TITLE VII.

HEATING, AIR-CONDITIONING AND COMBUSTION UNITS

CHAPTERS:

CHAPTER 7-01

GENERAL PROVISIONS

SECTIONS:

7-0101. **DEFINITIONS**. The following words, terms and phrases, when used in this title, shall have the meanings ascribed to them in this section except where the context clearly indicates a different meaning:

1. "Person" includes any individual, firm, partnership, joint adventure, association, corporation, estate, receiver, or any other group or combination acting as a unit, and the plural as well as the singular number; their agents, employees and representatives.

2. "Building Inspector" means the Building Inspector of the City of Harwood and his authorized assistants.

3. "Heating and Air-Conditioning Plant" includes any heating or air-conditioning plant or system and the component parts thereof (except combustion units as defined in Paragraph 4 of this section) including but not limited to steam boilers, hot water boilers and warm air furnaces.

4. "Combustion Unit" includes any stoker, oil burner, oil burning equipment, gas burner, gas burning equipment, conversion burner, or incinerator and their component parts.

5. "Cooling System" is all of that equipment intended or installed for the purpose of cooling air by mechanical means and discharging such air through ducts into any room or space. This definition shall not include any evaporative cooler.

7-0102. **SCOPE OF TITLE**. This title shall govern the construction, installation, alteration, maintenance and repair of all heating and air-conditioning plants; chimney flues, combustion units, gas burners, gas burner equipment and appliances; and gasoline stoves installed in or for all buildings within the City of Harwood, North Dakota, as well as for any area within the extraterritorial zoning jurisdiction of the City, except that the owner-occupant of any single family dwelling may, with the assistance of members of his family and household, personally perform

any work governed by this title, but before doing the same shall obtain a permit therefor from the Building Inspector and pass inspection as hereinafter provided.

7-0103. **MINIMUM REQUIREMENTS**. The provisions of this title shall be held to be minimum requirements adopted for the protection of the health, welfare and safety of the community.

7-0104. **EMERGENCY REPAIRS**. In case of emergency, repair work may be proceeded without first obtaining the permit hereinafter required. Application for such permit shall be made within 24 hours after repairs are commenced, Sundays and holidays excepted. This Section shall not be construed to limit the right of Otter Tail Power Company and its authorized employees to render necessary services.

7-0105. **CERTIFICATE OF AUTHORITY REQUIRED**. Except as is otherwise provided in Section 7-0102 and Section 7-0104 of this title, no person shall engage in or carry on the construction, installation, alteration, maintenance and repair of heating and air-conditioning plants and combustion units and gas burners, gas burner equipment and appliances within the City of Harwood, or advertise, hold-out or otherwise represent himself as being qualified to perform such work without first securing and continuing in force a "Certificate of Authority" as hereinafter prescribed in this title.

7-0106. **STANDARDS ADOPTED**. The following standards are hereby adopted for all heating, air conditioning and other gas, oil, or coal consuming appliances within the City limits of Harwood, as well as for any area within the extraterritorial zoning jurisdiction of the City.

1. All heating, air conditioning, or other gas, oil, or coal consuming appliances for either domestic or commercial use installed in the City of Harwood shall bear a seal of approval from the American Gas Association, American Standards Association, Underwriters Laboratories, or other nationally recognized testing laboratory.

2. The provisions of the International Mechanical Code, sponsored by the International Conference of Building Officials, 2003 edition, as the same are now established in said code, is hereby adopted as the Mechanical Code. Any amendments to the 2003 edition of the International Mechanical Code may be adopted by the City by resolution.

3. The following standards of the National Fire Prevention Association are hereby adopted as part of this code:

    A. NFPA No. 31, 2003 edition, for the installation of oil burning equipment; and

    B. The provisions of the rules and regulations of the 2003 edition adopted in subsection A are those that are now established in said code. Any amendment to that code may be adopted by resolution by the City Council.

7-0107. **MODIFICATIONS OF INTERNATIONAL MECHANICAL CODE**. The International Mechanical Code as adopted in Section 7-0106(2) is hereby changed and amended to read as follows:

1. Chapter 1 - Administration, Part III-Permits and Inspections. Sections 115.2, 115.3 and 115.3.2 are hereby changed and amended to read as follows:

SECTION 115 - FEES 115.1 General. Fees shall be assessed in accordance with the provisions of this section or shall be as set forth in the fee schedule adopted by this jurisdiction.

115.2 Permit Fees. The fee for each permit shall be as set forth by resolution of the Harwood City Council.

115.3 Plan Review Fees. When a plan or other data are required to be submitted by Section 113.2, a plan review fee shall be paid at the time of submitting plans and specifications for review. The plan review fees for mechanical work shall be equal to 25 percent of the total permit fee as set forth in Section 115.2.

115.3.2 Incomplete or changed plans. When plans are incomplete or changed so as to require additional plan review, an additional plan review fee shall be charged at the rate shown in Section 115.2.

CHAPTER 7-02

HEATING AND AIR-CONDITIONING PLANTS

SECTIONS:

7-0201. **DEFINITIONS**. The following words, terms and phrases, when used in this title, shall have the meanings ascribed to them in this section except where the context clearly indicates a different meaning:

1. The term "Gravity Warm Air Heating System" means any and all warm air furnaces enclosed within a casing of any type and any and all appurtenances thereto or connections therewith, intended to heat any building or enclosure by gravity air circulation only, wherein no mechanical forces or equipment is applied.

2. The term "Forced Air Conditioning" means one or more air heating units within individual housings or within one common housing, one or more motor driven blowers, or fans, smoke or vent pipes, individual leader pipes or trunkline systems, or both, with necessary control dampers for supply and return air, automatic controls, registers, faces and grills; and with provisions for other appurtenances such as filters, air washers, ozonators, humidifiers, etc., as may be desired.

3. The term "Floor Furnace" means a self-contained floor furnace, suspended from the floor of the space being heated, with means for observing the flame and lighting the furnace from the space heated.

4. The term "Warm Air Ceiling Panel System" means a system of heating wherein warm air is circulated through a ceiling "panel" to provide heat.

5. The term "clearance" means the distance prescribed between heating equipment and parts thereof and any structural combustible construction.

7-0202. **PERMIT AND APPROVAL OF PLANS REQUIRED: WHEN**. It shall be unlawful for any person to construct or install any heating or air-conditioning plant in or for any building, or to alter or repair any such existing heating or air-conditioning plant without first

making written application to and securing a permit from the Building Inspector. Such application shall be accompanied by:

1. A plan or sketch in duplicate for such proposed construction, installation, alteration or repair, if required by the Building Inspector.

2. Where a permit is applied for the installation of any steam or hot water boiler, warm air furnace, or any device performing some specific service in connection with any heating or air-conditioning plant, the capacity of which device might affect, in whole or in part, the efficiency of the plant, the application shall be accompanied by test data, measurements, ratings, capacities, or such other information required by the Building Inspector from which the ratings or capacities of such boilers, furnaces or devices may be determined. The Building Inspector may require that such test data, measurements, ratings, or capacities shall be verified by affidavit of the manufacturer thereof or the contractor making such application. Where a rating cannot be secured from the manufacturer there shall be supplied the Input Boiler Rating.

3. The Building Inspector may waive the requirement of a permit where the alterations, or repairs to any existing heating or air-conditioning plant will not exceed $50.00, when such alteration or repair will not exceed the rated capacity of such, heating or air-conditioning plant and are not of such a nature as to render an inspection of the same desirable or necessary.

7-0203. **DUTIES AND POWERS OF THE BUILDING INSPECTOR**. It shall be the duty of the Building Inspector and he shall have the power:

1. To enforce the provisions of this title relating to heating and air-conditioning plants.

2. To make all necessary inspections of such plants.

3. To require all necessary tests to be made to determine the tightness of any steam or hot water installation or any air-conditioning plant, or any portion thereof, or any sheet metal ducts or pipes connected therewith, and to supervise such tests.

4. To require the immediate removal of any material or construction which conceals or covers up any newly installed portion of such plant prior to its inspection and approval by the Building Inspector.

5. To post a "Stop Work" notice on the premises where the work is in progress and to notify anyone concerned of such a notice when the work or project is being performed in violation of this title. After the posting of such notice no person shall do any further work on such project until the particular defect or violation has been eliminated to the satisfaction of the Building Inspector, when such notice shall be removed by the Building Inspector.

7-0204. **APPEALS**. A person may appeal orders, decisions, or determinations made by the building inspector relative to the application and interpretation of Title X of the ordinances of

the City of Harwood. This appeal shall be to the City Council of the City of Harwood. The appeal must be in writing and filed with the City Auditor within thirty (30) days of the order, decision or determination made by the building inspector.

