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Recirculating direct gas-fired industrial air heaters

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Revision History

ANSI Z83.18-2015, Recirculating direct gas-fired industrial air heaters

Revision from previous edition	Revision symbol (in margin)
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Recirculating direct gas-fired industrial air heaters

American National Standards Institute, Inc.

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Preface

This is the 6th edition of ANSI Z83.18, Recirculation direct gas-fired industrial air heaters. It supersedes the previous editions published in 2012, 2004, 2000, 1990 and 1987.

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 Recirculating direct gas-fired industrial air 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 direct gas-fired process 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 Group, 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 direct gas-fired process 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.

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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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."

Notes:

1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*

2) *This Standard contains SI (Metric) units corresponding to the yard/pound quantities, the purpose being to allow the standard to be used in SI (Metric) units. (IEEE/ASTM SI 10, American National Standard for Metric Practice, or ISO 80000-1:2009, Quantities and units – Part 1: General, is used as a guide in making metric conversion from yard/pound quantities.) If a value for a measurement and a corresponding value in other units are stated, the first stated value is to be regarded as the requirement. The given corresponding value may be approximate. If a value for a measurement and a corresponding value in other units are both specified as a quoted marking requirement, the first stated unit, or both, are to be provided.*

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.*

4) *This publication 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 publication.*

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d) *rationale for the change.*

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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 governingStandardization and are available on the Current Standards Activities page at ***standardsactivities.csa.ca***

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History of the development of the Standard for Recirculating direct gas-fired industrial air heaters

Note: *This history is informative and is not part of the standard.*

At its March 1983 meeting, the Z83 Subcommittee on Standards for Gas-Fired Heavy Duty Forced Air Heaters considered the need to increase the discharge air temperature limit in the direct gas-fired make-up air heater standard (Z83.4), in light of the increased use of make-up air heaters as total space heating appliances. The heavy duty heater subcommittee appointed a working group of subcommittee members and interested individuals to gather information on the use of direct gas-fired make-up heaters for total space heating.

The working group's report to the subcommittee confirmed there were several local codes permitting the installation of gas-fired make-up air heaters as total space heating appliances in non-residential buildings. Consequently, the working group was requested to develop standards coverage for make-up air heaters installed as total space heating appliances for inclusion in Z83.4.

Although it was initially intended that the necessary coverage would be included in Z83.4, following review of the working group's suggested coverage of its July 1984 meeting, the subcommittee concluded that because of design and function differences (i.e., recirculation of inside air) a separate standard would better suit the needs of certification agencies and Code officials.

A draft standard for industrial air heaters, developed by the working group at a series of meetings, was adopted by the heavy duty heater subcommittee at its June 1985 meeting and distributed for industry review in December 1985. Following reconsideration of this draft standard in light of comments received at its February 1986 meeting, the heavy duty heater subcommittee recommended the draft standard to the Z83 Committee.

At its October 1986 meeting, the Z83 Committee approved the proposed standard for submittal the American National Standards Institute, Inc.

The first edition of the Standard for Direct Gas-Fired Industrial Air Heaters was approved by the American National Standards Institute, Inc., in September 1987. The second edition was approved by the American National Standards Institute, Inc., on November 30, 1990. The third edition was approved by the American National Standards Institute, Inc., on June 22, 2000. The fourth edition of the industrial heater standard was approved as American National Standard by the American National Standard Institute, Inc. on December 20, 2004. The fifth edition of the standard was approved by the American National Standards Institute on December 18, 2012.

The sixth edition of the standard was approved by the American National Standards Institute on January 8, 2015.

Following procedures outlined above, further revisions to this Standard were developed in line with industry developments.

Previous editions of the industrial air heater standard and addenda thereto, approved by the American National Standards Institute, are as follows:

Z83.18-1987	Z83.18a-1989	Z83.18b-1989
Z83.18-1990	Z83.18a-1991	Z83.18b-1992
Z83.18-2000	Z83.18a-2001	Z83.18b-2003
Z83.18-2004	Z83.18a-2005	Z83.18b-2008
Z83.18-2012		

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

ANSI Z83.18-2015

Note: *This, the 2015 edition incorporates changes to the 2012 edition of Z83.18. Changes other than editorial are denoted by a delta in the margin.*

ANSI Z83.18-2015
Recirculating direct gas-fired industrial air heaters

1 Scope

1.1
This Standard applies to newly produced, recirculating direct gas-fired industrial air heaters (see Clause 3, Definitions), hereinafter referred to as heaters, whose purpose is to offset building heat loss. Ventilation 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. This Standard applies to heaters designed for a heated discharge air temperature of 160 °F (71 °C) or less.

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.

1.2
Inside air may be introduced before or after the combustion zone.

1.3
Outside ventilation air is required to the heater. See Clauses 4.21.1-f), 4.21.1-n), and 4.22.2-u).

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

1.6
Clause 2, Reference publications, contains a list of standards specifically referenced in this Standard, and sources from which they may be obtained.

1.7
In this Standard, “shall” is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the standard; “should” is used to express a recommendation or that which is advised but not required; “may” is used to express an option or that which is permissible within the limits of the standard.

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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

ANSI Z21.15-2009 • CGA 9.1-M2009, ANSI Z21.15a-2012 • CGA 9.1a-2012
Manually Operated Gas Valves for Appliances, Appliance Connector Valves and Hose End Valves

ANSI Z21.18-2007(R2012) • CSA-6.3-2007(R2012), Z21.18a-2010(R2012) • CSA-6.3a-2010(R2012)
Gas Appliance Pressure Regulators

ANSI Z21.20-2005, Z21.20a-2008
Automatic Gas Ignition Systems and Components

ANSI Z21.21-2012 • CSA 6.5-2012
Automatic Valves for Gas Appliances

ANSI Z21.78-2010 • CSA 6.20-2010
Combination Gas Controls for Gas Appliances

CSA C22.2 No. 0.15-01(R2012)
Standard for Adhesive Labels

Air Movement and Control Association Inc.

AMCA 203-1990(R2011)
Field Performance Measurements of Fan Systems

American Gas Association

ANSI Z223.1-2012/NFPA 54-2012
National Fuel Gas Code

American National Standards Institute, Inc.

ANSI Y14.15-1966 (R1988), and Supplements ANSI Y14.15a-1971, ANSI Y14.15b-1973
Electrical and Electronics Diagrams (No Longer Available)

American Society of Heating, Refrigeration & Air-Conditioning Engineers, Inc.

ANSI/ASHRAE/AMCA 51-2007
Laboratory Methods of Testing Fans for Aerodynamic Performance Rating (ANSI AMCA Standard 210-07)

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