

Amendment to Article VI of Chapter 27

GAS FITTING

Dec. 11, 1951

ORDINANCE NO. 705

AN ORDINANCE to amend and reordain ARTICLE VI of Chapter 27, and amendments thereto, of the Code of the City of Alexandria, Virginia, enacted as a whole July 2, 1940 and made effective August 5, 1940, which Article relates to Gas Fitting and which Chapter relates to Plumbing.

THE CITY COUNCIL OF ALEXANDRIA HEREBY ORDAINS:

1. That Article VI of Chapter 27, as amended, of the Code of the City of Alexandria, Virginia, enacted as a whole July 2, 1940, and made effective August 5, 1940, be and the same hereby is amended and reordained to read as follows:

**Sec. 50. Scope.**

This article shall govern and regulate gas fitting from the outlet of the meter up to and including all appliances and their appurtenances.

**Sec. 51. Definition of Gas Fitting.**

Gas fitting shall mean the work, beginning at the outlet of the meter, of putting together and installing piping systems, fixtures and appliances which are to contain gas, including attachments, appurtenances, and the maintenance, repair and alteration of said systems, fixtures, appliances, etc.

**Sec. 52. Qualifications for Master Gas Fitters.**

All master gas fitters are required to take the City of Alexandria Gas Fitters examination at the Plumbing Office in the City of Alexandria, City Hall Building, Alexandria, Va.

In the event the applicant successfully passes the master gas fitters examination, he shall obtain a master gas fitter's certificate, a City of Alexandria Contractor's License, and post a \$1,000 Bond of

performance. By conforming to the requirements set forth above, he will therefore be eligible to secure permits for the installation and maintenance of gas appliances.

The master gas fitter may furnish and install gas appliances where the said appliances are to be connected to hot and cold water lines in place.

In no instance shall a master gas fitter be permitted to insert tees or other fittings in water lines or run branches to locations where gas appliances are to be installed unless he has also passed the master plumber's examination and holds a master plumber's certificate.

Gas fitting work may be performed by a firm or corporation, provided an employee of the firm or corporation holds a license as a master gas fitter, and the work is performed under his supervision.

#### **Sec. 53. Work on the Facilities of the Gas Company.**

Only duly authorized representatives of the Gas Company shall install, repair, alter or open the gas main, service pipe or service extension, or set, remove or change the location of a gas meter, or do any work on a part of its gas distribution system up to and including the meter, except as specified in Sections 54 and 64.

#### **Sec. 54. Emergency Service Repairs.**

When work by a gas fitter discloses the need for repairs up to and including the meter due to gas leaking, the fitter may make necessary temporary repairs and must immediately notify the Gas Company.

#### **Sec. 55. Permits.**

Gas fitting may be done only in accordance with the conditions of the permit and no person shall install, alter, extend or repair any gas piping or appliances, or cause same to be done without obtaining a permit therefor, provided, however, that permits shall not be required for piping work due to relocation of meter, either inside or outside of the building, or any condition set forth in Section 56, minor repairs.

#### **Sec. 56. Minor Repairs.**

Adjustments to appliances, replacement of parts, and repairing of leaks, are considered minor repairs but such work shall be done by authorized persons and in accordance with the provisions of these rules and regulations.

#### **Sec. 57. Unsafe Conditions.**

Conditions deemed unsafe by the Plumbing Inspector shall, upon notice to the owner, or user, by the Plumbing Inspector, be placed in a safe condition or use be discontinued within the time limits specified in such notice. If such condition is not made safe within the time limit specified, it may be ordered removed from service by the Plumbing Inspector.

#### **Sec. 58. Meters.**

#### **Sec. 59. Location.**

All meters in a premises shall be located in the same room or space if practicable. The builder, owner or their representative and the Gas Company shall agree upon a meter location and shall post a card at the location, marked "Reserved for gas meter." Such notice shall reserve adequate floor and wall space so as to provide accessibility for installation, examination, reading or replacement.

#### **Sec. 60. Cellar Installations.**

Meters installed in cellars shall, wherever practicable, be placed on the front wall close to the point of service entry and kept at least four (4) feet above the cellar floor.

#### **Sec. 61. Outside Installations.**

Meters located outside of buildings shall be housed in an approved weatherproof cabinet, constructed of brick, masonry, concrete, sheet metal or other durable material. The cabinet shall be located at the building wall where the house riser piping passes into the building.

#### **Sec. 62. Prohibited Locations.**

Gas meters shall not be set under non-fireproof stairways; nor in rooms normally used for sleeping or bathing; nor in any location where the meter may be subjected to damage such as driveways, coal bins, elevator shafts, ash vaults, etc.; nor in underfloor areas, crawl spaces under houses, or in attics.

