CSA Group

ANSI Z21.47-2012
CSA 2.3-2012

Standard for Gas-fired central furnaces

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CSA Group

AMERICAN NATIONAL STANDARD
ANSI Z21.47-2012

CSA 2.3-2012

Sixth Edition - 2012
This Standard is based on the Standard for
Connectors For Gas Appliances
ANSI Z21.47-2006 • CSA 2.3-2006
and ANSI Z21.47a-2007 • CSA 2.3a-2007,
ANSI Z21.47b-2008 • CSA 2.3b-2008

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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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American National Standards Institute, Inc.
25 West 43rd Street, Fourth Floor
New York, NY
10036

Preface

This publication represents a basic standard for safe operation, substantial and durable construction, and acceptable performance of gas-fired central furnaces. It is the result of years of experience in the manufacture, testing, installation, maintenance, inspection and research on gas-fired central furnaces 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 central furnaces, 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 CSA Group, 8501 East Pleasant Valley Road, Cleveland, Ohio 44131, or CSA Group, 5060 Spectrum Way, Suite 100, Mississauga, Ontario, Canada L4W 5N6.

Safe and satisfactory operation of gas-fired central furnaces 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 Group 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.

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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-Fired Central 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 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 preliminary step toward harmonization with international standards, which was to become a necessity as Europe moved toward its goal to form an economic United States of Europe (EC) by early 1990's.

A Z21/CGA joint working group on harmonizing central furnace standards was established. On May 4, 1989 the joint working group reviewed an initial comparison of the construction sections of the Standards for Gas-Fired Central Furnaces, ANSI Z21.47-1987, and the National Standard of Canada, CAN/CGA-2.3-M86. It was agreed that a consultant should be used to draft a complete unitary standard to address gas-fired central furnaces, including direct vent central furnaces. As a result, several drafts, based on the current Standards for Gas-Fired Central Furnaces (ANSI Z21.47-1990 and Z21.47a-1990, ANSI Z21.64-1990, and CAN/CGA 2.3-M86) were subsequently developed by the consultant and reviewed by the joint working group between 1989 and 1991.

A joint Z21/CGA Joint Subcommittee on Standards for Gas-Fired Central Furnaces was then established, based on memberships of the Z21 Subcommittee on Standards for Gas-Fired Central Furnaces and the CGA 2.3-2.9 Committee on Standards for Central Furnaces, Duct Furnaces and Unit Heaters. Membership encompasses representatives from the U.S. and Canadian manufacturing industry, gas suppliers (natural and LP), regulatory authorities and general interest with the intent that each country is equally represented.

The first meeting of the Z21/CGA joint central furnace subcommittee was held on July 10-12, 1992. At that meeting a third draft of a harmonized central furnace standard was considered and modified. A fourth draft was subsequently adopted for industry review during November 1991.

With the formation of joint subcommittees, a Canadian Gas Association Standards Steering Committee on Gas Burning Appliances and Related Accessories was established to parallel Accredited Standards Committees Z21 and Z83. Also, to support the formation of joint subcommittees. Operating procedures, in accordance with American National Standards Institute procedures, for joint subcommittees were developed and subsequently approved by ANSI on April 1, 1993.

Following reconsideration and modification of the proposed draft standard for gas-fired central furnaces in light of comments received, the joint central furnace subcommittee, at its February 11-13, 1992 meeting, recommended the proposed fourth draft to the Z21 Committee and the CGA Standards Steering Committee for approval.

The Z21 Committee, at its April 9, 1992 meeting, approved the proposed fourth draft of the harmonized standard for central furnaces, as modified by the joint subcommittee. The CGA Standards Steering Committee concurred with the actions of the Z21 Committee but further modified the standard to better address bilingual instructions and markings and other issues unique to one country. The additional modifications by the CGA Committee were subsequently adopted by the Z21 Committee by letter ballot dated June 16, 1992.

The first edition of the harmonized Z21/CGA Standard for Gas-Fired Central Furnaces was approved by the Standards Advisory Committee and the Standards Council of Canada on March 31,1993, and by the American National Standards Institute, Inc., on May 26, 1993.

At their respective meetings on April 10 and April 11, 1996, and by letter ballot dated May 16, 1996, members of the Z21 Accredited Standards Committee and the Z83 Accredited Standards Committee unanimously approved the merger of the two committees. By letter ballot dated October 8, 1996, the members of the Z21 Committee and the Z83 Committee unanimously approved the title and procedures of the new committee as Accredited Standards Committee Z21/83 on Performance and Installation of Gas-Burning Appliances and Related Accessories.

