ANSI Z83.4-2017 • CSA 3.7-2017

CSA Group

Non-recirculating direct gas-fired heating and forced ventilation appliances for commercial and industrial application

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Revision History

ANSI Z83.4-2017 • CSA 3.7-2017, Non-recirculating direct gas-fired heating and forced ventilation appliances for commercial and industrial application

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ANSI Z83.4-2017 • CSA 3.7-2017

Non-recirculating direct gas-fired heating and forced ventilation appliances for commercial and industrial application

American National Standards Institute, Inc.

International Gas Advisory Council

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Preface

This is the fifth edition of ANSI Z83.4 • CSA 3.7, Standard for Non-recirculating direct gas-fired heating and forced ventilation appliances for commercial and industrial application. It supersedes the previous editions published in 2015, 2013, 2003 and 1999.

This Standard was prepared by the Z83/CSA Joint Technical Sub-Committee on Standards for Gas-Fired Heavy-Duty Forced Air Heaters 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 Strategic Steering Committee on Standards for Fuel Burning Appliances, and had been formally approved by the Technical Committee(s), American National Standards Institute, and the Interprovincial Gas Advisory Council.

This publication represents a basic standard for safe operation, substantial and durable construction, and acceptable performance of non-recirculating direct gas-fired industrial heaters. It is the result of years of experience in the manufacture, testing, installation, maintenance, inspection, and research on appliances designed for the 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 function 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 non-recirculating direct gas-fired industrial air heaters, 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 technical advances take 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. A proposal form is provided in the back of this document.

Safe and satisfactory operation of a non-recirculating direct gas-fired industrial air heater depends to a great extent upon its proper installation, use, and maintenance. It should be installed in accordance with the *National Fuel Gas Code, ANSI Z223.1/NFPA 54*, manufacturers' installation instructions, and local municipal codes.

Users of this American National Standard are advised that the devices, products, and activities within its scope may be subject to regulation at the Federal, 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, state, or local regulations should be followed.

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Interpretations: The Strategic Steering Committee on Standards for Fuel Burning Appliances 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."

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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.*
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History of development of the Standard for Non-Recirculating Direct Gas-Fired Heating and Forced Ventilation Appliances for Commercial and Industrial Application

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 July 14-16, 1992 meeting, the Z21/CGA Joint Subcommittee on Standards for Gas-Fired, Heavy-Duty Forced Air Heaters group agreed to prepare a draft bi-national standard for Direct Gas-Fired Industrial Air Heaters. During its November 7-8, 1996 meeting, the joint subcommittee agreed to send the draft standard for public review and comment.

The first draft harmonized standard was based on current coverage from the American National Standards/Canadian Gas Association Standards for Direct Gas-Fired Non-recirculating Make-up Air Heaters, ANSI Z83.4, Direct Gas-Fired Make-up Air Heaters, CGA-3.7, the Direct Gas Fired Door Air Heaters, Z83.17 and CGA-3.12, and Direct Gas Fired Industrial Air Heaters, Z83.18.

Following reconsideration and modification of the proposed draft standard, in light of comments received, the joint heavy duty heaters subcommittee at its July 22-24, 1997 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 Non-Recirculating Direct Gas-Fired Industrial Air Heaters, as modified by the joint subcommittee, was approved by the Z21/83 Committee by letter ballot dated August 10, 1998 and by the CGA Standards Steering Committee by letter ballot dated October 6, 1997.

The first edition of the American National Standard/CSA Standard for Non-Recirculating Direct Gas-Fired Industrial Air Heaters was approved by the Canadian Interprovincial Gas Advisory Council on July 7, 1999, and by the American National Standards Institute, Inc., on November 9, 1999.

Following the procedures outlined above, further revisions to this Standard, Z83.4 • CSA 3.7, were made in line with industry developments. The second edition of the American National Standard/CSA Standard for Non-Recirculating Direct Gas-Fired Industrial Air Heaters was approved by the Interprovincial Gas Advisory Council on September 11, 2003, and by the American National Standards Institute, Inc., on November 26, 2003.

