

## Chapter 19.09

### FUEL GAS CODE

- 19.09.010 International Fuel Gas Code (IFGC) adopted.
- 19.09.101 Administration, general.
- 19.09.101.2 Administration, general, scope.
- 19.09.102 Authority to render gas service.
- 19.09.202 General definitions.
- 19.09.303.3 Prohibited locations.
- 19.09.303.7 Appliance location, pit locations.
- 19.09.303.8 Appliance location; liquefied petroleum gas facilities.
- 19.09.303.9 Appliance location; liquefied petroleum gas piping.
- 19.09.304.6 Outdoor combustion air.
- 19.09.304.6.1 Outdoor combustion air; two-permanent-openings method.
- 19.09.304.11 Combustion air ducts.
- 19.09.304.13 Specially engineered installations.
- 19.09.304.14 Combustion, ventilation; and dilution air; LPG systems.
- 19.09.305.9 Installation; aircraft servicing and storage areas.
- 19.09.306.4 Appliances under floors.
- 19.09.403.10.1 Pipe joints.
- 19.09.403.10.2 Tubing joints.
- 19.09.403.10.4 Metallic fittings.
- 19.09.404.4 Piping through foundation wall.
- 19.09.404.9 Minimum burial depth.
- 19.09.404.17 Piping system installation; frost heave.
- 19.09.404.18 Piping system installation; flex connectors.
- 19.09.404.19 Piping system installation; mobile homes.
- 19.09.406.4.1 Test pressure.
- 19.09.409.5 Equipment shutoff valve.
- 19.09.501.7 Connection to fireplace.
- 19.09.501.8 Equipment not required to be vented.
- 19.09.502.8 Vents; vent insulation.
- 19.09.502.9 Vents; ice damage.
- 19.09.503.8 Venting system termination location.
- 19.09.503.10.2.1 Materials; general.
- 19.09.621 Unvented room heaters.
- 19.09.Appendix A (IFGS) Sizing and capacities of gas piping.
- 19.09.Appendix B (IFGS) Sizing of venting systems serving appliances equipped with draft hoods, category I appliances, and appliances listed for use with type B vents.

**19.09.Appendix C (IFGS) Exit terminals of mechanical draft and direct-vent venting systems.**

**19.09.Appendix D (IFGS) Recommended procedure for safety inspection of an existing appliance installation.**

**19.09.010 International Fuel Gas Code (IFGC) adopted.**

For the purpose of regulating the installation, alterations, repair, relocation, replacement, addition to, use, design, quality of materials, location and maintenance of fuel gas piping systems, fuel gas utilization equipment and related accessories within and without all buildings and structures and portions thereof within the city and borough, there is adopted by reference as the mechanical code of the city and borough that compilation of rules and regulations prepared and published by the International Code Council, a nationally recognized technical trade organization, which compilation is entitled "International Fuel Gas Code, 2003<sup>6</sup> Edition," and 5 four copies each of which have been filed in the office of the clerk of the city and borough or at such other places designated by the clerk, for public use, inspection and examination and which compilation is made a part of this chapter as if fully set forth in this section, subject only to the following enumerated additions, deletions and changes:

**19.09.101 Administration, general.**

Delete Sections 101.3 through 109.7.

**19.09.101.2 Administration, general, scope.**

Add an Exception as follows:

- "2. As an alternative to the provisions of this code, fuel gas piping systems and fuel gas water heaters shall be permitted to comply with the appropriate provisions of the *Uniform Plumbing Code*."

**19.09.102 Authority to render gas service.**

In IFGC Chapter 1, add new Section 102 as follows:

"102 Authority to Render Gas Service

*102.1 Unlawful acts.* It shall be unlawful for any person, firm, or corporation, excepting an authorized agent or employee of a person, firm, or corporation engaged in the business of furnishing or supplying gas and whose service pipes

supply or connect with the particular premises to turn on or reconnect gas service in or on any premises where and when gas service is, at the time, not being rendered.

*102.2 Authority to disconnect.* The administrative authority or the serving gas supplier are hereby authorized to disconnect any gas piping, appliance, or both that is found not to conform to the requirements of this code or that is found defective and in such condition as to endanger life or property. Where such disconnection has been made, a notice shall be attached to such gas piping, appliance, or both that states the disconnection and the reasons for the disconnection."