7-0205. **DUTIES OF OWNER AND CONTRACTOR**. It shall be the duty of the owner of a building or the contractor employed by him:

1. To notify the Building Inspector immediately upon completion of those portions of a new building or any addition to an older building upon completion of those portions of a heating or air-conditioning plant which are thereafter to be concealed or covered up, that said plant is ready for inspection and testing. There shall be posted by the owner or contractor in a conspicuous position on some portion of the installation a notice substantially in the following form:

   "WARNING: This installation and piping have not been inspected and approved by the Building Inspector and must not be covered up or concealed until so inspected and approved."

   No other person than the Building Inspector shall remove such notice until the heating or air-conditioning plant has been inspected and approved by him. He shall then attach a certificate of such inspection and approval.

2. To notify the Building Inspector upon the completion of any installation of a heating or air-conditioning plant that the work is ready for inspection and tests by registering the number of the permit and the location of the work in an inspection order register book to be kept in the office of the Building Inspector for that purpose. Such tests shall be made by the contractor in the presence of and under the supervision of the Building Inspector. If found satisfactory and in compliance with the provisions of this title, the Building Inspector shall approve the same. Where approval is refused by the Building Inspector for any of the reasons set forth in this title, correction of such installations shall be made to meet such objections, and upon notice to the Building Inspector as above provided, he shall make a re-inspection thereof.

7-0206. **REPLACEMENTS, ALTERATIONS, ADDITIONS AND REPAIRS TO EXISTING HEATING AND AIR-CONDITIONING PLANTS**. The following regulations shall apply:

1. To replacements of existing equipment. Such replacements shall be of such capacity as would be required under this title if the same were installed for use in connection with a new plant or system, and designed to meet the heating or air-conditioning requirements for said building. Provided, however, that in a building other than a single family dwelling, where in the opinion of the Building Inspector, it would be impracticable or work an unnecessary hardship to require complete compliance with the foregoing requirements, a steam or hot water boiler, warm air furnace, fan, blower, air-conditioning equipment or appurtenance, based as to capacity on the connected load, may be installed to replace any existing equipment of like nature.

2. To alterations of existing equipment. Such alterations shall be made in conformity with the requirements of this title insofar as may be practicable in the judgment of the Building Inspector without impairing the efficient operation of the system, as a whole, or any portion thereof.

3. To additions to existing equipment. Wherever the heating or air-conditioning requirements of any existing building are hereafter increased either by the construction of an addition thereto or by an increase in the portions of the building to be heated or air-conditioned, or in any other manner, the capacity of such heating or air-conditioning plant shall be increased to that capacity which would be required by this title for a new installation, designed to meet equal heating or air-conditioning requirements.

4. To repairs of existing equipment. All such repairs shall be made in such manner as to restore the equipment as near as is practicable to its original sound condition. When repaired, such equipment shall be subjected to such tests as may be required, in the judgment of the Building Inspector to satisfactorily demonstrate its ability to meet the service requirements to which it may normally be subjected.

7-0207. **CLEARANCES**.

1. Installations. Heating equipment and parts thereof shall be so located that the clear space between any heated surface and combustible construction is sufficient to prevent temperatures of more than 160 degrees on such constructions. Unless specifically provided otherwise, the clearance generally shall be as shown in Table I, following:

TABLE I - CLEARANCE WITH NO PROTECTION

Heating Unit	Above (a)	Minimum Clearance in Inches		
		Sides and Front and Rear		Smoke or Vent Pipe
Mechanical Warm Air Furnaces (with fan) automatically fired, with 250 degree temp. limit control (b)				
Burning liquid or solid fuel	6"	6"	48"	18"
Burning gas	6"	6"	18"	9" (c)
Gravity Furnaces				
Burning liquid or solid fuel	18"	18"	48"	18"
Burning gas	18"	18"	18"	9" (c)

(a) The clearance above warm air furnaces shall be measured from the furnace bonnet or warm air plenum chamber.

(b) "Mechanical warm air furnaces with 250 degrees temp. limit control" shall be defined as automatically fired warm air furnaces equipped with a fan to circulate the air and with approved automatic temperature limit controls that cannot be set higher than 250 degrees and if coal stoker is fired, equipped also with an automatic overrun control to operate the fan when the air reaches a temperature not higher than 250 degrees even though the controlling thermostat is not calling for heat.

(c) These clearances do not apply to approved type B gas vents (approved vent piping of non-combustible, corrosion-resistant material of adequate strength and heat insulating value and having bell and spigot or other acceptable joints). These clearances may be reduced to 6 inches for approved gas appliances which produce flue gas temperatures not in excess of 350 degrees at the outlet of the draft hood when burning gas at the manufacturer's input rating.

2. Attic furnaces. Attic furnaces or furnaces in attics shall not be installed unless of a type approved for such use with installation in accordance with the mounting and clearance provisions of this section.

3. Clearances required with protection. Heating furnaces may be installed with clearance to woodwork or other combustible material, as provided in the National Building Code and adopted by the City of Harwood.

7-0208. **CONSENT REQUIRED: SOLICITING PROHIBITED**. All installations, alterations, repairs or inspections of heating and air-conditioning plants shall be made only by order or authorization of the owner or manager of any building. No person shall engage in house to house canvassing or soliciting for the sale or supplying of such services.

7-0209. **MODIFICATIONS**. Where circumstances or conditions of any particular installation are unusual and such as to render the strict application of this title impracticable, the Building Inspector may, if he deems it safe, permit such modification as will provide a substantially equivalent degree of safety.

CHAPTER 7-03

COMBUSTION UNITS

SECTIONS:

7-0301. **DEFINITIONS**. The following words, terms and phrases, when used in this title, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

1. The term "Stoker" means a mechanical device for feeding solid fuel into the combustion chamber of a boiler or furnace used in connection with a heating plant whether automatically or manually controlled.

2. "Oil Burner" shall mean any device designed to burn fuel oil having a flash point of 100 degrees Fahrenheit or higher, as determined by the Tag Closed Test in accordance with the method of test adopted by the American Society for Testing Materials (ASTM Designation D56-36), and having a fuel tank or container with a capacity of more than ten gallons connected thereto.

3. "Oil Burning Equipment" shall include oil burners and all tanks, piping, pumps, control devices and accessories, including blowers for the distribution of warmed air connected to the burners.

4. The term "Gas Burner" means a device for the final conveyance of the gas or a mixture of gas and air, to the combustion zone of a boiler, furnace, device or appliance used in connection with a heating system and shall include conversion burners and gas designed appliances as hereinafter defined.

5. The term "Gas Burner Equipment" shall include gas burners, as above defined, and all piping, shut-off valves, fans, blowers, control devices and accessories connected to the burners.

6. The term "Conversion Burner" means a gas burning appliance designed to supply gaseous fuel to and properly burn the same within the combustion chamber of a boiler, furnace or other device originally designed to burn another fuel.

7. The term "Gas Designed Appliance" means all gas burning space heating appliances designed for the exclusive use of gaseous fuels either natural or manufactured.

7-0302. **DUTIES AND POWERS OF BUILDING INSPECTOR**. It shall be the duty of the Building Inspector and he shall have the power:

1. To enforce the provisions of this title relating to combustion units as herein defined.

2. To make all necessary inspections of such units.

3. To require all necessary tests to be made to determine the safety, adequacy and efficiency of such units.

7-0303. **STOKER INSTALLATION**. The construction, arrangement, equipment and manner of installation of all stokers, hereafter installed for use in connection with heating plants in or for buildings in the City of Harwood and the alteration hereafter of all such stoker installations shall conform to the following provisions:

1. Non-automatic Stokers Not Allowed: Exceptions: When. Stokers which are not equipped with automatic means of preventing excessive pressure or temperatures of the heating medium shall not be installed or operated in any location where a competent attendant will not be constantly on duty on the premises while the stoker is in operation.

2. Automatic Controls. Each mechanical stoker shall be equipped with at least one (1) high limit control so connected as to shut off power from stoker drive in the event of excessive pressure in a steam boiler or excessive temperature in a hot water boiler or warm air furnace casing. Each steam boiler or hot water boiler shall be equipped with a low water cut-off.

   Where there may be an over-run of heat due to sustained period of operation for the stoker, a reverse action control or equivalent control shall be installed in hot water or steam systems so as to relieve this condition.

   On all installations where operation of stokers is controlled by an aquastat, pressurestat or furnacestat, a second control, either aquastat, pressurestat or furnacestat shall be installed in the 110 volt line ahead of all controls as a high limit or safety control.

