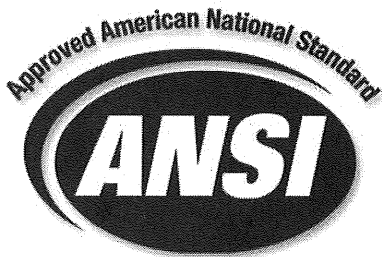


**AN AMERICAN NATIONAL STANDARD
IAPMO/ANSI UMC 1-2003**

UNIFORM MECHANICAL CODE™



**Comprehensive
Consensus
Codes™**



Member

2003 UMC Foreword

The *Uniform Mechanical Code*[™] (UMC[™]) provides complete requirements for the installation and maintenance of heating, ventilating, cooling, and refrigeration systems, while at the same time allowing latitude for innovation and new technologies.

This code was first published in 1967. With the publication of the 2003 edition of the *Uniform Mechanical Code*, another significant milestone has been reached. For the first time in the history of the United States, a mechanical code developed through a true consensus process has been achieved. Contributions to the content of this code were made by every segment of the built industry, including such diverse interests as consumers, enforcing authorities, installers/maintainers, insurance, labor, manufacturers, research/standards/testing laboratories, special experts, and users.

The consensus process, accredited by the American National Standards Institute, serves as the framework for the Comprehensive Consensus[™] Code (C3) set – our nation's first true set of ANSI accredited harmonized construction codes for the built industry. IAPMO's C3 partners include the National Fire Protection Association (NFPA), the Western Fire Chiefs Association (WFCA) and the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE).

The public at large is encouraged and invited to participate in IAPMO's open consensus code development process. This code is updated every three years. A code development timeline and other relevant information is available at IAPMO's website at www.iapmo.org.

The *Uniform Mechanical Code* is dedicated to all those who, in working to achieve "the ultimate mechanical code," have unselfishly devoted their time, effort, and personal funds to create and maintain this, the finest mechanical code in existence today.

The 2003 *Uniform Mechanical Code* is supported by the C3 partners as well as the American Society of Sanitary Engineering (ASSE), Mechanical Contractors Association of America (MCAA), Plumbing-Heating-Cooling Contractors National Association (PHCC-NA), the United Association (UA), and the World Plumbing Council (WPC). The presence of these logos, while reflecting support, does not imply any ownership of the copyright to the UMC which is held exclusively by IAPMO. Further, the logos of these associations indicates the support of IAPMO's open, consensus process being used to develop IAPMO's codes and standards.

The addresses of the organizations are as follows:

ASHRAE – 1791 Tullie Circle, NE • Atlanta, Georgia 30329-2305 • (800) 527-4723

ASSE – 901 Canterbury Road, Suite A • Westlake, Ohio 44145-7201 • (440) 835-3040

MCAA – 1385 Piccard Drive • Rockville, Maryland 20850 • (301) 869-5800

NFPA – 1 Batterymarch Park • Quincy, Massachusetts 02169 • (617) 770-3000

PHCC-NA – PO Box 6808 • Falls Church, Virginia 22046 • (800) 533-7694

UA – 901 Massachusetts Avenue NW • Washington, DC 20001 • (202) 628-5823

WFCA – 727 Center Street NE, Suite 300 • Salem, Oregon 97301 • (503) 588-7665

WPC – WPC Secretary • c/o The Institute of Plumbing • 64 Station Lane • Hornchurch Essex
RM12 6NB • United Kingdom • +44 17-08-47-27-91

Notice

The 2003 edition of the *Uniform Mechanical Code* is developed through a consensus standards development process approved by the American National Standards Institute. This process brings together volunteers representing varied viewpoints and interests to achieve consensus on mechanical issues. While the International Association of Plumbing and Mechanical Officials (IAPMO) administers the process and establishes rules to promote fairness in the development of consensus, it does not independently test, evaluate, or verify the accuracy of any information or the soundness of any judgments contained in its codes and standards.

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909.0 Non-Recirculating Direct Gas-Fired Industrial Air Heaters.