Meters shall not be located within a two foot radius above and to the side, nor in the space below measured two feet horizontally from the sides of any heat producing equipment, flue pipe, open flame, electric meter, meter box, socket, receptacle or any other arc producing device unless such electrical equipment is made explosion proof.

### **Sec. 63. Ventilation.**

Meter rooms or any space in which gas meters are set shall be provided with adequate ventilation.

### **Sec. 64. Disconnecting or Turning Off Meters.**

Any qualified person may disconnect the outlet of a meter from the house piping, or turn off the meter when necessary to do work on the piping system. After reconnecting same, all house lines must be turned on and purged in accordance with Section 65.

### **Sec. 65. Turning Gas On.**

The following procedure shall be observed when gas is turned on at any meter cock:

1. Before turning gas under pressure into any piping, the person in charge shall assure himself that there are no openings from which gas can escape.
2. A small burner, as close as possible to the meter shall then be turned on and the test dial of the meter observed to see that the meter will pass and register gas. If this does not occur, the meter is defective and the small burner should be closed, the gas turned off at the meter and the meter changed.
3. A proper meter being installed, the small burner is then closed and with the gas turned on at the meter the test dial (a small dial generally above the regular dials) carefully watched for five minutes to ascertain that no gas is passing through the meter. To ascertain any movement of the dial hand, it is customary to wet a small piece of paper and paste its edges directly over the center of the hand as soon as the gas is turned on.
4. If the test hand shows any movement all cocks, pilot burners, etc., supplied through the meter shall be examined to see that they are turned off and do not leak. If these are found tight it will indicate that there is a leak in the house piping. The meter cock shall then be turned off until the necessary repairs have been made, after which the above tests shall be repeated.
5. Before leaving the premises, all air must be blown from piping and appliances and all pilot burners, automatic appliances and all appliance burners lighted and properly adjusted. Purging is to be done by opening as many burners as necessary, until it is certain that no air remains in the piping. The burners should be lit one at a time as soon as the gas reaches them. When trying burner some distance from the point where the air has entered, they should be allowed to burn long enough to be sure that no pocket of air remains between the outlet tested and the supply.

### Sec. 66. Meter Capacity and Size.

Meters must have adequate capacity for the service to be rendered. The following table shows meter sizes, capacities and necessary space to be allowed for each size.

Size	Capacity Cu. ft./hour	Width	Working Space Height	Depth
5	200	18	27	12
10	400	22	32	14
20	600	23	34	15
30	875	24	36	16
60	1,500	36	40	26
150	3,400	48	60	34

### Sec. 67. House Piping and Connections.

### Sec. 68. Pipe Material.

Piping shall be of a minimum standard weight wrought iron, steel or equivalent except as specified in Sections 69, 70 and 71.

### Sec. 69. Non-Ferrous Tubing.

Copper or other approved non-ferrous tubing of minimum size of  $\frac{1}{2}$  of an inch may be used for connecting certain low-demand appliances requiring less than ten cubic feet per hour flow. Tubing shall be listed under "American Standards for Semi-rigid Appliance Tubing and Fittings."

### Sec. 70. Semi-Rigid Connectors.

Semi-rigid, non-ferrous connectors may be used only if exposed, not exceeding  $1\frac{1}{2}$ " O.D. and 6 feet in length, of types listed as "American Standard for Semi-rigid Appliance Tubing and Fittings."

### Sec. 71. Flexible Tubing Hose Connectors.

Appliances which are approved to be used as portable, or which require a vibration joint may be connected with flexible tubing, such as rubber hose or other tubing made of flexible organic material, approved by the American Standards Association. On such appliances the shut-off shall be in the solid connection of piping only, and not at the appliance end of the tubing, and the length shall not exceed 6 feet, unless especially approved by the Plumbing Inspector.

### **Sec. 72. Piping Size.**

Pipe sizes shall be planned for maximum gas flow anticipated (Section 73) according to the number and type of appliances to be used and to the length of piping required (Section 75).

### **Sec. 73. Maximum Flow.**

The maximum gas flow anticipated shall be taken as the sum of the rated capacities (Section 74) of individual appliances connected to the piping system, except that where a common system of piping supplies gas appliances in multiple occupancy dwellings, such as apartment houses, diversity of appliance use may be considered in computing the maximum anticipated flow; but such a computation shall be made by a competent engineer and have the approval of the Chief Inspector of Plumbing.