#### **19.09.202 General definitions.**

Add the following definitions:

"ICC Electrical Code shall mean appropriate corresponding references in the National Electrical Code adopted at CBJ 19.08.010."

#### **19.09.303.3 Prohibited locations.**

Delete Exceptions 3 and 4.

#### **19.09.303.7 Appliance location, pit locations.**

Delete the section and add the following:

"303.7 Pit Locations. Fuel gas appliances shall not be installed in pits."

#### **19.09.303.8 Appliance location; liquefied petroleum gas facilities.**

Add a new section as follows:

"*303.8 Liquefied Petroleum Gas Facilities.* Liquefied petroleum gas facilities shall not be located in any pit, basement, crawlspace, under show windows, or interior stairways, in engine, boiler, heater, or electric meter rooms. LPG facilities means tanks, containers, container valves, regulating equipment, meters, and/or appurtenances for the storage and supply of LPG for any building structure or premises."

**19.09.303.9 Appliance location; liquefied petroleum gas piping.**

Add a new section as follows:

"303.9 *Liquefied Petroleum Gas Piping*. Liquefied petroleum gas piping shall not serve any gas appliance located in a pit or basement where heavier than air gas might collect to form a flammable mixture."

**19.09.304.6 Outdoor combustion air.**

Add the following sentence to the end of the paragraph:

"Combustion air shall not be obtained from the attic, unless prior written approval is obtained from the administrative authority."

**19.09.304.6.1 Outdoor combustion air; two-permanent-openings method.**

Change "4,000 Btu/h" to "5,000 Btu/h" and "2,000 Btu/h" to "2,500 Btu/h".

**19.09.304.11 Combustion air ducts.**

Delete the exception to Item 1 in its entirety.

**19.09.304.13 Specially engineered installations.**

Add a new subsection as follows:

"304.13.1 Cold Climate Alternate Requirements For Combustion and Ventilation Air.

*304.13.1.1 Purpose.* The purpose of this section is to provide alternate methods of designing combustion air and ventilation air systems for fuel burning appliances in cold climate regions.

Only persons registered to practice engineering in the applicable jurisdiction will be permitted to use these alternate design methods.

*304.13.1.2 Scope.* The requirements of this section apply to all fuel gas burning appliances.

*EXCEPTION:* Direct vent appliances, listed cooking appliances, appliances having separated combustion system, enclosed furnaces, refrigerators and domestic clothes dryers.

*304.13.1.3 Definitions.* Certain words and terms used in this section shall have meanings as listed. The below-listed definitions shall apply to this section only, even though they may differ with broader definitions found elsewhere in the code.

**COMBUSTION AIR** is that air required for stoichiometric combustion, plus excess air, plus flue dilution air.

**VENTILATION AIR** is that air required for cooling of the appliance enclosure to maintain temperatures required for proper equipment operation.

**FREE AREA** is the net actual open area of a louver, screen, duct, or intake grille.

*304.13.1.4 General*

*304.13.1.4.1 Air Supply.* Fuel-burning equipment shall be provided with a sufficient supply of combustion and ventilation air.

*304.13.1.4.1.1 Enclosures Containing Fuel Burning Appliances.* Enclosures shall be provided with minimum unobstructed combustion air openings as specified in Section 304.13.1.9 and arranged as specified in Sections 304.13.1.5 and 304.13.1.6 of this code and ventilation air systems shall be as specified in Section 304.13.1.10.

*304.13.1.4.1.2 Existing Buildings.* When fuel-burning appliances are installed in an existing building containing other fuel-burning equipment, the enclosure shall be provided with sufficient combustion and ventilation air for all fuel-burning equipment contained therein as specified in Sections 304.13.1.9 and 304.13.1.10.

*304.13.1.5 Combustion Air Openings.*

*304.13.1.5.1 Location.* The combustion air opening(s) may be located anywhere in the enclosure provided that there is an unobstructed area extended to the fire box that does not increase the total combustion air system static pressure requirements.

*304.13.1.5.2 Dampers Prohibited.* Combustion air openings shall not be installed so as to open into construction where fire dampers are required. Volume dampers shall not be installed in combustion air openings.

*Exception:* Motor operated dampers interlocked with appliance controls to open damper prior to firing appliance are permitted, if damper blade actuated end switches are provided to prevent appliance operation should dampers fail to open.