909.1 Application. Direct gas-fired industrial air heaters of the non-recirculating type shall be designed certified to be in compliance with the Standard for Non-Recirculating Direct Gas-Fired Industrial Air Heaters, ANSI Z83.4/CSA 3.7. Unlisted direct gas-fired industrial air heaters of the non-recirculating type shall not be installed. [NFPA 54:9.8.1]

909.2 Prohibited Installations.

- (A) Non-recirculating direct gas-fired industrial air heaters shall not serve any area containing sleeping quarters.
- (B) Non-recirculating direct gas-fired industrial air heaters shall not recirculate room air. [NFPA 54:9.8.2]

909.3 Installation. Installation of direct gas-fired industrial air heaters shall comply with the following requirements:

- (A) Non-recirculating direct gas-fired industrial air heaters shall be installed in accordance with the manufacturer's instructions.
- (B) Non-recirculating direct gas-fired industrial air heaters shall be installed only in industrial or commercial occupancies.
- (C) Non-recirculating direct gas-fired industrial air heaters shall be permitted to provide fresh air ventilation.
- (D) Non-recirculating direct gas-fired industrial air heaters shall be provided with access for removal of burners; replacement of motors, controls, filters, and other working parts; and for adjustment and lubrication of parts requiring maintenance. [NFPA 54:9.8.3]

909.4 Clearance from Combustible Materials. Non-recirculating direct gas-fired industrial air heaters shall be installed with a clearance from combustible materials of not less than that shown on the rating plate and the manufacturer's instructions. [NFPA 54:9.8.4]

909.5 Air Supply. All air to the non-recirculating direct gas-fired industrial air heater shall be ducted directly from outdoors. Where outside-air dampers or closing louvers are used, they shall be verified to be in the open position prior to main burner operation. [NFPA 54:9.8.5]

909.6 Atmospheric Vents or Gas Reliefs or Bleeds. Non-recirculating direct gas-fired industrial air heaters with valve train components equipped with atmospheric vents, gas reliefs, or bleeds shall have their vent lines, gas reliefs, or bleeds lead to a safe point outdoors. Means shall be employed on

these lines to prevent water from entering and to prevent blockage from insects and foreign matter. An atmospheric vent line shall not be required to be provided on a valve train component equipped with a listed vent limiter. [NFPA 54:9.8.6]

909.7 Relief Openings. The design of the installation shall include adequate provisions to permit the non-recirculating direct gas-fired industrial air heater to operate at its rated airflow without overpressurizing the space served by the heater by taking into account the structure's designed infiltration rate, properly designed relief openings, or an interlocked powered exhaust system, or a combination of these methods.

- (A) The structure's designed infiltration rate and the size of relief opening(s) shall be determined by approved engineering methods.
- (B) Louver or counterbalanced gravity damper relief openings shall be permitted. Where motorized dampers or closeable louvers are used, they shall be proved to be in their open position prior to main burner operation. [NFPA 54:9.8.7]

909.8 Purging. Inlet ducting, when used, shall be purged with at least four air changes prior to an ignition attempt. [NFPA 54:9.8.8]

910.0 Recirculating Direct Gas-Fired Industrial Air Heaters.

910.1 Application. Direct gas-fired industrial air heaters of the recirculating type shall be designed certified to be in compliance with the Standard for Recirculating Direct Gas-Fired Industrial Air Heaters, ANSI Z83.18. Unlisted direct gas-fired industrial air heaters of the recirculating type shall not be installed. [NFPA 54:9.9.1]

910.2 Prohibited Installations.

- (A) Recirculating direct gas-fired industrial air heaters shall not serve any area containing sleeping quarters.
- (B) Recirculating direct gas-fired industrial air heaters shall not recirculate room air in buildings that contain flammable solids, liquids, or gases explosive materials, or substances that can become toxic when exposed to flame or heat. [NFPA 54:9.9.2]

910.3 Installation. Installation of direct gas-fired industrial air heaters shall comply with the following requirements:

- (A) Recirculating direct gas-fired industrial air heaters shall be installed in accordance with the manufacturer's instructions.
- (B) Recirculating direct gas-fired industrial air

heaters shall be installed only in industrial or commercial occupancies.