### **Sec. 74. Appliance Capacities.**

The gas flow of an appliance in cubic feet per hour shall be determined by dividing the manufacturer's BTU rating by the BTU per cu. ft. of the gas supplied. When the appliance to be installed or served does not bear a label showing the "BTU rating", this rating must be obtained from the manufacturer or distributor of the appliance. In case the manufacturer's BTU rating cannot be secured the following table may be used as a guide.

## TYPICAL APPLIANCE RATINGS

	B. T. U. per hour	Demand Cu. Ft./Hr.
<b>Appliances:</b>		
Domestic gas range (4 burner top).....	57,000	50
Domestic Circulating Water Heater.....	30,000	30
Domestic gas range (6 burner top).....	75,000	70
Hotel Range, per section.....	132,000	120
Domestic 30-gal. Automatic Storage Heater.....	30,000	30
Domestic 60-gal. Automatic Storage Heater.....	45,000	40
<b>Automatic Instantaneous Water Heaters:</b>		
Capacity 1½ gal. per minute.....	60,000	50
Capacity 2 gal. per minute.....	72,000	70
Capacity 2¼ gal. per minute.....	90,000	80
Capacity 3 gal. per minute.....	108,000	100
Capacity 4 gal. per minute.....	150,000	140
Capacity 6 gal. per minute.....	225,000	200
Capacity 8 gal. per minute.....	300,000	270
<b>Appliance:</b>		
Gas-fired Boiler, per horse power.....	48,000	40
Gas-fired House Heating Boiler—See BTU input rating on particular boiler.....	—	—
Domestic Hot Plate or Laundry Stove, per burner.....	12,600	10
Gas-steam Radiator, per section.....	1,980	2
Gas Log (according to size).....	12,000 to 27,000	10 to 20
Domestic Room-Heater—Radiant heater per single radiant.....	2,000	2
Per double radiant.....	4,000	4
Domestic Room Heater—Luminous flame, per tip.....	1,260	1

## Sec. 75. Minimum Pipe Diameters.

Minimum allowable diameters for various lengths of straight pipe (in lineal feet) and for different gas flows (in cubic feet per hour) shall conform with the following table:

MINIMUM DIAMETER OF PIPE IN INCHES  
(Flow in cu. ft. per hour)

Length of Pipe										
Ft.	1/2	3/4	1	1 1/4	1 1/2	2	3	4	6	8
15	76	172	345	750	1,220	2,480	6,500	13,880	38,700	79,000
30	52	120	241	535	850	1,780	4,700	9,700	27,370	55,850
45	43	99	199	435	700	1,475	3,900	7,900	23,350	45,600
60	38	86	173	380	610	1,290	3,450	6,800	19,330	39,500
75		77	155	345	545	1,120	3,000	6,000	17,310	35,300
90		70	141	310	490	1,000	2,700	5,500	15,800	32,250
105		65	131	285	450	920	2,450	5,100	14,620	29,850
120			120	270	420	860	2,300	4,800	13,680	27,920
150			109	242	380	780	2,090	4,350	12,240	25,000
180			100	225	350	720	1,950	4,000	11,160	22,800
210			92	205	320	660	1,780	3,700	10,330	21,100
240				190	300	620	1,680	3,490	9,600	19,740
270				178	285	580	1,580	3,250	9,000	18,610
300				170	270	545	1,490	3,000	8,500	17,660
450				140	226	450	1,230	2,500	7,000	14,420
600				119	192	390	1,030	2,130	6,000	12,480

(This table allows for pressure drop through fittings and is designed to limit the total pressure drop through a piping system to 0.3 inches of water pressure during periods of maximum gas flow.)

No ferrous piping smaller than 3/4" shall be installed except laterals which may be the size of the appliance connection. This shall not preclude the use of approved range connectors.

## Sec. 76. Extensions of Existing Systems.

Extension of existing piping shall conform to Section 75 and shall be connected only to a line adequate in size to carry the total resulting load.

### Sec. 77. Piping Installation.

Piping installed beyond the meter shall be connected to the outlet side of the meter connection provided by the Gas Company in conformity with the following requirements. In case the meter connection has not been installed by the Gas Company at time of completion of house piping installation, the piping shall run to within 18 inches of the proposed meter location, and may be connected by the Gas Company (not including multiple housing projects).

### Sec. 78. Fittings.

Malleable iron fittings, approved flexible sleeve type couplings, or ground joint unions shall be used in connecting iron or steel gas piping. Except for steel couplings, all malleable iron fittings shall have beaded edges for reinforcement. Tubing fittings shall be of the flared type listed under American Standards for Semi-rigid Gas Appliance Tubing and Fittings by the A.S.A., and may be used with the approval of the Chief Inspector of Plumbing. Running threads and lock nuts (longscrews), sweated and gasketed fittings (except as noted above) are prohibited. No ground joint unions, sleeve type couplings, or flared fittings shall be concealed.