3. Stoker Capacity, Setting Heights and Combustion Space. The capacity of a stoker for any given installation shall be in accordance with load carrying capacity set forth by the Stokers Manufacturing Association. In any event, the stoker installed shall have a capacity or feed rate not to exceed 50% greater than that required in said table of Stoker Manufacturers' Association.

   The distance from retort to crown sheet and the space for combustion, within any boiler or furnace, shall be such as to secure efficient smokeless combustion and shall be in accordance with the Table set forth by the Stokers Manufacturers' Association. Where stokers are installed in old boilers and strict compliance with

the foregoing requirements cannot be met, minor modifications may be made subject to the approval of the Building Inspector.

4. Alterations to Combustion Chambers. Where stokers are installed in downdraft boilers, the upper grates shall be removed and baffling changed where necessary to secure an unrestricted combustion space.

5. Used Stokers: Reconditioned. It shall be hereafter unlawful for any person to install any used stoker, or for the Building Inspector to issue any permit authorizing such installation until such person shall have first submitted, with his application for such permit to install, a copy of the purchase order stating that a used, repaired or reconditioned stoker is to be installed and bearing a statement by the installer that said stoker has been properly reconditioned and will comply in every way with the requirements of this title for new equipment as to operation and adjustment.

6. Approval Required: It shall be unlawful for any person to install within the City of Harwood any stoker not approved by the Stoker Manufacturers' Association.

7. Stoker Equipment Installation Permit Required. Any person may install an approved stoker and its associated equipment in accordance with the provisions of this title, but no stoker equipment shall be installed in the City of Harwood unless and until the Building Inspector shall have issued a permit for the specific installation.

8. Application. Application for the installation permit herein required shall be made in writing signed by the dealer or installer, stating the location of the property or building in which the installation is intended, the name, type and model of the stoker, type and model of controls, stoker capacity, setting heights and combustion space, accompanied by a sketch, if deemed necessary by the Building Inspector, showing the layout of controls for the purpose of installation.

9. Granting Permits. Within forty-eight (48) hours after filing of the application and sketch, the Building Inspector shall issue such a permit or in writing notify the applicant of changes required before a permit will be issued or the reason why the application is denied. Upon the required changes being made in the application or sketch, a permit shall be issued. No stoker equipment of a different kind than that specified in the application and no other changes shall be made, nor shall the installation be made in any other manner than as described in such application or shown in the sketch submitted therewith.

10. Inspection of Installations. All installations of stokers installed within the City of Harwood shall be inspected by the Building Inspector. An approval of installation shall be given the installer before any stoker is turned on for use. Installers of stokers shall give at least twenty-four (24) hours notice that a stoker installation is ready for inspection.

7-0304. **OIL BURNER INSTALLATION**. The construction, arrangement and manner of installation of all oil burners and oil burning equipment hereafter installed for use in connection

with heating plants in or for buildings in the City of Harwood and the alteration or repair hereafter of such, installations shall conform to the following provisions:

1. Exception. This title does not apply to oil heaters and oil lamps equipped with a wick or a mechanical device, the movement of which is essential to flame adjustment. or to such portable apparatus as blow torches, soldering pots, etc., but does include all types, classes and sizes of oil burning water heaters and space heaters, regardless of their oil container or tank capacity.

2. Approval Required. It shall be unlawful for any person to install within the City of Harwood any oil burner not approved by the Underwriters Laboratories or other nationally recognized testing laboratory.

3. Inspection. The Building Inspector shall automatically approve any oil burners listed by the Underwriters Laboratory or any other nationally recognized inspection board or laboratory. Oil burners not listed by the Underwriters Laboratory or any other nationally recognized board or laboratory shall not be approved.

4. Oil Heating Equipment: Installation Permit. Any qualified person may install approved oil burning equipment in connection with an approved oil burner in accordance with the provisions of this title, but no oil burning equipment shall be installed in the City of Harwood, unless and until the Building Inspector shall have issued a permit for the specific installation.

5. Definition of Permit. A permit is the written authority of the Building Inspector issued pursuant to this title for the installation of an oil burner and its associated equipment covered by this title or any material entering into the composition thereof.

6. Application for Installation Permit. Application for an installation permit shall be made in writing signed by the dealer or installer stating the location of the property in which the installation is intended, the name, type, and model of the burner, type and model of controls, the number and capacity of tanks for storage of fuel, accompanied by a sketch, if deemed necessary by the Building Inspector, showing the layout of the proposed installation.

7. Granting Permits. Within forty-eight (48) hours after filing of an application and sketch in accordance with this title, the Building Inspector shall issue such permit or in writing notify the applicant of changes required before a permit will be issued or the reasons why the application is denied. Upon the required changes being made in the application or sketch a permit shall be issued. No oil burner or equipment of a different kind than that specified in the application and no tanks of different sizes, kind or quality shall be installed nor shall the installation be made in any manner other than as described in such application or shown in the sketch submitted therewith.

8. Inspection of Installation. All installations of oil burners or equipment within the City of Harwood shall be inspected by the Building Inspector. An approval of

installation shall be given the installer before any oil burner is turned on for use. The installer shall give at least eight (8) hours notice that the installation is ready for inspection.

9. Installation of Used Oil Burners: Procedure to be Required. No person shall install a used oil burner for use in connection with a heating plant until he shall have furnished the Building Inspector with a statement that said oil burner has been put in first class operating condition and a letter from the purchaser acknowledging that said purchaser is buying a used oil burner.

10. Fuel Oil. The grade of fuel oil used with any oil burner shall be one which tests and experience have shown to be suitable for use with that burner. The oil shall have a flash point not less than 100 degrees Fahrenheit, determined as specified in paragraph 2 of Section 7-0701 of this chapter and shall be free from acid, grit and fibrous or other foreign matter likely to clog or inure the burner or valves.

11. Commercial Standard. The commercial standards (Grades 1, 2, 3, 5, and 6) for domestic and industrial fuel oil, set up by the U.S. Department of Commerce, Bureau of Standards Bulletin CS 12-4U (effective June 5, 1940) shall constitute standard grades for fuel oil sold or delivered to oil burners within the City of Harwood and it is hereby declared a violation of this title for any person to deliver for use as fuel in an oil burner or burners, or put into the storage tank of any oil burner or burners a grade of oil heavier than that which has been approved by the Building Inspector for use in such burner or burners.

12. Secondary Controls: Thermostats. All domestic types of oil burner installations in the City of Harwood shall be equipped with a modern type of thermostat for the secondary control of the oil burner.

13. Electrical Installations. Electrical installations used in connection with oil burning equipment shall be installed in accordance with the electrical code of the City of Harwood.

14. Combustion Chamber Dimensions. It shall be unlawful for any person to install any oil burner into a combustion chamber of a design, size or type other than that which has been specified by the manufacturer as being the correct design, size or type for the size of nozzle and angle of atomization, with which the oil burner being installed is so equipped.

15. Flue Gas Analysis Tests. Before any final approval shall be given by the Building Inspector on any installation of any type of oil burner covered by the provisions of this title, the person installing the same shall make a test or tests commonly known as a flue gas analysis in the presence of the inspecting officer if deemed necessary by the Building Inspector. The findings of such analysis shall be recorded upon the inspection approval form.

7-0305. **GAS BURNER INSTALLATION**.

1. Approval of Gas Burner.

   a. Permit Required. No apparatus or equipment to be used with gas supply from the general gas distribution system of the Northern States Power Company within the City of Harwood shall be installed or connected for use without a permit having been secured therefore from the Building Inspector.

   b. Certificate Required. No permits shall be issued by the Building Inspector for the installation or connection for use of any gas-fired apparatus or equipment (except domestic ranges, refrigerators, water heaters, or any gas equipment other than space heating equipment, having an input rating of less than 50,000 BTU per hour) supplied from the general gas distribution system of the Northern States Power Company located within the City of Harwood unless the application for said permit for such installation or connection is accompanied by a certificate from said company operating such system stating that it has the facilities and capacity to serve the equipment or apparatus at the location designed.

   c. Refusal of Gas Service - When. The Northern States Power Company shall refuse gas service to the premises wherein any gas-fired installation or connection is made contrary to the terms of this title, upon discovery of same, until the same has been remedied or disconnected and removed.

   d. Standards. All installations of mains, regulator stations, services and meter installations shall conform to the Gas Construction Standards on file in the office of the City Engineer of the City of Harwood. Such standards shall not be effective until approved by the City Council and any changes in such standards shall not be effective unless approved by the Building Inspector of the City of Harwood. However, regardless of such standards every high or medium pressure service shall have an outside shutoff valve and all low pressure services installed after January 1, 1962, shall have outside shutoff valves.