- (C) Recirculating direct gas-fired industrial air heaters shall be permitted to provide fresh air ventilation only for the amount that exceeds the minimum ventilation air specified on the heater's rating plate to maintain the combustion level created by the heater in the space being served by the heater below 25 ppm for carbon monoxide, 3 ppm for nitrogen dioxide, and 5000 ppm for carbon dioxide. Where gas-powered fork trucks or other fossil-fueled equipment are utilized in the conditioned space, additional ventilation requirements for the facility must be addressed separately.
- (D) Recirculating direct gas-fired industrial air heaters shall be provided with access for removal of burners; replacement of motors, controls, filters, and other working parts; and for adjustment and lubrication of parts requiring maintenance. [NFPA 54:9.9.3]

910.4 Clearance from Combustible Materials. Recirculating direct gas-fired industrial air heaters shall be installed with a clearance from combustible materials of not less than that shown on the rating plate and the manufacturer's instructions. [NFPA 54:9.9.4]

910.5 Air Supply. Ventilation air to the recirculating direct gas-fired industrial air heater shall be ducted directly from outdoors. Air to the recirculating direct gas-fired industrial air heater in excess of the minimum ventilation air specified on the heater's rating plate shall be taken from the building, ducted directly from outdoors, or a combination of both. Where outside-air dampers or closing louvers are used, they shall be verified to be in the open position prior to main burner operation. [NFPA 54:9.9.5]

910.6 Atmospheric Vents or Gas Reliefs or Bleeds. Recirculating direct gas-fired industrial air heaters with valve train components equipped with atmospheric vents, gas reliefs, or bleeds shall have their vent lines, gas reliefs, or bleeds lead to a safe point outdoors. Means shall be employed on these lines to prevent water from entering and to prevent blockage from insects and foreign matter. An atmospheric vent line shall not be required to be provided on a valve train component equipped with a listed vent limiter. [NFPA 54:9.9.6]

910.7 Relief Openings. The design of the installation shall include adequate provisions to permit the recirculating direct gas-fired industrial air heater to operate at its rated airflow without overpressurizing the space served by the heater by taking into account the structure's designed infiltration rate, properly designed relief openings or

an interlocked powered exhaust system, or a combination of these methods.

- (A) The structure's designed infiltration rate and the size of relief opening(s) shall be determined by approved engineering methods.
- (B) Louver or counterbalanced gravity relief openings shall be permitted. Where motorized dampers or closeable louvers are used, they shall be proved to be in their open position prior to main burner operation. [NFPA 54:9.9.7]

910.8 Purging. Inlet ducting, when used, shall be purged with at least four air changes prior to an ignition attempt. [NFPA 54:9.9.8]

911.0 Duct Furnaces.

911.1 Clearances. The installation of duct furnaces shall comply with the following clearance requirements:

- (A) Listed duct furnaces shall be installed with clearances of at least 6 in. (150 mm) between adjacent walls, ceilings, and floors of combustible material and the furnace draft hood. Furnaces listed for installation at lesser clearances shall be installed in accordance with their listings. In no case shall the clearance be such as to interfere with combustion air and accessibility. (See Sections 305.1 and 701.0.)
- (B) Unlisted duct furnaces shall be installed with clearances to combustible material in accordance with the clearances specified for unlisted furnaces and boilers in Table 9-1. Combustible floors under unlisted duct furnaces shall be protected in an approved manner. [NFPA 54:9.10.1]

911.2 Erection of Equipment. Duct furnaces shall be erected and firmly supported in accordance with the manufacturers' instructions. [NFPA 54:9.10.2]

911.3 Access Panels. The ducts connected to duct furnaces shall have removable access panels on both the upstream and downstream sides of the furnace. [NFPA 54:9.10.3]

911.4 Location of Draft Hoods and Controls. The controls, combustion-air inlet, and draft hoods for duct furnaces shall be located outside the ducts. The draft hood shall be located in the same enclosure from that combustion air is taken. [NFPA 54:9.10.4]

911.5 Circulating Air. Where a duct furnace is installed so that supply ducts carry air circulated by the furnace to areas outside the space containing the furnace, the return air shall also be handled by a duct(s) sealed to the furnace casing and terminating outside the space containing the furnace. The duct furnace shall be installed on the positive-pressure side of the circulating air blower. [NFPA 54:9.10.5]