The Z21/83 Committee, at its April 17, 1997 meeting, approved proposed revisions to the harmonized central furnace standard. the Canadian Standards Steering Committee concured with the actions of the Z21/83 Committee and approved the proposed revisions to the harmonized central furnace standard.

The second edition of the harmonized central furnace standard was approved by the Interprovincial Gas Advisory Council on December 21, 1998, and the American National Standards Institute, Inc. on June 9, 1998.

The third edition of the harmonized central furnace standard was approved by the Interprovincial Gas Advisory Council on September 4, 2001, and the American National Standards Institute, Inc. on September 27, 2000.

The fourth edition of the harmonized central furnace standard was approved by the Interprovincial Gas Advisory Council on August 28, 2003, and the American National Standards Institute, Inc. on September 17, 2003.

The fifth edition of the harmonized central furnace standard was approved by the Interprovincial Gas Advisory Council on December 1, 2006, and the American National Standards Institute, Inc. on July 27, 2006.

This, the sixth edition of the harmonized central furnace standard was approved by the Interprovincial Gas Advisory Council on March 22, 2012, and the American National Standards Institute, Inc. on March 27, 2012.

Previous editions of the harmonized central furnace standard, and addenda thereto, approved by the Interprovincial Gas Advisory Council and the American National Standards Institute are as follows:

Z21.47-1993 • CAN/CGA 2.3-M93
Z21.47a-1995 • CGA 2.3a-M95
Z21.47b-1997 • CGA 2.3b-M97

Z21.47-1998 • CSA 2.3-M98
Z21.47a-1999 • CSA 2.3a-M99
Z21.47b-2000 • CSA 2.3b-M00

Z21.47-2001 • CSA 2.3-2001
Z21.47a-2001 • CSA 2.3a-2001
Z21.47b-2002 • CSA 2.3b-2002

Z21.47-2003 • CSA 2.3-2003
Z21.47a-2004 • CSA 2.3a-2004
Z21.47b-2006 • CSA 2.3b-2006

Z21.47-2006 • CSA 2.3-2006
Z21.47a-2007 • CSA 2.3a-2007
Z21.47b-2008 • CSA 2.3b-2008

NOTE: *This edition of Z21.47 • CSA 2.3 incorporates changes to the 2006 edition of Z21.47 • CSA 2.3 and addenda thereto. Changes, other than editorial, are denoted by a vertical line in the margin.*

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Gas-fired central furnaces

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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. (Standard for use of the International System of Units (SI): The Modern Metric System, IEEE/ASTM SI I0 or Metric Practice Guide, 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.

ANSI Z21.47-2012 • CSA 2.3-2012
Gas-Fired Central Furnaces

Part I: Construction

1.1 Scope

1.1.1
This standard applies to automatically operating gas-fired central furnaces (see Part X, Definitions), hereinafter referred to as furnaces, for installation in residential, commercial, and industrial structures including furnaces for Direct Vent, Recreational Vehicle, Outdoor, and Manufactured (Mobile) Homes.

These furnaces may include a cooling unit. All units shall be constructed entirely of new, unused parts and materials.

1.1.2
In Canada, this standard applies to gas-fired central furnaces having inputs up to and including 400,000 Btu/hr (117 228 W).

1.1.3
This standard applies to Category I, Category II, Category III and Category IV Central Furnaces. See Part X, Definitions.

1.1.4
This standard applies to furnaces of the types defined in Part X, Definitions, which are designed to supply heated air through ducts to spaces remote from or adjacent to the furnace location. Location and use of such furnaces with respect to the spaces being heated necessitates automatic operation of the appliance.

1.1.5
This standard covers the thermal efficiency, 2.39, Thermal Efficiency, and related markings of only those furnaces whose efficiencies are not regulated in the U.S.A. by the Energy Policy Act and Conservation Act of 1975 and the National Energy Conservation Policy of 1978* or not covered in Canada by Exhibit K, Items Unique to One Country, (K.1), when connected to single phase electrical supply.

1.1.6
A furnace of a type not specifically defined in this standard may be subjected to such examination and tests as deemed necessary by the testing agency to determine compliance with the intent of this standard.

1.1.7
This standard also applies to a furnace which is factory equipped with both a draft hood and an automatic vent damper device, see Part X, Definitions, hereinafter referred to as vent damper device.

* At the time of printing, Federal energy acts in the U.S.A. regulate the efficiency (heating capacity) of furnaces having input ratings less than 225,000 Btu/hr (65 941 W).