

CHAPTER 19

**HEATING AND AIR CONDITIONING CODE**

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19.01 **LICENSES**.

(1) REQUIRED.

(a) No person shall act as, engage in the work of, advertise as, or otherwise represent himself as a heating and/or air conditioning contractor (hereinafter "heating contractor") unless an authorized representative of such person obtains a license as provided in this chapter. Such license holder shall be responsible for all violations of the provision of this chapter.

(b) No person shall install, erect, alter, repair, service, reset, or replace any heating or air conditioning system or parts thereof unless such person regularly employs a holder of such license, who shall be the authorized representative of such person in all matters pertaining to this chapter. Should the authorized representative holder of such license terminate the employment or partnership with such person, a new authorized holder of a license shall be obtained within 180 days thereafter.

(2) QUALIFICATIONS. No license shall be issued unless the applicant shall produce evidence that such person has had not less than three years experience in wet heat, warm air heating, central air conditioning, electric heating, and service as defined in this chapter, has satisfactorily completed a course of study in heating given by a recognized school plus one year of experience or is a graduate engineer and has one year of experience, and that the place of business is or will be maintained by such applicant or by the person employing such applicant and will be equipped with equipment necessary to contract for and perform work governed by such license. Service facilities shall be maintained and offered for the servicing of work performed.

(3) LICENSES ISSUED. Combination or individual licenses shall be obtained for the following:

- (a) Wet heat.
- (b) Warm air heating.
- (c) Central air conditioning.
- (d) Electric heating.
- (e) Service only.

Licenses in classifications (a), (b), (c), and (d) include a service license.

(4) ISSUANCE OF LICENSE. Any applicant who has fully complied with the provisions of this chapter and passed an examination given by the Heating and Air Conditioning Board at each quarterly period shall be issued a license. All examination papers shall be kept on file at the office of the Heating and Air Conditioning Inspector (hereafter "Inspector"). No license shall be issued until a surety bond is filed with the City Clerk in the amount of \$2,000.

(5) FEE AND RENEWAL. Fees for licenses issued under this section shall be as established by resolution of the Common Council. Licenses shall be renewed annually.

(6) Repealed per GO 39-02.

19.02 **PERMITS.**

(1) **REQUIRED.** No person shall construct or install within the City any heating or air conditioning equipment or appurtenances without the holder of a license therefor securing a permit therefor setting forth the nature of the work to be performed from the Superintendent of Inspection.

(2) **TO WHOM ISSUED.** No permit shall be issued except to the owner of a residence to personally do work on the owner's home or to a licensed heating contractor. Such permits shall be nontransferable.

(3) **FEES.**

(a) Fees for permits issued under this section shall be as established by resolution of the Common Council.

(b) If an application for a permit has not been obtained prior to the commencement of a job, the applicable permit fee shall be doubled.

19.03 **INSPECTION.**

(1) The Inspector shall examine and approve or disapprove all plans and specifications for the performance of any work governed by this chapter. The Inspector shall inspect all work as required by this chapter and shall order work stopped which is in violation of this chapter.

(2) In any new building or addition, immediately upon completion of those portions of the installation which are to be concealed or covered, the heating contractor shall notify the Inspector, who shall make an inspection within two working days after notice for inspection, excepting Sundays or holidays. If no inspection is made within the specified time period, work may proceed. All other inspections shall be made immediately upon notification of the completion of such work.

(3) Wherever work for which a permit has been issued has been ordered stopped by the Inspector, the inspector shall post such a stop work notice. After such notice has been posted, no further work shall be done until the violations have been corrected and such corrections approved by the Inspector.

19.04 Repealed per GO 39-02.

19.05 Repealed per GO 39-02.

19.06 **PERFORMANCE OF HEATING SYSTEMS FOR ONE- AND TWO-FAMILY RESIDENCES.** Notwithstanding any provisions of this chapter to the contrary, all heating systems shall be so designed and installed as to maintain a temperature of 70°F. inside while the outside temperature is -20°F. with a 15 MPH wind. No allowance shall be made for the heating effects of lighting, people, solar conditions, or any other sources of heat not part of the building heating system.

19.07 **HOT WATER AND STEAM HEATING SYSTEMS.**

(1) **MAINS.**

(a) **Size.** The size of mains, risers, and radiator connections shall be selected from capacity tables as shown in the "Heating, Ventilating, and Air Conditioning Guide," latest edition, except design friction loss

per foot of pipe shall be between 100 and 500 mil. in. Piping systems shall include an expansion tank of proper size.

(b) Water Required. The amount of water required in gallons per minute shall be determined by the following formula: G.P.M. equals total BTU per hour divided by the temperature drop times 60 minutes per hour times 8 lb. per gallon of water. A maximum temperature drop of 20 degrees shall be used in determining G.P.M. Pumps shall be selected from manufacturer's pump capacity charts. The minimum allowable head pressure shall be 2 1/2'.

(2) PIPING AND PIPING CONNECTIONS AND EQUIPMENT.

(a) Steam Heating Systems. All pipe used for steam heating systems shall be not less in weight and strength than that known to the trade as Schedule 40 steel pipe. Piping and piping connections and equipment hereafter installed for all steam heating plant installations or alterations to installations shall conform to the following requirements:

(b) Hot Water Heating Systems. All steel pipe used for hot water heating systems shall not be less in weight and strength than that known to the trade as Schedule 40 steel pipe. Brass pipe and copper tubing may be used, provided the weight of all such pipe and tubing shall be Type M or heavier for above-ground and Type L or heavier for underground. All piping shall be cut and reamed in a workmanlike manner.