### Sec. 79. Cocks and Valves.

When a multiple dwelling building is supplied through a single meter unit, each dwelling unit shall have an approved stopcock in its piping system. Cocks not located in the dwelling unit shall be identified by a durable tag.

Cocks which control the supply of gas to multiple dwelling units shall be of a ground key type, identified by a durable tag and shall be turned on only by the Gas Company or licensed fitter.

1. **Reverse Flow Valves:** When air or oxygen under pressure is used in connection with the gas supply, effective means shall be provided to prevent the air or oxygen from going back into the gas piping, and all such installations shall be registered with the Chief Inspector of Plumbing.
2. **Vacuum Shut-Off Valves:** A system supplying gas to equipment which withdraws gas by external force, shall be equipped with an approved low pressure cut off valve which will prevent forming a vacuum in the gas meters.

### Sec. 80. Grading.

Piping should grade back to meter. Where it is impossible to grade to meter the Plumbing Inspector may approve installation of

piping and fittings at low points, to provide for removal of condensate and foreign material. Such locations must be readily accessible.

#### Sec. 81. Risers.

The lower end of a vertical supply line shall be provided with a tee (or cross), looking down, with a short nipple and cap to act as a dust trap.

#### Sec. 82. Interconnections.

Any interconnection of piping systems which are supplied through separate service meters is prohibited.

#### Sec. 83. Underground Piping.

If a pipe is to be run from one building to another, it shall be placed underground except it may be run in an enclosure properly protected against accident, and the size shall be of the next size larger than that specified in Section 75 but in no case less than 1½ inches.

Screw fittings shall not be installed within 15 feet of the foundation wall in underground piping, or in filled ground on the outside of the building. Where a joint is required under such conditions the connections shall be made by an approved sleeve type coupling, or made by welding. The first fitting on solid ground adjacent to any filled area through which the pipe may pass shall be an approved sleeve type coupling or connected by welding.

#### Sec. 84. Concealed Piping.

Piping may be concealed between ceilings and floors where clearances are provided to avoid stresses from building settlement. It may be run between joists, between joists and hung ceilings, or over joists. When necessary to run over joists, such members shall not be notched for pipes, except within two feet of the end and not more than one and one-half inches in depth, unless properly reinforced according to the approval of the Building Inspector. Clearance of not less than ½ inch shall be provided above piping so installed, below flooring.

No tubing smaller than ⅜ inch size shall be concealed and such tubing shall be protected where notched at studs, from hazard of puncture by nails. No iron size pipe smaller than ½ inch size shall be used for concealed horizontal piping.

#### Sec. 85. Oil Burner Pilots.

Laterals supplying pilots for oil burning equipment shall not be less than ½ inch and shall not be exposed to extreme temperatures. The pilot connection shall be taken from a tee fitting and shall be run

### Sec. 86. Cutting, Threading and Joining.

The following table specifies the number of threads to be cut and the length of section to be threaded for each size of pipe, based on American Standard:

Nominal Size of pipe (In.)	Approximate length of threaded portion (In.)	Approximate No. of Threads to be cut	Effective Threads
$\frac{3}{8}$	9/16	10	7½
$\frac{1}{2}$	$\frac{3}{4}$	10	7½
$\frac{3}{4}$	$\frac{3}{4}$	10	8
1	$\frac{7}{8}$	10	8
1¼	1	11	8
1½	1	11	8½
2	1	11	9
2½	1½	12	9
3	1½	12	9½
4	1¾	13	10½

Pipe shall be threaded with clean-cut threads and all burrs or other obstructions shall be removed from the pipe.

Pipe with threads stripped, chipped or damaged or which has corroded threads shall not be used, or if the weld opens during the operation of cutting or threading, that portion of the pipe shall not be used.

When an approved jointing compound is used, it shall be applied sparingly and only to the male thread of the joint.

### Sec. 87. Outlets.

Outlets shall extend three inches through finished ceilings, floors and walls, and either the outlet fitting or the pipe shall be securely fastened.

Each outlet shall be securely closed gas-tight with a pipe lug or cap.

### Sec. 88. Support.

Piping shall not be laid to support any external weight or be subject to any strain and shall be supported in accordance with American Standards Association Recommended Practice for City Gas, a portion of which is included below.