The third edition of the American National Standard/CSA Standard for Non-Recirculating Direct Gas-Fired Industrial Air Heaters was approved by the Interprovincial Gas Advisory Council on February 25, 2013, and the American National Standards Institute, Inc., on December 19, 2012.

The fourth edition of the American National Standard/CSA Standard for Non-Recirculating Direct Gas-Fired Industrial Air Heaters, was approved by the Interprovincial Gas Advisory Council on February 5, 2015, and the American National Standards Institute, Inc., on January 8, 2015.

This, the fifth edition of the American National Standard/CSA Standard for Non-Recirculating Direct Gas-Fired Heating and Forced Ventilation Appliances for Commercial and Industrial Application, was approved by the Interprovincial Gas Advisory Council on June 29, 2016, and the American National Standards Institute, Inc., on June 29, 2016.

Previous editions of the harmonized Non-Recirculating Direct Gas-Fired Heating and Forced Ventilation Appliances for cCommercial and Industrial Application, and addenda thereto, approved by the Interprovincial Gas Advisory Council and the American National Standards Institute are as follows:

Z83.4-1999 • CSA 3.7-1999	Z83.4-2003 • CSA 3.7-2003
Z83.4a-2001 • CSA 3.7a-2001	Z83.4a-2004 • CSA 3.7a-2004
Z83.4b-2002 • CSA 3.7b-2002	Z83.4b-2006 • CSA 3.7b-2006
Z83.4-2013 • CSA 3.7-2013	Z83.4–2015 • CSA 3.7–2015

The following identifies the designation and year of the fifth edition of the Standard:

ANSI Z83.4-2017• CSA 3.7-2017

Note: *This, the 2017 edition of Z83.4 • CSA 3.7, incorporates changes to the 2015 edition. Changes, other than editorial, are denoted by a vertical line in the margin.*

ANSI Z83.4-2017 • CSA 3.7-2017
Non-recirculating direct gas-fired heating and forced ventilation appliances for commercial and industrial application

1 Scope

Δ **1.1**

This Standard applies to newly produced, non-recirculating direct gas-fired heating and forced ventilation appliances, hereinafter referred to as heaters, whose purpose is to address building infiltration, replace building air that is exhausted, offset building conduction heat loss and provide outside air ventilation. All air to the heater is ducted directly from outdoors and the products of combustion generated by the heater are released into the air stream being heated.

Heaters covered by this Standard are intended for use in industrial and commercial applications. Heaters covered by this Standard are not intended for use in any area containing sleeping quarters. The installation conforms with local codes, or in the absence of local codes, in accordance with the *National Fuel Gas Code,* ANSI Z223.1/NFPA 54, or the *Natural Gas and Propane Installation Code,* CSA B149.1.

1.2

This Standard applies to heaters designed for heated discharge air temperature of 160 °F (71 °C) or less.

1.3

This Standard is intended to cover only complete packaged heaters with integral air moving components, i.e., those which are designed by, cataloged by, and built on a repetitive basis by the manufacturer.

1.4

If a value for measurement as given 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

Items unique to the U.S.A. are shown in Clause 6.

1.6

Items unique to Canada are shown in Clause 7.

1.7

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

1.8
All references to “psi” through this Standard are to be considered gage pressure unless otherwise specified.

1.9
In this Standard, “shall” is used to express a requirement, i.e., a provision that the user shall 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 (non-mandatory) to define their application.

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

CSA Group

CSA C22.1-15
Canadian Electrical Code, Part I

CSA C22.2 No. 3-M1988 (R2014)
Electrical Features of Fuel-Burning Equipment

CSA C22.2 No. 77-14
Motors with Inherent Overheating Protection

CSA C22.2 No. 199-M89 (R2004) (withdrawn)
Combustion Safety Controls and Solid-State Igniters for Gas- and Oil-Burning Equipment

CAN/CSA Z234.1-00 (withdrawn)
Canadian Metric Practice Guide

CGA 2.17-M91 (R2014)
Gas-Fired Appliances for Use at High Altitudes

CGA 3.11-15
Lever Operated Pressure Lubricated Plug Type Gas Shut-Off Valves

CGA 3.16-15
Lever Operated Non-Lubricated Gas Shut-Off Valves