2. Appliances with Input of 400,000 BTU or Less.

   a. Scope. The construction arrangement, manner of installation, alteration and repair of all gas burners, gas burner equipment and appliances as herein defined having an input capacity of 400,000 BTU per hour or less shall conform to provisions of this title.

   b. Definitions. For the purpose of this Section the following definitions shall apply:

      (1) Gas Burners and Gas Burner Equipment. The term "gas burner" shall mean a device for the final conveyance of gas or a mixture of gas and air to the combustion zone of a steam or hot water boiler,

furnace, or to any device or appliance used in connection with a space heating system and shall include conversion burners, gas designed heating appliances, power gas burners and atmospheric gas burners. The term "gas burner equipment" shall include gas burners as above defined, together with all fans, blowers, control devices, accessories connected to the burners and piping involved in supplying the burner.

(2) Conversion Burner. The term "Conversion Burner" shall mean a gas burning device designed to supply gaseous fuel to and properly burn this fuel in the combustion space of equipment, originally designed to burn another fuel.

(3) Gas Designed Heating Appliance. The term "gas designed heating appliance" shall mean any space heating appliance designed for the exclusive use of gaseous fuel, excepting such auxiliary heaters ss gas logs, radiant heaters, etc.

(4) Power Gas Burner. A "power gas burner" is one which either gas or air or both are supplied at pressures exceeding, for gas, the normal line pressure at the burner and for air atmospheric pressure, the added pressure being applied at the burner.

(5) Atmospheric Burner. An "atmospheric burner" is a device (other than a gas range or a gas water heater) in which air at atmospheric pressure is injected into the burner by a jet of gas under pressure not more than the house line pressure and whose input exceeds 50,000 BTU per hour.

c. Approval of Gas Burners. It shall be unlawful for any person, firm, corporation, or agent to install any gas burner, as defined within this title until such gas burner has been approved by the Building Inspector of the City of Harwood. The Building Inspector may approve all gas burners meeting the minimum requirements for approval or listing by the American Standards Association, sponsored by the American Gas Association and in compliance with requirements of this code.

d. Installation of Used Gas Burners. It shall be unlawful to install any used gas burner and no permit shall be issued authorizing such installation until the licensed installer shall have first submitted with this application for permit a copy of the purchase order stating that a used burner is to be installed and bearing an acknowledgment by the purchaser that such is the case together with a statement by the licensed installer that said burner has been reconditioned and will comply in every way with ordinance requirements for new equipment as to operation, safety standards and adjustments. No used gas burner shall be installed unless it is of a type, make and model currently approved for installation in the City of Harwood.

e. Type of Gas. The requirements of this title shall apply to gas burners supplied with natural gas from the general distribution system within the City of Harwood. Burners and their installation where supplied with other types of gas, such as bottled or liquified petroleum gas, shall conform to the requirements of this title where applicable together with the requirements of the American Gas Association and the National Board of Fire Underwriters pertaining to the type of gas to be used.

f. Ventilation. Gas burners and gas burning appliances as hereinbefore defined shall not be installed for operation in a room where the normal facilities for ventilation do not permit proper combustion of the gas, unless special provision is made for supplying sufficient air for complete combustion.

Gas burners, gas burner appliances and space heaters will not be permitted in bedrooms, rooms used for sleeping purposes, bathrooms or any confined space or area unless proper provisions are made for the supply of primary and secondary air for combustion from outside of the building. Provisions shall also be made for proper venting to the outside.

Method of securing air for combustion and the proper venting of the appliances shall be secured from the Building Inspector before work is started on any specific installation.

g. General. The installation of conversion burners shall be made in conformance with the American Standards Association requirements as sponsored by the American Gas Association and with requirements herein set forth.

h. Preparation of Boilers and Furnaces. Before a gas burner is installed in any existing boiler or furnace, all flues, fire pots, combustion chambers and connecting joints through which flue gases are conducted shall be thoroughly cleaned, examined for leaks and draft conditions and made gas tight as shown by a smoke bomb test or its equivalent.

i. Flues and Flue Pipes. The chimney flue and flue pipe shall be examined and reconditioned if necessary so that they will freely conduct the flue gases to the outer air. Where flue pipes are rusted or burned out, they shall be replaced by new pipe.

j. Removal of Oil Burners. Where a gas burner is installed and an oil burner removed, it shall be mandatory that the vent and fill pipes to the storage tank be removed and all openings to the storage tank plugged.

k. Draft Hoods. Each gas burning appliance shall be equipped with a draft hood or its equivalent designed to:

(1) Insure the ready escape of the products of combustion in the event of no draft, back draft, or stoppage beyond the appliance.

(2) Prevent a back draft from entering the appliance.

(3) Neutralize the effect of stack action of the flue upon the operation of the appliance.

The draft hood shall be placed in and made a part of the flue pipe from the appliance or shall be in the appliance itself. Such device shall have a free area equal to or greater than the cross-sectional area of the flue pipe connected thereto subject to the approval of the Building Inspector.

The draft hood shall be located at a point not lower than the top of the highest flue passage in the appliance.

Appliances of the revertible flue type shall have the draft hood located at least one foot higher than the top of the highest flue passage. Proper provision shall be made, subject to the approval of the Building Inspector, to prevent the accumulation of gas in any part thereof. Revertible flue type furnaces shall have as a minimum a two (2) inch bleeder cut through if trapped more than twelve (12) inches.

l. Flue Pipes. The internal cross-sectional area of the flue pipe between the appliance and the chimney liner shall be such as to provide not less than one square inch of flue area per 7,500 hourly BTU input. In no case shall this flue pipe be less than five (5) inches in diameter for central heating gas appliances nor less than four (4) inches in diameter for space heating appliances and it shall not be larger than the next integral inch diameter above the sizes given in the following table:

Minimum Permissible Flue Sizes
For Gas Burner Installations

Input Rating BTU per hour	Area of Flue Outlet Sq. inch	Diameter Flue Pipe Inches
95,500	12.6	4
147,000	19.6	5
212,250	28.3	6
288,750	38.5	7
377,250	50.3	8
477,000	63.6	9

Based on 1 sq. in. flue area per 7,500 BTU per hour input.

NOTE: If flue pipe exceeds 10 feet in length or contains more than two elbows, use next size larger pipe and draft hood.

In cases where the outlet from the appliance is larger than the above indicated size, an orifice plate may be inserted, or a section of the flue pipe restricted to the size indicated between the appliance outlet and the draft diverter. In special cases with high chimneys or flues, the above schedule of areas may be modified subject to specific approval of the Building Inspector.

The draft hood should ordinarily be located adjacent to the appliance. In cases where it appears desirable to place the draft hood at a distance from the appliance, the size of the restricted section may be modified according to the length and rise of the flue pipe.

The proportioned section at the flue outlet of the appliance eliminates the necessity of using an adjustable damper in the flue pipe and such damper will not be permitted.

Where dampers are an integral part of the boiler or furnace, they shall be removed or permanently secured in the wide open position, except such dampers the function of which is to alter the passage of the flue gases through the appliance, which shall be locked in such a position as not to interfere with the normal operation of the burners.

m. Construction of Flue Pipes. Material used for flue pipe shall be such as to resist the corrosive action of flue gases.

Flue pipe of existing systems shall be relocated where necessary and new flue pipe installations shall be so made as to avoid sharp turns or other constructional features which could create excessive resistance to the flow of flue gases. Flue pipe shall slope upward to chimney.

Flue pipe shall be tightly connected to the chimney liner, so as to prevent infiltration of cold air.

No baffles shall be applied which will interfere with the proper combustion of gas.

Flue pipe shall be well supported to prevent sagging and shall not be installed closer than six (6) inches to any combustible building materials unless flue pipe is covered with incombustible insulation such that the surface temperature of the exterior surface thereof attain a temperature of not higher than one hundred twenty-five (125) degrees Fahrenheit when the appliance is under continuous operation.

All space heating equipment shall be of the vented type and properly vented to an effective flue. Heaters of a sealed unit type vented through a wall to the atmosphere will be accepted if approved by the American Gas Association.

n. Radiant Heaters. Radiant Heaters or other unvented heaters of less than 25,000 BTU input may be installed in fireplaces providing the chimney has a positive draft with the damper closed.

o. Gas Burners. Gas burners of all types shall consist of assembled and tested units and shall be accompanied by complete and comprehensive installation and operation instructions. The burner or burners shall be located according to the manufacturers' instruction and shall be so secured that they will not twist, slide or drop out of position.

p. Installation of Gas Burners. The burners shall be so installed as to be readily accessible for cleaning and inspection. The burner or burners shall be so installed that no part of the flames impinge on the heating surface so as to cause incomplete combustion.