## Maximum Spacings of Supports for Iron Pipe

3/8 or 1/2 inch pipe.....	6 feet
3/4 or 1 inch pipe.....	8 feet
1 1/4 inch or larger (horizontal).....	10 feet
1 1/4 inch or larger (vertical).....	Every floor level

### Sec. 89. Prohibited Location.

Piping shall not be located in chimneys, flues, elevator shafts, ash vaults, coal bins and the like where it may be subject to corrosive action, strain or damage.

### Sec. 90. Electrical Ground Wires.

Electrical wiring shall not be connected to gas piping. When so found, it shall be reported to the Plumbing Inspector's Office.

### Sec. 91. Tests.

Before any system or any extension of any system of gas piping is put in service, it shall be tested to insure that it is gas tight. Where any part of the system is to be enclosed or concealed, it shall be tested prior to closing in and also on completion after closing in. Concealed piping shall withstand a pressure of air exerted by a column of mercury 6 inches high in a mercury gauge for a period of 10 minutes or such period as the inspector shall deem necessary without showing any drop in pressure, and this fact must be attested by a certificate attached to the pipe showing the date of the test, signed by the Chief Plumbing Inspector or his authorized representative.

Piping systems in which the pressure to be used is greater than one lb. per sq. inch shall be tested 3 times the anticipated operating pressure.

In no case shall gas piping be filled with water, acid or other substances to test or close leaks.

### Sec. 92. Appliances.

### Sec. 93. Approval.

Appliances must be approved and listed by a nationally recognized organization with functions equivalent to the American Standards Association and/or the American Gas Association whenever minimum requirements for safety and performance have been established by them for that type of appliance. In the event that no such requirements have been established by such organizations, the approval of the Plumbing Inspector shall be secured before installation. Each

appliance must meet all the requirements set forth in the various sections of these regulations.

#### **Sec. 94. Design.**

Every appliance shall be so designed so that all operating parts, flue passages, etc. are readily accessible for servicing, repairs, cleaning, etc.

#### **Sec. 95. Locations.**

Every appliance shall be located so that it will be readily accessible for inspection, adjustment, operation, maintenance and where the facilities provide sufficient air for combustion and ventilation. The plans of new construction showing locations of water heaters or heating plants and provisions for ventilation and flue connections shall be approved by the Chief Plumbing Inspector prior to construction unless appliances are to be installed in a full, open basement.

#### **Sec. 96. Prohibited Locations.**

Gas appliances shall not be located so they discharge products of combustion into, or consume air from, rooms normally used for sleeping or bathing purposes. Where space used is changed to provide such room, gas appliances shall be removed before use change. Gas appliances shall not be installed in any room where paint, ether, gasoline, naphtha, benzine, or other inflammable liquids or materials are regularly used or stored, or in garages, unless approved by the Chief Plumbing Inspector; nor shall they be located so that their continued operation will raise the temperature of surrounding combustible walls more than 120° Fahrenheit from a normal room temperature or combustible floors more than 90°.

#### **Sec. 97. Attachments.**

No device or material shall be affixed to any appliance, or to any part of the piping system, which may in any way impair the combustion of the gas, or the adjustment of any appliance.

#### **Sec. 98. Appliance Regulators.**

A pressure regulator or governor requiring access to the atmosphere for successful operation, and having a capacity in excess of 10 cubic feet per hour, unless provided with a device which shuts off gas supply including vent breather, shall be equipped with a vent pipe leading to the outer air or into a combustion chamber, adjacent to a constantly burning pilot, or in the case of unit heaters to the flue pipe of the heater beyond the diverter. Means shall be employed to prevent water from entering this vent pipe, and also to prevent stoppage of it.

An approved gas pressure regulator of sufficient size shall be installed in the gas supply line to every boiler, furnace conversion burner, unit heater and refrigerator.

#### **Sec. 99. Shut-Off Valves.**

A lever or wheel type handle cock or valve shall be provided ahead of all controls (excluding pilot take-offs) on appliances utilizing a pressure regulator. The cock or valve shall be readily accessible and within reaching distance when lighting.

#### **Sec. 100. Electrical Controls.**

No device employing or depending upon an electrical current shall be used to control or ignite a gas supply unless the appliance served is provided with a means to automatically cut off the main burner gas supply, or otherwise prevent excessive temperatures or pressures in case of current failure.

#### **Sec. 101. Automatic Pilots.**

Except for industrial appliances burning less than 50,000 B.T.U. per hour, approved and registered with the Chief Plumbing Inspector, every fully automatic appliance shall be provided with a thermostatic pilot, which shall operate or cut off within five minutes, so that no gas shall pass the main burner unless the pilot is burning in a manner that will cause immediate ignition of the main burner under normal operating conditions. This device shall not depend upon closing of an electric circuit.