*304.13.1.5.3 Screening.* Combustion air openings shall be covered with corrosion-resistant screen of 1/2 inch (12.8 mm) mesh, except as provided in IFGC Section 304.13.1.7.3.

*Exception:* Combustion air openings serving a nonresidential portion of a building may be covered with a screen having openings larger than 1/2 inch (12.8 mm) but in no case larger than 1 inch (25.4 mm).

*304.13.1.6 Sources Of Combustion And Ventilation Air.*

*304.13.1.6.1 Air from Outside.* Combustion and ventilation air obtained from outside the building shall be supplied as follows:

1. Through permanent openings of the required area directly to the outside of the building through the floor, roof, or walls of the appliance enclosure; or
2. Through continuous ducts of the required cross-sectional area extending from the appliance enclosure to the outside of the building.

*304.13.1.6.2 Under-floor Supply.* Combustion and ventilation air openings may connect with under-floor areas conforming to the following requirements:

1. Under-floor spaces having unobstructed openings to the exterior which are sized to not exceed the maximum system static pressure requirements specified in Sections 304.13.1.9 and 304.13.1.10.
2. The height of the under-floor space shall comply with the requirements of the Building Code and be without obstruction to the free flow of air.

*304.13.1.6.3 Interior Spaces.* Large indoor areas may be used for combustion and/or ventilation air if sufficient infiltration or other outside air supply is available by nature of the building construction, system design, or building use.

*304.13.1.6.4 Prohibited Sources.* Openings and ducts shall not connect appliance enclosures with space in which the operation of a fan may adversely affect the flow of combustion air.

Combustion and ventilation air shall not be obtained from a hazardous location or from any area in which objectionable quantities of flammable vapor, lint or dust are given off. Combustion and ventilation air shall not be taken from a machinery room.

*304.13.1.7 Combustion And Ventilation Air Ducts.*

*304.13.1.7.1 General.* Combustion and ventilation air ducts shall:

1. Be of galvanized steel complying with Chapter 6 or equivalent corrosion-resistant material approved for this use.
2. Have a minimum cross-sectional dimension of 3 inches.
3. Serve a single appliance enclosure.

*304.13.1.7.2 Dampers.* Combustion air ducts shall not be installed so as to pass through construction where fire dampers are required, unless properly enclosed in a rated shaft.

Volume dampers shall not be installed in combustion air ducts.

*Exception:* Motor operated dampers interlocked with appliance controls to open damper prior to firing appliance are permitted, if damper blade actuated end switches are provided to prevent appliance operation should dampers fail to open.

*304.13.1.7.3 Screen.* Neither end of the ducts which terminate in an attic shall be screened.

*304.13.1.8 Special Conditions Created By Mechanical Exhausting Or Fireplaces.* Operation of exhaust fans, kitchen ventilation systems, clothes dryers or fireplaces shall be considered in determining combustion and ventilation air requirements to avoid unsatisfactory operation of installed fuel burning appliances.

*304.13.1.9 Area Of Combustion Air Openings.*

*304.13.1.9.1 General.* The free area of openings, ducts or plenums, screens and louvers supplying combustion air to enclosures containing fuel-burning appliances shall be as required:

The opening(s) shall communicate directly or by means of ducts with outdoors or to such spaces (crawl space) that freely communicate with outdoors and shall be sized in accordance with Table No. 304.13.1.1.

*304.13.1.10 Ventilation Air.*

*304.13.1.10.1 General.* In addition to the combustion air required, sufficient ventilation shall be supplied for proper operation of equipment. Ventilation system shall be designed to maintain positive or atmospheric pressures within the enclosure. If exhaust fans are provided, mechanical make-up air fan must be installed to make-up exhausted air. Natural or gravity make-up air is not allowed.

**TABLE NO. 304.13.1.1 COMBUSTION AIR SYSTEM DESIGN CRITERIA<sup>2</sup>**

Fuels	System Static Pressure Limits <sup>1</sup>			Combustion Air Requirements
	Atmospheric		Forced Draft	
	Draft Hoods	Barometric Dampers		All Types
<b>GAS</b> (Natural, Propane, Butane)	0.02" WG	0.02" WG	0.05" WG	24 CFM/100,000 BTUH
<b>LIQUID</b> (Light Oil, Heavy Oil)	0.02" WG	0.02" WG	0.05" WG	27.1 CFM/100,000 BTUH
<b>SOLID</b> (Coal, Coke)	0.02" WG	0.02" WG	0.05" WG	30.8 CFM/100,000 BTUH

*Note 1:* Static pressure values represent maximum static pressure losses across all components of the combustion air system including screens, louvers, ducts and fittings.

