisfactory operation of gas unit heater, gas packaged heater, gas utility heater, or gas-fired duct furnace 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*; or 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.

THIS STANDARD IS INTENDED TO BE USED BY THE MANUFACTURING SECTOR AND BY THOSE APPLYING THE EQUIPMENT AND BY THOSE RESPONSIBLE FOR ITS PROPER INSTALLATION. IT IS THE RESPONSIBILITY OF THESE USERS TO DETERMINE THAT IN EACH CASE THIS STANDARD IS SUITABLE FOR AND APPLICABLE TO THE SPECIFIC USE THEY INTEND.

CAUTION NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute, Inc., require that action be taken to reaffirm, revise or withdraw this standard no later than five (5) years from the date of approval. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute, Inc., 25 West 43rd Street, Fourth Floor, New York, N.Y. 10036, (212) 642-4900.

EFFECTIVE DATE: An organization using this standard for product evaluation as a part of its certification program will normally establish the date by which all products certified by that organization should comply with this standard.

# *History Of Development Of The Standard For Gas Unit Heaters, Gas Packaged Heaters, Gas Utility Heaters, And Gas-Fired Duct Furnaces*

(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 equipment.

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.

A Z83/CGA joint Subcommittee on Standards for Heavy Duty Heaters was then established, based on memberships of the Z83 subcommittee for Gas-Fired Heavy Duty Forced Air Heaters, and the CGA committees for Unit Heaters/Duct Furnaces, Make-up Air Heaters, and Door Heaters.

Membership on the joint heavy duty heaters subcommittee encompasses representatives from the U.S. and Canadian manufacturing industry, gas suppliers (natural and LP), regulatory authorities and general interest.

To facilitate the reporting structure of joint subcommittees, a CGA Standards Steering Committee on Gas Burning Appliances and Related Accessories was established to parallel Accredited Standards Committees Z21 and Z83.

The first meeting of the Z83/CGA joint heavy duty heaters subcommittee was held on July 14-16, 1992 in Toronto.

During the standards development process, a total of four drafts were circulated for public review.

The fourth draft of the proposed harmonized standard was issued for public review in March 1994. All comments relating to the fourth draft were duly considered by the joint heavy duty heaters subcommittee at its meeting of June 21-22, 1994. The resulting fifth draft of the proposed harmonized standard (fourth draft as revised at the June 21-22, 1994 subcommittee meeting) was submitted for approval by the Z83 Committee and the CGA Steering Committee.

The first edition of the harmonized Z83/CGA standard for Unit Heaters and Gas-Fired Duct Furnaces was approved by the Interprovincial Gas Advisory Council on June 7, 1996, and by the American National Standards Institute, Inc. on August 29, 1996.

The second edition of the harmonized Z83/CSA Standard for Gas Unit Heaters and Gas-Fired Duct Furnaces was approved by the Interprovincial Gas Advisory Council on February 8, 2002 and by the American National Standards Institute, Inc., on April 24, 2002.

The third edition, was approved by the Interprovincial Gas Advisory Council on January 13, 2006 and by the American National Standards Institute, Inc. on October 7, 2005.

With this, the fourth edition, the title of the Standard for Gas Unit Heater and Gas-Fired Duct Furnace was changed. The American National Standard/CSA Standard for Gas Unit Heaters, Gas Packaged Heaters, Gas Utility Heaters, or Gas-Fired Duct Furnaces was approved by the International Gas Advisory Council on December 29, 2008, and by the American National Standards Insitute on December 15, 2009.

The previous editions of the gas unit heaters and gas-fired duct furnaces, and addenda thereto, approved by the Interprovincial Gas Advisory Council and American National Standards Institute, Inc. are as follows:

Z83.8-1996 (R2001) • CGA 2.6-M96
Z83.8a-1998 (R2001) • CGA 2.6a-M98
Z83.8b-2000 • CGA 2.6b-2000
Z83.8-2002 • CSA 2.6-2002
Z83.8a-2003 • CSA 2.6a-2003
Z83.8b-2004 • CSA 2.6b-2004
Z83.8-2006 • CSA 2.6-2006
Z83.8a-2009 • CSA 2.6a-2009

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

ANSI Z83.8-2009 • CSA 2.6-2009

***NOTE:*** *This edition of Z83.8 • CSA 2.6 incorporates changes to the 2006 edition and addenda thereto. Changes, other than editorial, are denoted by a vertical line in the margin.*

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# *American National Standard/ CSA Standard for Gas Unit Heaters, Gas Packaged Heaters, Gas Utility Heaters, and Gas-Fired Duct Furnaces*

## *Part I: Construction*

### 1.1 Scope

#### 1.1.1
This standard applies to newly produced gas fired-duct furnaces, packaged heaters, utility heaters with inputs up to and including 400,000 Btu/hr (117 228 W), and unit heaters with input rates up to and including 10,000,000 Btu/hr (2 930 712 W) and constructed entirely of new, unused parts and materials:

a. For use with natural gas with inlet gas pressures up to and including 5.0 psi (34.5 kPa); unit heaters, packaged heaters, and duct furnaces with burners having input rates over 400,000 Btu/hr (117 228 W) may have higher inlet pressures;

b. For use with liquefied petroleum gases; and

c. Convertible for use with natural gas and liquefied petroleum gases, when provision is made for the conversion from one gas to the other.

#### 1.1.2
The term "appliance," when used herein, applies to gas-fired duct furnaces, packaged heaters, utility heaters and unit heaters.

#### 1.1.3
Duct furnaces, unit heaters, and packaged heaters may be factory-built as a single unit or as a package system intended to be disassembled for shipping and reassembled for installation, and may be combined with a cooling unit. (See Part IV, Definitions).

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

#### 1.1.5
The performance of appliances for use with the above-mentioned gases is covered under Part II.

#### 1.1.6
This Standard applies to Category I, Category II, Category III and Category IV Appliances. (See Part IV, Definitions.)

#### 1.1.7
This standard covers self-contained, automatically controlled, vented unit heaters, packaged heaters, utility heaters and duct furnaces. These appliances are intended for installation in locations where flammable gases or vapors are not generally present.