#### **Sec. 102. Adjustment.**

Appliances shall be adjusted by the installer in accordance with the manufacturer's instructions and the appliance rating. Air shutters shall be securely locked in position.

#### **Sec. 103. Appliance Relief Valves.**

Relief valves shall be required on all closed systems of water piping as follows:

1. **Pressure and Reseating Temperatures.** Whenever additional means of heating water is connected to any system, except when the supplemental device is an indirect heater connected entirely below the water line of a boiler operating at less than 15 pounds (in which case see 103-2).
2. **Pressure and Temperature** (not necessarily reseating). Non-automatic gas water heaters (without additional means of heating as in preceding paragraph). Temperature may be omitted if appliance is provided with approved temperature gas shut-off valve.

3. **Pressure Reducing and Pressure Relief Valves.** On "closed" central hot-water house heating systems.
4. **Pressure Relief Valves.** On automatic water heaters equipped with thermostats.

No valve shall be placed between the relief valve and its outlet or in any circulating line between the heating element and the relief valve.

#### **Sec. 104. Drains for Relief Valves.**

1. **For Gas Water Heaters.** Temperature and combination temperature and relief valves shall be provided with drain connections of pipe or tubing of approved material, not less than  $\frac{3}{8}$  inch diameter for a single valve,  $\frac{1}{2}$  inch for two manifolded valves,  $\frac{3}{4}$  inch for four and 1 inch for six such valves. When gas water heaters are used in conjunction with other means of heating water (except indirect heaters connected below water line of low pressure boilers) such drain connections shall, where possible, discharge over a trapped, vented and water supplied plumbing fixture, or over the surface of a drained areaway. If no such discharge is available, the drain shall discharge over and within 6 inches of the floor in a protected location. When gas heaters are not used in conjunction with other fuels or are connected to indirect heaters, below water line of low pressure boilers, the drain connection may discharge over and within 6 inches of the floor in any case.
2. **For House Heating Hot-Water Boilers.** The relief line from the pressure relief valve shall drain to a safe location in a manner approved by the Chief Plumbing Inspector. Where the relief line drains through an outside wall, this drain shall be into the open end (non-solid connection) of a nipple six inches long and elbow turned up on inside of the pipe extending through the wall. An elbow turned down shall be used on the outside end. Connection through wall shall be of  $\frac{3}{4}$ " or larger pipe and shall be so located that hot water or steam discharge will not be hazardous. Connection from boiler to wall shall be not smaller than relief discharge outlet.

#### **Sec. 105. Location of Relief Valves.**

Thermostatic elements of temperature operated valves shall be located in the tank within 6 inches of the top, or if the tank is covered with an insulating jacket, they shall be located in the hot water supply pipe within 4 inches of the outlet connection.

## Sec. 106. Water Heaters.

1. **Non-Automatic Water Heaters.** Non-automatic water heaters shall be provided with a door through which the burner and all of the heating surfaces may be exposed for lighting and cleaning. All water backed heating surfaces of manually operated heaters shall be of copper, brass, or an approved corrosion-resisting alloy. Manually operated water heaters shall be set so that the bottom of the burner is not less than two feet from the floor and the top shall not be less than 18 inches from the ceiling.
2. **Automatic Water Heaters.** Automatic instantaneous water heaters shall be installed only where sufficient water pressure is provided to properly operate the water valve when drawing water from a hot water faucet on the top floor, and then only when provided with water pressure regulator. Automatic storage water heaters shall not be directly connected to a water back or water section of a range, laundry stove, house heating furnace or a furnace coil but such connections shall be made through an auxiliary hot water storage tank.
3. **Conversion.** Non-automatic water heaters shall not be provided with pilots or otherwise changed to automatic operation, unless also made to comply with all requirements for automatically operated heaters.

## Sec. 107. Central Heating Equipment.

1. **Initial Tests.** Shall include check of all control operation under working conditions.
2. **Low-Water Cut-Offs and Gauges.** Every steam boiler using gas for fuel shall be equipped with an approved low-water fuel cut-off and a pressure gauge. Tees and crosses, rather than ells and tees, shall be used in connecting the low-water cut-off.
3. **Limiting Devices.** Every boiler, furnace and conversion burner using gas for fuel shall be equipped with an automatic safety device provided to limit either the steam pressure of steam boilers, the water temperature of hot water boilers or the air temperature of warm air furnaces. The operation of these devices shall not depend upon the closing of an electric circuit to cause the shutting off of the main gas supply valve.
4. **Warm Air Furnace Combustion Chambers.** Direct-fired warm air furnaces shall have combustion chambers and heat exchangers constructed of appropriate materials to withstand wear through corrosion over a period of years. Acceptable materials shall be cast

iron, stainless steel, heavy steel sheet of at least 16 U. S. gauge thickness or equally durable materials.