Air shutters shall be adjusted to produce a proper flame at the prevailing gas pressure.

On all installations where the combustion air pressure can exceed the house line pressure, an approved check valve or other approved device shall be installed in the gas supply line to prevent air from backing into the gas line.

q. Air Intake. Where secondary air is necessary, secondary air opening or openings shall be provided of sufficient area to supply an adequate amount of air for complete combustion under the specified draft conditions and at the maximum rate of firing.

Where an automatic secondary air control is provided, the construction shall be such that in case the control fails in any way, either the gas will be shut off or the secondary air door will remain open.

The air intake of power burners shall be so located as to prevent the possibility of accidental closure. The gas and air supply shall be equipped with controls coordinated to prevent opening of the gas supply until the air supply is adequate for proper combustion and to shut off the gas supply in the event of failure of the air supply.

r. Pilots. Each gas burner shall be equipped with a safety device arranged to prevent the flow of gas through the main burner unless the pilot flame is burning, to consist of a thermostatic pilot or other approved type of safety device. The operation of this device shall not depend upon the closing of an electric circuit to shut off the main gas supply. Gas burners installed under Section 2n are exempt from this provision.

Pilot burners shall be rigidly supported in such a manner that their position relative to the main burner or burners will be fixed.

Pilot burner or burners shall be so placed that they can be safely lighted and they shall be readily accessible or removable for cleaning.

The gas supply line to the pilot or pilots shall be connected to vertical main gas supply lines or to the side or top of horizontal lines ahead of the main burner governor and appliance shut-off valve and shall be provided with a separate cock. Provided, however, that where complete shut-off type automatic pilot is provided with approved flow interrupter, the pilot line shall be connected to this control and such control shall be located ahead of the main burner governor and after the appliance shut-off valve.

Room heaters, floor furnaces and recessed wall heaters shall be equipped with complete shut-off type of automatic pilot.

Thermostatic safety pilots shall be so adjusted that main gas supply will be shut off within three minutes after pilot flame has been extinguished under continuous operating conditions.

Copper or iron tubing shall not be used for supply piping within the burner heat zone to pilot burners.

s. Main Shut-off Valve or Cock. A manually operated approved shut-off valve or cock shall be installed at each appliance to shut off the entire gas supply to appliance.

Such valve or cock shall be so located that it is readily accessible at about five (5) feet above the floor and shall clearly indicate the "on" and "off" positions, or direction of rotation to open or close. Where a cock is provided, the opening handle shall be securely attached to the plug in such manner that it may not be readily removed.

t. Automatic Control. Electric control valves shall be installed according to the instructions furnished by the manufacturer. All heating equipment shall be automatically controlled by thermostat except heaters installed in fireplaces as provided in Paragraph 2n.

u. Electric Wiring. All electrical connections shall be made in accordance with the provisions of all Building and Electrical codes relating to the installation of electric wiring in 2v.

v. Gas Pressure Regulators. An approved gas pressure regulator shall be installed on the downstream side of the pilot supply on all gas burners and a pressure regulator and pilot filter shall be installed in all pilot lines, downstream from the pilot shut-off cock, on all burners. Pressure regulators and pilot filters shall be of a type listed for approval by the American Gas Association and shall be approved by the Building Inspector.

w. Limiting Devices. The boiler or furnace shall be equipped with safety devices arranged to limit high steam pressures or water temperatures, as well as high air temperature in warm air furnaces and all such devices shall be subject to the approval of the Building Inspector.

Each gas fired steam boiler shall be equipped with a low-water cut-off approved by the Building Inspector.

Safety devices operated electrically shall not depend upon the closing of a circuit to shut off the main gas supply. This requirement shall not be construed as prohibiting the use of electrical regulating devices, providing the required safety devices are also installed. Controls shall be so connected that maximum inherent safety provided by such controls will be attained.

Safety shut off valves, if used, shall be tested to assure gas tightness of the seal when in the closed position; the valve assembly shall be gas tight in all positions. Packing glands shall be designed so that the valve will not be made inoperative by excessive tightening of the packing nut.

Either the valve shall incorporate means for requiring a manual operation for reopening of the valve after it has closed or the electrical circuit shall be so arranged as to require a manual operation to reopen the valve after it has been closed. In no case shall valves be able to be opened manually until safety pilots are lighted and circuit completed or low-water cut-off circuit has been completed.

x. Piping. Gas piping installed for serving conversion burners or gas designed heater appliances shall be sized for a total pressure drop not exceeding 0.3 inches water gauge from the meter to the burner for the total connected load. A separate pipe from the meter is to be preferred and in no case shall the service pipe be smaller than the size of equipment connection. All gas piping shall be installed in conformance with the provisions of this title and in conformance with American Standard Association's requirements.

y. Chimney Liners. Except as exempted in this section and except on approved incinerators as designated in this title, masonry chimneys serving gas fired boilers, furnaces or heating devices, whether of the gas designed type or fired by gas conversion burners, shall be lined continuously from the thimble to the top with an approved incombustible, acid and corrosion resisting liner of the same equivalent internal cross-sectional area as the flue pipe or pipes extending from the appliance or other appliances to the chimney liner. A condensation pocket shall be provided at the base of said liner with provisions for a drip, so arranged that excessive condensation of flue products may be disposed of without damage to chimney, foundation, floor or footings. Such liners shall be constructed of material having a thickness before coating of not less than No. 22 U.S. Standard Gauge. Where such liners are constructed of uncoated materials and inherent characteristics of which show a high degree of resistance to acids and

corrosion, a lighter gauge may be used, subject to the approval of the Building Inspector. If the masonry chimney is of Type A Underwriter's construction and is provided with a glazed tile flue liner or a vitrified bell type flue liner installed with bells upward, set in acid and moisture resistant mortar, of ample size for the load but not less than 8" equivalent diameter, the above flue liner may be omitted. In the event the chimney flue serving the conversion fired or gas designed appliance also serves one or more appliances other than gas fired, the above provided liner may be omitted. On larger installations where burners are in more or less continuous operation and stack temperatures are sufficiently high to minimize the possibility of condensation within the chimney, the chimney liner may be omitted, subject to the approval of the Building Inspector.

z. Adequacy of Draft. In the event conditions at the time of installation are such that the chimney or vertical flue has insufficient natural draft to properly carry away the products of combustion or is subject to down drafts, provision shall be made by the installer to rectify existing conditions, or provide mechanical means of maintaining constant updraft during appliance operation.

aa. Adjustment of Burners. After the piping has been thoroughly purged, the pilot burner shall be lighted and adjusted and the burners put into operation in accordance with the manufacturer's instructions.

ab. Pilot Operation. Pilot flames shall effectively ignite the gas at the main burner or burners and shall be adequately protected from drafts. A device which under normal chimney draft conditions is at least equal in performance to the draft hood hereinbefore provided for, shall be interpreted as fulfilling the second part of this requirement as far as chimney drafts are concerned.

Pilot flames shall not become extinguished when the main burner or burners are turned on or off in a normal manner, either manually or by automatic controls.

Luminous flame pilots shall not show carbon deposits when adjusted according to the manufacturer's instructions.

Where escapement pilots are used, their flames shall be freely ignited by the constant burning pilot.

ac. Burner Operation. The flames from each burner shall freely ignite the gas from adjacent burners when operating at the normal gas pressure or when the main control valve is regulated to deliver about one-third (1/3) the full gas rate, except where additional pilots are provided. If the additional pilot is a runner type pilot, this pilot must be proven by a safety mechanism before the main burner valve can open.

Burner flames shall not flash back upon immediate ignition, nor upon turning the gas cock until the gas rate to the burner is about one-third (1/3) the full supply.

Burner flames shall not flash back when the gas is turned on or off by any automatic control mechanism.

Main burner flames shall ignite freely from each constant burning pilot when the main control valve is regulated to deliver about one-third (1/3) the full gas rate and when pilot flame is reduced to minimum point at which it will actuate the safety thermostatic device. The holding port of multiple port pilots must satisfactorily ignite the main burner if the ignition port, or ports, are stopped.

Burners shall be of such design that ignition from pilot or pilots shall carry to all ports or burner heads protected by the pilot at inputs from one-third (1/3) to maximum rating.

When ignition is made in a normal manner, the flames shall not flash outside appliance. Burners shall not expel gas through air openings in mixer faces when operating at the normal burner pressure.