*Note 2:* For enclosures containing both atmospheric and forced draft appliances, the most restrictive design requirements shall apply.

**PER ASHRAE 1993 FUNDAMENTALS HANDBOOK**

CHAPTER 15 TABLE 11 (Pg. 15.10)

1 cu. ft. natural gas requires 9.6 cu. ft. air

Convert to CF/1000 Btu/h

$$\frac{9.6 \text{ cu. ft. air}}{\text{cu. ft. gas}} \times \frac{1 \text{ cu. ft. gas}}{1000 \text{ Btu/h}} = 9.6 \text{ cu. ft. air/1000 Btu/h}$$

(14.4 @ 50% excess)

\*Air at 2000 feet above sea level. Installations above this must derate appliance output 4%/1,000 feet.

EXAMPLE: Combustion Air Flow Rates (CFM) per 100,000 Btu/h input. Verify heating values and adjust CFM as required.

	<u>STOICHIOMETRIC</u> <u>0% EXCESS AIR</u>	<u>COMBUSTION</u> <u>@ 50% EXCESS AIR</u>
<b>Natural Gas</b> 1000 Btu/h/cu. ft.	16.0 CFM/100,000 Btu/h	24 CFM/100,000 Btu/h"

**19.09.304.14 Combustion, ventilation, and dilution air; LPG systems.**

Add a new section as follows:

*"304.14 LPG Systems.* Appliances using LPG shall have two combustion air openings. The lower opening shall be at floor level or below and shall be sloped down toward the exterior.

These systems shall be continuously ducted to outside the building.

Use of underfloor areas for supply of combustion air to LPG burning appliances is prohibited."

**19.09.305.9 Installation; aircraft servicing and storage areas.**

Add a new section as follows:

"305.9 Aircraft Servicing and Storage Areas. Overhead heaters installed in aircraft storage or servicing areas shall be at least 10 feet (3048 mm) above or away from the upper surface of wings or engine enclosures of the tallest aircraft which may be housed in the hangar."

**19.09.306.4 Appliances under floors.**

Add the following as the first sentence:

"Installation of appliances in underfloor crawlspaces is prohibited unless prior written approval is obtained from the administrative authority."

**19.09.403.10.1 Pipe joints.**

Add the following at the end of the paragraph:

"All joints in underground ferrous piping shall be welded when any of the following conditions apply:

1. The nominal pipe diameter is 2 1/2 inch or larger.
2. The pipe is installed under a driveway.
3. Medium pressure systems."

**19.09.403.10.2 Tubing joints.**

Add the following sentence at the end of the paragraph:

"All joints in underground copper shall be brazed with wrought copper fittings. No underground joints shall be permitted unless the underground length of run exceeds 60 feet (18.3 m). All pipe to tubing transitions shall be made above ground."

**19.09.403.10.4 Metallic fittings.**

In Item 2, delete the words "cast iron." and delete Item 5.

**19.09.404.4 Piping through foundation wall.**

Delete this section in its entirety and replace with the following:

"All building fuel gas piping entrances and exits shall be located above grade. Sleeve to have one half inch minimum annular space larger than the pipe the sleeve is protecting when penetrating a foundation wall."

**19.09.404.9 Minimum burial depth.**

Add the following sentence to the end of the paragraph:

"Plastic and copper gas piping shall have at least 18 inches of earth cover or other equivalent protection."

**19.09.404.17 Piping system installation; frost heave.**

Add a new subsection as follows:

"*404.17 Frost heave.* At all points where fuel gas piping enters or leaves the ground there shall be installed, above ground, a connection capable of absorbing relative motion due to frost heave action. Such connectors shall be of a type approved by the building official and installed in such a manner to absorb a 6-inch (152 mm) displacement in any direction. A wire braided kink-proof flexible connection with woven jacket and oil proof synthetic tube and cover and neoprene liner may be used. Supporting wire shall run the full length of hose. Hose-to-pipe connectors are to be of the removable metal compression type.