5. **Warm Air Return Grilles in Utility Rooms.** Air circulated in a warm air heating system shall not be drawn from the utility room or closet in which the furnace is located.
6. **Conversion.** Conversion burners shall be installed by agencies having adequate engineering facilities and subject to special permission by the Chief Inspector of Plumbing. Installation shall be made in accordance with standards established by the Chief Inspector of Plumbing. Conversion burners for space heating shall meet the following requirements:
  - a. All conversion burners shall be subject to approval by the Chief Plumbing Inspector.
  - b. Prior to submitting a burner for approval, the Chief Plumbing Inspector shall be furnished:
    - (1) Certificate of A. G. A. listing.
    - (2) Complete plans and specifications of the burner.
    - (3) Complete set of installation and operating instructions.
  - c. Conversion burners shall be completely factory prefabricated and assembled, except for governor and manual valves.
  - d. Conversion burners shall be factory equipped with fully organized means of aeration.
  - e. Ignition, combustion and control performance and adjustment shall provide maximum safety.
  - f. All component parts requiring servicing shall be easily accessible and replaceable.

#### **Sec. 108. Unit Heaters.**

1. Units hung from the ceiling shall be securely supported by piping over the ceiling joists.
2. Units bracketed from a side wall shall have the bracket bolts extend completely through the wall and be securely anchored.

#### **Sec. 109. Venting.**

#### **Sec. 110. Required.**

All fully automatic appliances, (ranges excluded), all manually operated water heaters and all heating appliances shall be connected with an approved diverter (112) and effective flue or outlet to the outer air, except for industrial appliances, automatic water heaters as pro-

vided in 111 and automatic refrigerators provided with a complete thermostatic cut-off rated at less than 7,500 B. T. U. per hour.

**Sec. 111. Commercial Water Heater.**

Where it is impracticable to make a flue connection in commercial and industrial establishments and when all of the following provisions are met, the Chief Plumbing Inspector may approve installation of an automatic water heater:

1. It shall otherwise conform to the Gas Code.
2. In no case shall the maximum flow exceed 10,000 B. T. U. per hour.
3. The maximum flow of gas shall be limited by fixed orifice to the value listed below, in relation to the net cubical contents of the space in which the heater is located.

**MAXIMUM PERMISSIBLE FLOW FOR UNVENTED  
COMMERCIAL AND INDUSTRIAL WATER HEATERS**

Net Cubical Contents of Room Space in Cubic Feet	Permissible Maximum Gas Flow in Cubic Feet per hour	
	**Column No. 1	*Column No. 2
1000 to 1250 .....	2	3
1250 to 1500 .....	2	3
1500 to 1750 .....	3	4
1750 to 2000 .....	3	4
2000 to 2250 .....	4	5
2250 to 2500 .....	4	5
2500 to 2750 .....	5	6
2750 to 3000 .....	5	6
3000 to 3250 .....	6	7
3250 to 3500 .....	6	7
3500 to 3750 .....	7	8
3750 to 4000 .....	7	8
4000 to over .....	8	8

\* Column No. 2 applies to spaces which have a permanent opening of at least 15 sq. ft. to another space of equal or greater cubical contents.

\*\* Column No. 1 applies to spaces which have no such permanent opening to another space.

### Sec. 112. Diverters.

1. Every flue connected appliance operating under natural draft, except an incinerator, shall be equipped with an approved and effective draft hood, either built in or attached, except that a commercial and industrial boiler or furnace may be equipped with a barometric damper in lieu of a draft hood by approval of the Chief Inspector of Plumbing.
2. Diverter shall be of approved design, proper size, and installed in manner for which approved. No elbow or other fitting shall be installed between appliance outlet and diverter.
3. Diverters shall be located higher than the top of the combustion chamber or of circulating flues acting as heat transfer surfaces.

### Sec. 113. Dampers.

1. No manually operated damper shall be permitted in any part of any gas appliance or in the appliance flue between the appliance and the chimney, or the outer air, unless interlocked so as to shut off gas supply to the appliance when the damper is closed.
2. Each automatic damper must be approved by the Chief Plumbing Inspector prior to installation.

### Sec. 114. Chimney Connection.

Wherever practicable, appliance flues shall be connected to an effective chimney flue to the outer air, leading to a point sufficiently high (minimum 2 feet) above any part of any structure within 30 feet to avoid backdraft. Where necessary, the Inspector may require an approved backdraft cowl, or ventilator or further extension of flue.