Note: In making the test under Part ac., care shall be exercised to prevent the accumulation of unburned gas in the appliance or flues which might result in explosion or fire.

ad. Appliance Performances. The flue gas temperature as taken on the appliance side of the draft hood shall not exceed 480 degrees Fahrenheit above that of the air temperature surrounding the appliance. The concentration of CO2 shall not exceed 9%, the concentration of CO shall not exceed .04%, the concentration of oxygen shall be not less than 4% nor more than 10%.

Method of Test: Gas Designed Equipment - The rate of flow of the gas shall be adjusted to within plus or minus two (2) percent of the required hourly BTU input rating at the manifold pressure specified by the manufacturer. When the prevailing pressure is less than the manifold pressure specified, the gas rate shall be adjusted at the prevailing pressure. The appliance shall be allowed to operate until the stack temperature becomes stabilized, after which a sample of the flue products shall be taken at a point in the flue after the outlet of the appliance but ahead of the draft hood, and analyzed for carbon dioxide, carbon monoxide and oxygen.

Method of Test: Conversion Burners - The rate of flow of gas shall be adjusted to within plus 5% or minus 15% of 1.7 times the calculated hourly BTU heat loss of the building in which it is installed. The appliance shall be allowed to operate until the stack temperature becomes stabilized, after which a sample of the flue products shall be taken at a point in the flue after

the outlet of the appliance but ahead of the draft hood, and analyzed for carbon dioxide, carbon monoxide and oxygen.

The various controls of the appliance shall be checked by the installer to insure their proper operation.

Upon completion of the test of any newly installed gas burning equipment as hereinafter provided in Section 2-ad and its subsections, the installer shall file with the Building Inspector, in duplicate, complete records of such test, if deemed necessary by the Building Inspector.

ae. Instructions to the Owner and/or Occupant. The owner and/or occupant shall be thoroughly instructed by the installer as to the proper and safe operation of the appliance before it is placed in service, such instructions to include actual demonstration to the customer or his authorized agent of the processes of lighting and turning off the gas burner. A printed set of instructions, enclosed in an envelope labeled "Instructions to Customer" shall be securely attached to the gas valve.

A metallic plate, suitably etched or stamped, setting forth detailed instructions for the safe lighting and shutting off of the appliance, shall be permanently attached to the appliance in a prominent position near the lighting apertures. The size of type used shall be not smaller than ten (10) point and the wording contained thereon shall be subject to the approval of the Building Inspector. This plate shall also state make and model numbers of the burner and show the rate hourly gas BTU input.

3. Technical Regulations for Gas Burner Installation Exceeding 400,000 BTU.

a. Scone. The construction, arrangement, manner of installation, alteration and repair of all gas burners for steam and hot water boilers, furnaces, industrial power and process uses shall conform to this title. The requirements for installation of gas burning equipment in power boilers as adopted by the American Standards Association, sponsored by the American Gas Association, shall be considered herein as minimum requirements.

Before approval for installation is granted for initial installation, after adoption of this title, plans and specifications and/or official literature and data, including piping arrangements, type and model of controls, capacities of equipment, and wiring diagram shall be submitted to the Building Inspector for preliminary approval. Upon receiving preliminary approval, the installation shall then be made accordingly, and final approval shall not be granted until the equipment has been tested in the presence of the Building Inspector. Such tests shall consist of orsat testing, within acceptable limits where applicable, pressure regulation, stack temperature, control operation, pilot turn down, flame lockout and such other tests as may be deemed necessary by the Building Inspector.

b. Definitions. For the purpose of this section, the following definitions shall apply:

(1) Gas Burners and Gas Burning Equipment: the term "gas burner" shall mean a device for the final utilization of gas, or a mixture of gas and air in any steam hot water boiler, furnace, air heater and devices and appliances for power industrial, space heating and process used in connection with a heating system or commercial and industrial applications, and shall include conversion burners, gas designed equipment, power burners, atmospheric burners, dual fuel burners and process and industrial equipment and shall include all auxiliary and equipment accessories including flue pipe control devices, electric wiring diagrams, piping diagrams, gas controls, safety controls, and accessories in connection with the equipment and all piping supplying said equipment with gas, air or mixtures thereof.

(2) Conversion Burner: The term "conversion" burner" shall mean a gas burning device designed to supply gaseous fuel to and properly burn this fuel in the combustion space of equipment originally designed to burn another fuel.

(3) Power Gas Burner: A power gas burner is one in which either gas or air or both are supplied at pressures exceeding, for gas, the normal line pressure at the burner and for air, atmospheric pressure; the added pressure being applied at the burner.

(4) Atmospheric Burner: An atmospheric burner is defined as a device in which the air at atmospheric pressure is induced into the burner by a jet of gas under pressure not more than the house line pressure.

(5) Dual Fuel Burner: A dual fuel burner is defined as a burner designed to burn either gas or oil but not both simultaneously.

(6) Gas Designed Equipment: Gas designed equipment is defined as equipment designed as an integral unit for burning gas only as fuel.

(7) Process and Industrial Equipment: Process and industrial equipment is defined as all gas burning equipment burning gas or a mixture of gas and air for industrial process applications.

(8) Gas Pressure: For the purposes of this title, gas supply pressure shall be classified as follows:

Low Pressure - up to and including 14" W.C. Medium Pressure - from 14" W.C. to & including
25 P.S.I. gauge
High Pressure - over 25 P.S.I. gauge

c. General Regulations.

(1) All burners for space heating applications shall be accompanied by complete and comprehensive operating instructions and wiring diagrams.

(2) Where burners are equipped with secondary air shutters or louvres, they must be designed or counter-balanced so as to drop to a wide open position in the event of failure or breakage of connecting linkage. They shall also be of sufficient area to supply adequate air for complete combustion under specified draft conditions and at maximum rate of firing.

(3) The burner or burners shall be located according to the manufacturer's instructions and shall be so secured that they will not slide, twist or drop out of position.

(4) The burner or burners shall be so installed as to be readily accessible for cleaning and inspection.

(5) The burner or burners shall be so installed that no part of flame shall impinge on heating surface so as to cause incomplete combustion.

(6) On all installations where the combustion air pressure can exceed the house line pressure, an approved check valve or other approved device, shall be installed in the gas supply line to prevent air from backing into the gas line.

(7) Under no condition shall the equipment be fired at a capacity greater or less than that shown in the official data supplied by the manufacturer, or at greater or less gas pressure than the maximum or minimum pressures, as listed by the manufacturer, or as approved by the Building Inspector.

(8) All equipment is to be installed in the basic manner in which the original approval was obtained, and wiring and piping diagrams shall accompany each permit application when the input is 1,000,000 BTU per hour or more and when different from the original approval or requested by the Building Inspector.

d. Piping. All gas piping under this section shall be wrought iron or black steel pipe where applicable with malleable or steel fittings and shall be designed so that the pressure drop through the piping does not exceed that which will

supply the proper pressure for the particular application and shall be carefully tested for leaks. Adequate drips shall be installed at any point at which liquid condensate could collect, and such drips shall be readily accessible for cleaning. Gas piping shall not be supported from other pipes and shall be securely hung so that proper grade will be maintained.

An approved type of main shut-off cock shall be installed in a readily accessible location for the convenient operation of the burner and ahead of all other gas controls. When this cock is two (2) inches in size or larger, or the gas pressure exceeds fourteen (14") in W.C. pressure, it shall be of the lubricated plug type and in all cases shall have a permanently attached handle, which shall clearly indicate the "on" and "off" position.

A firing cock of a suitable type may be installed downstream of all controls that start and stop the flow of gas to the firing equipment if desired.

All pilot lines shall be equipped with an approved shut-off cock.

e. Combustion Gas Controls. For a burner or a combination of burners not exceeding 500,000 BTU input per hour, a combustion control of the on and off type may be used. This control may be of either the quick opening or slow opening type.

For a burner or a combination of burners not exceeding 5,000,000 BTU input per hour, approved on and off type of controls may be used, provided a slow opening automatic gas valve is used. This valve shall have a maximum closing time of five (5) seconds. In addition to the slow opening valve, an approved automatic valve of the positive closing type shall be installed upstream of the slow opening type of valve.

For burners or a combination of burners with an input exceeding 5,000,000 BTU per hour, an approved modulating, or high-low type of gas control must be used in addition to the slow opening and positive gas valves described in Subsection 3-e, or an approved combination modulating and slow opening valve. This modulating or high-low control shall be of a type that controls the firing rate of the equipment throughout its entire range and so adjusted that the minimum and maximum firing rate stays within the limit as specified for the equipment by the manufacturer and within the limits of the particular application to which it is applied.

Modulating controls may use steam, air, hydraulic or electricity as an actuating medium and shall be so arranged that the gas burning equipment starts and stops in the minimum firing position for the particular application and suitable means shall be provided to prevent starting of the main flame until the controls are in the minimum firing position on installation exceeding 5,000,000 BTU per Hr.