Temperature range shall be -40 degrees F (-40c) to +250 degrees F (121c). (Aeroquip #1503 medium-pressure single-wire braid hose equipped with non-swivel male pipe fittings is an example of a suitable connector.)"

**19.09.404.18 Piping system installation; flex connectors.**

Add a new subsection as follows:

"*404.18 Flex connectors.* Flex connectors listed for outdoor use may be used between meter and house main. No flex connector may pass through any wall, partition, panel or other barrier. Solid fittings shall be used on each end."

**19.09.404.19 Piping system installation; mobile homes.**

Add a new subsection as follows:

"404.19 *Mobile homes.* Pounds to inches water-column regulators serving mobile homes and connected to copper tubing shall be attached directly to the inlet connection on the exterior of the mobile home, and shall not be located under the mobile home. An approved gas valve shall be installed immediately preceding the regulator."

**19.09.406.4.1 Test pressure.**

Replace the minimum test pressure of 3 psig with 10 psig and add the following sentence at the end of the paragraph:

"Required pressure tests of 10 psig shall be performed with gauges of 1/10 pound incrementation or less."

**19.09.409.5 Equipment shutoff valve.**

Delete the exception.

**19.09.501.7 Connection to fireplace.**

Delete this section and replace with the following:

"Gas fired appliances shall not be connected to fireplace chimneys without prior approval of the Administrative Authority."

**19.09.501.8 Equipment not required to be vented.**

Delete Item 8.

**19.09.502.8 Vents; vent insulation.**

Add a new subsection as follows:

"502.8. *Vent insulation.* Unless a vent listed for exterior use in cold weather climates is installed, a venting system installed exterior to the building, outside the thermal envelope, shall be installed in an insulated (R-19 minimum) shaft. The portion of the vent system that is above the last roof and its projected plane need not be enclosed. The portion of the venting system passing through an attic

space need not be insulated or enclosed."

**19.09.502.9 Vents; ice damage.**

Add a new subsection as follows:

"502.9 *Ice damage.* Vent terminations that penetrate a metal roof with a pitch shall be protected by an ice dam or deflector of an approved type acceptable to the Administrative Authority."

**19.09.503.8 Venting system termination location.**

Change Item 3 to read:

"3. The vent terminal of a direct-vent appliance shall be as required in the manufacturer's installation instructions. If such instructions do not specify the minimum dimension to air openings into the building, then that dimension shall be not less than 24 inches."

Also, add a new Item 5 to read as follows:

"5. An anticipated snow depth of 12 inches shall be used when determining the manufacturer's minimum vent termination height. Measurements shall be made to the bottom of the vent outlet."

**19.09.503.10.2.1 Materials; general.**

Add the following at the end of the paragraph:

"Single wall material of noncombustible corrosion-resistant material capable of withstanding the flue gas temperatures produced by the appliance, such as in Tables 503.10.2.4 and 503.10.2.5 may be used to vent the following:

- A. Vent connector serving a single gas appliance connected to an individual vent system.
- B. Vent connector system serving two gas appliances connected to a common vent.
- C. Three or more gas appliances connected to a common vent system may have single wall vent connectors to the point of connection to the common vent connector.

D. An engineered system acceptable to the Administrative Authority."

**19.09.621 Unvented room heaters.**

Delete the entire section and add the following:

"621 Unvented Room Heaters. Unvented room heaters shall not be used."

**19.09.Appendix A (IFGS) Sizing and capacities of gas piping.**

IFGC Appendix A (IFGS) Sizing and capacities of gas piping is adopted.

**19.09.Appendix B (IFGS) Sizing of venting systems serving appliances equipped with draft hoods, category I appliances, and appliances listed for use with type B vents.**

IFGC Appendix B (IFGS) Sizing of venting systems serving appliances equipped with draft hoods, category I appliances, and appliances listed for use with type B vents is adopted.

**19.09.Appendix C (IFGS) Exit terminals of mechanical draft and direct-vent venting systems.**

IFGC Appendix C (IFGS) Exit Terminal of Mechanical Draft and Direct-Vent Venting Systems is hereby adopted.

**19.09.Appendix D (IFGS) Recommended procedure for safety inspection of an existing appliance installation.**

IFGC Appendix D (IFGS) Recommended procedure for safety inspection of an existing appliance installation is adopted.