1. The installer of a gas appliance shall pay especial attention to the height of the chimney proper in relation to surrounding or adjacent construction in order to guard against the occurrence of, or tendency toward, a downdraft condition. Where such a downdraft tendency exists the gas appliance shall not be installed until effective means have been provided to create a proper updraft such as by extending the height of the chimney proper in an approved manner or by providing approved means to create a forced updraft.
2. Before making a flue connection, the chimney or flue shall be examined to ascertain that it is properly constructed, clear, and will normally conduct the products of combustion to the outer air. Flue connections shall be made at least 12 inches above bottom of chimney flue.

3. The flue pipe of a gas appliance shall enter the chimney at a point above the entrance of flues from appliances burning other fuels to within 1 inch of the chimney lining. No gas appliance flue shall be connected to the flue pipe of an appliance burning other fuel at any point between the appliance and the chimney proper.
4. Means must be taken to prevent appliance flue pipes from entering into the chimney flue beyond the lining thereof by providing a collar securely riveted to the appliance flue or by some other positive stop.

#### Sec. 115. Size.

1. The flue pipe or connection shall not be smaller than the size indicated by the flue collar of any appliance originally designed to burn gas.
2. Two or more gas appliance flue pipes may be connected together but the joint flue pipe shall have a cross-sectional area at least equal to the sum of areas of the several flue pipes.

#### Areas of Circles (to the closest sq. inch)

Diameter in inches	Area in sq. inches	Diameter in inches	Area in sq. inches	Diameter in inches	Area in sq. inches
3	7	7	38	11	95
4	12	8	50	12	113
5	19	9	63	13	132
6	28	10	78	14	153

#### Sec. 116. Pitch.

The flue pipe shall maintain a pitch or rise of not less than  $\frac{1}{4}$  inch per foot from the appliance to the chimney entrance.

#### Sec. 117. Length.

Total graded length of appliance flue pipe shall be as short as possible and shall in no case exceed fifty (50) diameters.

#### Sec. 118. Layout.

Appliance flue pipes shall be so installed as to avoid sharp turns or other constructional features which would create excessive resistance to the flow of gaseous products.

### **Sec. 119. Material.**

The material used for appliance flue pipes shall be such as can withstand the corrosive action of flue gases and condensate and shall be approved by the Chief Inspector of Plumbing. Horizontal or slightly graded masonry flues are prohibited.

### **Sec. 120. Protection.**

Flue pipe installed near combustible materials shall be properly insulated, as follows:

1. Whenever it is necessary to run flue pipe through an enclosed space (ordinarily the space between the ceiling and the under side of the roof or extending through the roof) the minimum requirements for such pipe or extension shall be type B flue as defined and listed by the National Board of Fire Underwriters, or:
  - (a) Copper flue (at least 16 oz.) or equivalent may be required by the Inspector.
  - (b) The flue shall be concentrically enclosed within galvanized iron flue pipe, at least 24 gauge (or equal) of 4" greater diameter.
  - (c) The annular space in between the copper flue and the galvanized flue shall be packed with insulating material equivalent to mineral wool or exploded mica pellets.
  - (d) Type B flue vent, if used, shall be installed with adequate clearance as required under the National Board of Fire Underwriters listing for that material.

### **Sec. 121. Support.**

The flue pipe shall be securely fastened and be well supported to prevent sagging and shall be installed so as to permit disconnecting the flue pipe immediately above the appliance in a simple and easy manner.

### **Sec. 122. Vertical Appliance Flues.**

Vertical flue pipes (not connecting with any masonry chimney), on the exterior wall, shall be amply supported, properly flashed, insulated where required, dripped at the bottom, and provided with special cowl or ventilator at top if required. Materials or construction not ordinarily required for appliance flues may be specified by the Chief Plumbing Inspector in view of exposure.

### **Sec. 123. Flue Pipes—Forced, Induced Draft—Ventilating Fan Action.**

For special condition listed above, the Chief Plumbing Inspector shall pass upon adequacy of design.

2. That this ordinance shall be published in a newspaper of general circulation in the city not later than two days following its introduction together with a notice containing the time and place for a public hearing. The clerk of the council shall note the date of introduction and first reading, the date of publication, the date of the public hearing, and the date of the second reading and final passage in the minutes of the meeting. This ordinance shall become effective the date of its final passage.

FRANKLIN P. BACKUS  
Mayor

Published—November 29, 1951

Final Passage: December 11, 1951

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