Modulating controls that are inter-connected by mechanical linkage to inlet air louvres of natural draft burners, shall have this linkage so arranged that the louvres will go to the open position in the event of failure of the linkage, provided such failure could change the fuel-air ratio.

On equipment with approved programming controls, the positive closing gas valve may be of either the automatic or the manual reset type. On equipment with constantly proved pilot, and on which the positive closing valve and flame failure control relay does not program with the starting and stopping of the main flame, the valve shall be of the approved manual reset type. On equipment with an input of less than 5,000,000 BTU per hour, automatic types of positive closing may be used on either type of pilot control provided that they do not require the closing of a circuit or relay, and are of the "normally closed" type of valve.

f. Gas Pressure Regulators. Approved types of gas regulators shall be used on all gas burning equipment. These regulators shall maintain a stable gas pressure to the equipment, within the range of pressure set up by the manufacturer of the gas burning equipment.

For low pressure, an approved gas pressure regulator shall be installed.

For medium pressure, an approved pressure regulator shall be installed upstream of all other controls when the inlet pressure is not regulated by the utility and this regulator shall be rated at not less than the maximum street pressure.

Where the inlet pressure is regulated by the utility at a pressure not exceeding five (5) psi, an approved regulator shall be installed. This regulator shall be rated at not less than five (5) psi and may be either up or down stream of other operating controls.

For high pressure, not less than two gas pressure regulators shall be installed downstream of the Utility Company meter, one of these to be normally at the meter location and pressure reduction shall be accomplished in not less than two stages. Both the first and second regulators shall be designed for, and capable of handling the maximum street pressure available. If a third stage of regulation is desired, this regulator shall be rated for not less than the outlet pressure of the first stage regulator unless installed downstream of the operating controls.

A limiting device shall be installed on the downstream side of the final stage of pressure regulation, on medium and high pressure. This limiting device shall be so arranged that it will close the main gas control valves in the event the gas pressure exceeds the proper regulated pressure. This limiting device shall be so arranged that it will require manual re-cycling or re-setting before the equipment can be put back in operation.

g. Operating and Limit Controls. Steam boilers shall be equipped with not less than one operating control, and one high limit control, and low water cut-off.

Hot water boilers shall be equipped with not less than one operating and one high limit control, activated by boiler water temperature. Operating controls actuated by water temperature shall be of immersion type, mounted directly into the boiler water, the high limit control may be of the surface type, mounted on the rise or risers adjacent to the boiler, ahead of all flow and other controls.

Warm air furnaces shall be equipped with not less than one operating and one high limit control. These controls shall be so located that failure of fans or air circulation through the unit will not appreciably affect their operation, or such fans shall be equipped with air switches to prevent operation of the equipment in the event of fan failure.

Thermostats, where directly operating the gas burning equipment, may be considered operating controls.

Where forced or induced draft is used, an approved air switch shall be installed to prevent operation of the equipment at any time such draft is not definitely established and maintained at predetermined adequate setting.

Electrically operated safety device shall not rely on closing a circuit or relay to close the main gas valve or valves.

Primary air fans shall be equipped with an approved positive method of preventing the burner from starting or remaining in operation in the event of failure of the primary air source.

h. Plain Pilot. Each burner shall be equipped with a plain gas pilot or gas pilots in addition to the safety pilot to insure smooth lighting of the burner so that there will be no roll back or heavy detonations during lighting off period, except that where the burner unit is of such size that safety pilot only will light burner smoothly, the plain pilot may be omitted. The pilot flame shall effectively ignite the gas at the burner and shall be so designed as to be adequately protected from drafts where required. Pilot flames shall not become extinguished by the main burners when starting or stopping them in a normal manner. Luminous flame pilots shall not show carbon deposit during the period of tests when adjusted according to the manufacturer's instructions.

Where the vertical or upshop type of burner consisting of a multiplicity of heads is used, a minimum of one plain gas pilot for each eight heads must be used. In arriving at the number of pilots, the safety pilot will be counted as one plain gas pilot above eight heads; below eight heads there must be at

least one plain gas pilot and a safety pilot unless the Building Inspector approves a lesser number.

i. Safety Pilots and Controls. Where the total input to any gas burning device exceeds 400,000 BTU all burners shall be equipped with approved flame rectifier, flame conductivity or scanner cell types of safety controls. Heat sensitive type of pilots will not be permitted.

Safety pilots shall be so designed that upon insertion of pilot after removal for repairs or cleaning, pilot will be in the same position relative to main burner as when originally installed. The pilot flame shall be in such a position that in the event of a drop in gas pressure, the contact between the pilot flame and flame rod or scanner shall be broken before the point where the pilot light will fail to reliably ignite the main burner.

The control system used in conjunction with the electronic safety pilot shall be of a type to lock out the main flame in approximately five (5) seconds or less, and shall require a manual re-set operation before flame can be reestablished. All safety pilots shall be equipped with positive closing automatic gas valves, and shall close in the event of an indicated failure.

Forced or induced draft equipment and natural draft type burners with supplementary air fans with modulating or closing air shutters with an input in excess of 1,000,000 BTU per hour shall be so arranged that a pre-purge period of approximately thirty (30) seconds is obtained. This pre-purge shall occur before establishing ignition on intermittent or interrupted pilots and before establishing main flame or continuously proved pilots.

Where a switch is installed in a low water cut-off circuit to keep the circuit to the safety shut-off valve closed when blowing down water column, switch must be of the push button type so that when operator releases button the control circuit to safety shut-off valve will be normal.

All pilot burners shall be supported in such a manner that their position relative to the main burner or burners will remain fixed.

Pilot lines shall be connected to vertical supply lines when possible. When horizontal line is used, connection must be made on top or side. Connection must be ahead of all controls, (except pressure regulator on medium and high pressure) and main shut-off valve and shall be provided with separate shut-off cock. Where gas pressure is greater than that for which pilots are designed, a pressure regulator (pilot regulator) must be installed on the downstream side of pilot line shut-off cock.

Safety shut-off valves shall be tested to assure gas tightness of the seam when in a closed position; the valve assembly shall be gas tight in all positions. Packing glands shall be designed so that the valve will not be made inoperative by excessive tightening of the packing nut.

j. Venting of Controls. Pressure regulators, slow opening gas valves and other gas equipment requiring venting shall be vented to a safe point outside of the building, or to a point in the breaching or stack, where the volume or flow of air is such that a combustible mixture cannot be obtained.

k. Draft Controls. Approved draft controls are to be used on all equipment, except when forced and induced draft is used in conjunction with controls that modulate the forced or induced draft in the direct ratio with the fuel modulation, and shall be used with forced or induced draft modulating systems when they are attached to a stack which may disturb fuel air ratio due to its draft intensity to the equipment.

(1) Barometric Draft Controls: These draft controls are to be of the "gas" type control, free to swing both ways. Barometric type draft controls shall have a cross sectional area equal to approximately seventy-five percent (75%) of the cross sectional area of the breaching from equipment which they are regulating.

(2) Mechanical Draft Controls: This type of control may use hydraulic pressure steam, air or electricity as an actuating medium and shall be so arranged that they will program to the open position before ignition is established or interrupted or intermittent piloted equipment, and before main flame is established on constantly proved pilot equipment and shall be equipped with a positive means of delaying the equipment, before the open position is obtained.

l. Dual Fuel Equipment. All dual fuel equipment, using gas as one of the fuels must comply with the requirements of this section, in controlling the gas equipment and shall be so arranged that no adjustments are changed or required when changing fuels. Dual fuel equipment shall be equipped with an on-off-on type of transfer switch that will not pass through the center off position without stopping in the "off" position.

m. Inspection and Tests. All installations shall be carefully tested for the proper operation of all controls and electrical circuits. Upon completion of fire testing and adjustment, a complete test report shall be filed with the Building Inspector in accordance with forms supplied by the Building Inspector.

Piping shall be carefully tested for leaks.

n. Industrial Applications. On certain industrial and process applications, where certain parts of these regulations cannot be met as required, individual approval must be obtained from the Building Inspector before a permit will be issued or installation can be made.

o. Air Intake. Gas burning equipment in buildings where adequate air for combustion is not assured, shall have fresh air intakes of the permanently open type, or with closeable dampers. Air intakes with closeable or automatic type dampers that program with the equipment, shall be equipped with a positive lockout device to prevent operation of the equipment unless the damper is open to a predetermined position.

4. Incinerators: Domestic or Portable Type.

a. General Provisions. Portable or domestic incinerators or rubbish burners may be installed and vented into the same flue with gas fired boilers, furnaces or heating devices, providing the incinerator or rubbish burner installation conforms to the following requirements:

(1) The incinerator shall be designed with gas or constant electrical auxiliary heating elements to facilitate the drying and combustion of garbage.

(2) When gas fired, the incinerator shall conform to the American Standard Requirements for Domestic Gas-Fired Incinerators.

(3) When equipped with electric heaters, the incinerator shall conform to standards established by the Underwriters' Laboratories, Inc., and features shall meet the requirements of the standards for gas-fired equipment.

(4) The incinerator shall bear the manufacturer's tag or name plate permanently attached stating the fuel for which the unit is designed and the input rating.

b. Venting. The vent from the incinerator shall be connected to a masonry flue by means of a smoke pipe constructed of metal suitable for operation of 1800 degrees F. temperature. Where such smoke pipe is within eighteen (18) inches of combustible materials, such materials shall be provided with one-half (½) inch fireproof insulation.

Where the masonry chimney is of Type A construction and is provided with a glazed tile flue liner or a vitrified bell type flue liner installed with bells upward, of ample size for the load of the incinerator in addition to other appliances connected thereto, but not less than eight (8) inches equivalent diameter, the metal chimney liner required elsewhere in this code, may be omitted.

Where the masonry flues are not provided with tile flue liners as above described then the flue shall be provided with flue liner constructed of materials approved for operation with temperatures of 1200 degrees F., this liner to receive the vents from the incinerator and other devices and to be sized for the total load.

An approved spark arrester shall be installed on the chimney or flue to which the incinerator is connected.

c. Piping. The piping for incinerator shall conform to the requirements of Paragraph 2-x.

CHAPTER 7-04

CHIMNEYS AND FLUES

SECTIONS:

7-0401. **OWNER'S DUTY TO PROVIDE PROPER CHIMNEY**. It shall be the duty of the owner of any new building in which it is hereafter proposed to install any warm air furnace, steam or hot water boiler or any conversion burner using a liquid or solid fuel, for use in connection with a heating system in such building to provide an all-purpose chimney with at least a seven (7) inch flue to withstand a minimum temperature of 1000 degrees F., thereby providing a chimney suitable for utilizing all types of fuel; and in all old construction where new heating plants are to be installed, the chimney shall be inspected and repaired so as to be put in first-class condition and an approved chimney liner installed if required by the Building Inspector.

7-0402. **CHIMNEY AND FLUE DRAFT MEASUREMENTS**. Before any final approval shall be given by the Building Inspector on an installation of any type of combustion unit herein covered by the provisions of this title, the person, firm or corporation or their agents making the installation of the burner shall make in the presence of the inspecting officer a test or tests for determining the amount of draft actually present upon or in connection with any and all burners attached to the chimney or flue, if requested by the Building Inspector.

7-0403. **REGULATION OF DRAFTS**. Chimney and flue drafts shall be set or regulated in such a manner as to be in accordance with the specifications of the burner's manufacturer or in compliance with the American Society of Heating and Ventilating Engineers.

7-0404. **DRAFT MEASUREMENTS**. Draft measurements shall be recorded upon the final inspection approval certificate if required by the Building Inspector.

CHAPTER 7-05

GASOLINE STOVES

SECTIONS:

7-0501. **STANDARDS FOR THE INSTALLATION, MAINTENANCE AND USE OF GASOLINE STOVES FOR COOKING AND HEATING**. These standards shall apply to all new and existing installations and all persons shall be governed by the provisions hereinafter set forth whether or not specifically named.

7-0502. **CLASSIFICATION**. The following classifications are designed for the purpose of giving recognition to various types of stoves now being manufactured and used, on the basis of the hazards involved in operation and use:

Class A. Stationary Stoves Furnished with Anti-flooding Device: Stoves of this classification feed the fuel to the burners either by gravity or pressure from the tank located at the stove, whose liquid capacity does not exceed approximately one (1) gallon, or employ pressure feed or fuel from an outside tank whose fuel capacity does not exceed six (6) gallons and in all cases are furnished with anti-flooding devices. Stoves of this classification are regarded as constituting the least danger.

Class B. Stationary Stoves Not Furnished With Anti-flooding Device: Stoves of this classification feed the fuel to the burners either by gravity or pressure from a tank located at the stove, whose liquid capacity does not exceed approximately one (1) gallon, or employ pressure feed or fuel from an outside tank whose fuel capacity does not exceed six (6) gallons and are not furnished with anti-flooding devices. Stoves of this classification are regarded as more dangerous than those of Class A. The possibility of drafts extinguishing the burner flame is of prime importance in connection with Class B Stoves, which are not provided with anti-flooding devices.

Class C. Portable Heaters Equipped with Anti-flooding Device: Heaters of this classification feed the fuel to the burner by pressure from a tank located at the heater whose liquid capacity does not exceed approximately one (1) gallon and are designed and intended to be readily carried from one place to another as desired and used as a source of local heat and are always equipped with anti-flooding devices. Heaters in this classification are regarded as even more dangerous than those covered in Class A and B since their gasoline

supply is in close proximity to the flame and they are portable, whereby rendering it possible that they may be placed too close to combustible material.

7-0503. **STANDARDS - LOCATION OF STOVES**: Stoves should be placed on the floor or on permanent foundations and never on boxes, shelves, or temporary supports. Locations in close proximity to wooden shelves, cupboards or other combustible materials shall not be allowed.

Stoves shall be located away from windows or other openings where drafts may blow curtains or draperies into contact with the flame.

Stoves provided with outside storage tanks shall be attached to the floor to prevent breaking of fuel lines.

7-0504. **LOCATION OF OUTSIDE TANKS**. Outside tanks which may have a fuel capacity of not exceeding six (6) gallons (U.S.) and which feed the fuel either directly to the burner or to the one-gallon tank mounted on the stove shall be so located that no artificial light will be required while filling.

Installation of such tanks shall be made outside the building well removed from all openings where escaping fuel or vapor may enter or accumulate. Tanks shall be suitably protected from extreme heat and accumulations of ice and snow.

7-0505. **FUEL PIPING**. Fuel piping for connecting outside tanks to stationary stoves shall be 3/16 inch O.D. seamless drawn copper or brass tubing having a wall thickness of at least 3/64 inch and shall be of suitable quality to withstand the effects of handling and manipulation in installation and use. Tubing shall be provided with approved fittings not depending upon ordinary solder for strength.

The piping shall not be secured in place with staples or other fittings likely to injure the tubing. Tubes shall be run in iron pipes from supply tank to inside of building wall and be protected by wooden moldings or iron pipe where the distance above the floor is less than seven (7) feet.

Fuel piping shall in no case be concealed behind walls or ceilings and shall be protected by sleeves where passing through floors, partitions or walls.

Fuel piping shall be supported in ceiling runs at intervals not exceeding six (6) feet by metal strips or the equivalent.

When piping is installed near electric wiring, the requirements of the National Electrical Code shall be observed. Where tubes cross wires, pipes or metal girders, protection from mechanical injury shall be provided.

Tubing shall be thoroughly tested after all connections have been made and shall not show loss within one (1) hour at a pressure of fifty (50) pounds per square inch.

Tubing shall be provided with a separate shut-off valve installed inside the building at a point easily reached in an emergency.

7-0506. **CARE AND ATTENDANCE**. Reserve supplies of fuel oil shall be kept in standard safety cans or filling cans or in larger containers conforming to the standards for storage and handling of flammable liquids.

Filling of tanks or reservoirs on stoves in buildings shall be by daylight only and not in the same room where or while any fire, blaze or flame of any kind is burning.

Filling tanks shall be carefully done in order to avoid spilling and splashing with the attendant hazards.

Stoves shall be kept clean and manufacturer's directions closely followed.

CHAPTER 7-06

PENALTY

SECTIONS:

7-0601. **PENALTY**. Any person violating any of the provisions of this title, or failing to comply therewith, or who violates or fails to comply with any code, standard or requirement therein adopted by reference, or who constructs or installs any heating or air conditioning plant, gas burning equipment or appliance or combustion unit in violation of any plans, specifications or sketches upon which the same was submitted and approved or any permit issued thereunder shall be guilty of an infraction and shall be subject to the penalties set forth in Section 1-0211. The imposition of one penalty for any violation or non compliance of this title shall not excuse or permit the same to continue; and all such persons shall be required to correct or remedy such violations or non-compliances within a reasonable time; and when not otherwise specified, each ten (10) days that prohibited conditions are maintained shall constitute a separate offense. The application of the above penalty shall not be held to prevent the enforced correction or removal of prohibited conditions.