(c) Connections to be Independently Supported. Pipe connections shall be independently supported in such manner as to prevent undue stresses in pumps.

(d) Reaming. After cutting, all pipe shall be reamed to full internal diameter.

(e) Fittings and Joints. Piping may be jointed together by welding or by the use of fittings. Such welds shall be made in a neat and workmanlike manner and shall be as strong as the base metal. Fittings shall be of cast iron or malleable iron, or of copper, and shall be of standard weight with cleancut threads, and free from blow-holes or other defects.

(f) To be Protected. In all piping systems, provision shall be made for adequate anchorage and protection against damage to piping from expansion and contraction.

(g) Metal Hangers Required. Piping and fittings shall be securely supported by metal hangers properly spaced to prevent sag or undue strain on fittings.

(h) Pitch. All piping shall be run level or pitched upward toward the point of venting.

(i) Friction Head to be Equalized. The piping system shall be installed so that each circuit has its correct friction head with a balancing valve on each circuit.

(j) Expansion Tanks and Relief Valves. Expansion tanks and relief valves shall be installed in accordance with the "Heating, Ventilating, and Air Conditioning Guide," latest edition. Relief valves for hot water heating systems shall also conform to the provisions of sub. (3) below.

(3) RELIEF AND PRESSURE-REDUCING VALVES.

(a) Every closed hot water heating system shall be provided with a relief valve which shall be of adequate size and so constructed as to insure positive relief of any pressure over the pressure rating of the system. Relief valves so employed shall be of such nature and so constructed and arranged as to permit their being tested manually to determine their operating condition. Each such relief valve shall be placed on the boiler side of all valves and accessories and shall be located not lower than the crown sheet of the boiler. Discharge from relief valves shall be piped to within 18" of the floor or to an open receptacle.

(b) Pressure-reducing valves shall be subject to the provisions for relief valves.

(4) DESIGN AND INSTALLATION OF HOT WATER RADIANT PANEL HEATING SYSTEM.

(a) All hot water radiant panel heating systems shall be designed according to standards set forth in "Heating, Ventilating, and Air Conditioning Guide," latest edition.

(b) The maximum surface temperature shall be 110° for floor panels and 135° for ceiling panels.

(c) Screw threads shall not be permitted in coils or grids embedded in concrete slab or in plaster. Ferrous fabrication shall be all-welded except in equipment rooms above floors or in boxes or covered recesses in slab where flow-adjusting cocks are installed. Where non-ferrous pipe or tubing is used in concrete slabs or in plaster, solder sweat fittings shall be used throughout and no ferrous to non-ferrous connections shall be embedded in concrete or plaster or concealed in the construction, nor shall non-ferrous piping or tubing come in contact with steel reinforcing in slabs. Threaded pipe and fittings may be used in equipment rooms above floors or in accessible recess boxes where adjusting flow cocks are installed in slabs. A balancing cock or valve shall be installed for each individual room except storage areas, closet areas, and halls and shall be installed in each individual coil branch, either on the supply side or on the return side.

(d) Before being covered, concealed, or embedded, pipe or tubing shall be tested to a hydrostatic or compressed air pressure of not less than 100 lb. gauge per sq. in. When a dual system of hot water baseboard heating and radiant heating is supplied from the same boiler, the radiant system shall have a separate pump, controls, and a means of blending the water so entering water does not exceed temperatures outlined in (b) above.

(5) AMOUNT OF DIRECT STEAM OR HOT WATER RADIATION TO BE INSTALLED IN A STEAM OR HOT WATER HEATING SYSTEM.

(a) Steam. The amount of equivalent direct radiation to be installed in a given room where unenclosed radiators are to be employed shall be determined by dividing the heat loss of the room in BTU per hour by 240.

(b) Hot Water. The amount of equivalent direct radiation to be installed in a given room where unenclosed radiators are to be employed shall be determined by dividing the heat loss of the room in BTU per hour by the BTU heat emission of the radiation at the design average water temperature as given by the manufacturer of the radiator.

(c) Forced Hot Water Systems. The maximum water temperature to be used in designing forced hot water systems shall be 200°F. maximum limit setting 220°F. control.

(d) Enclosed Radiators. If cast iron direct radiators are to be recessed or enclosed in cabinets, allowance shall be made for capacity loss or gain incurred by the type installation.

(e) Convactor and Baseboard Ratings. Convactor and baseboard ratings used in selecting convectors and baseboards shall be those published by the "Mechanical Contractors Association of America," latest edition.

(f) Convectors and Baseboards Used with Steam. All convectors used with steam as the heating medium shall be piped as a two-pipe system unless such convactor is specifically designed for use on a one-pipe system. All baseboard radiation shall be piped as a two-pipe system and shall be installed according to the manufacturer's recommendations.

#### (6) BOILERS.

(a) Foundations. Each steam or hot water boiler installed for use in connection with a heating plant shall be placed on concrete or incombustible floor and shall be level.

(b) Rating. Boilers shall have sufficient rating capacity to take care of the radiation load, hot water supply load, piping loss, and any other load which might increase the total load of the boilers. Ratings used shall be net load recommendations as published by the "Mechanical Contractors Association of America," latest edition.

(c) Boilers to be Rated. No person shall sell or install any boiler for use in the City that has not been rated by a recognized testing laboratory.

(d) Installation. Each steam or vapor boiler shall be equipped with a low water cut-off and pressure relief valve.

### 19.08 WARM AIR HEATING.

#### (1) FORCED WARM AIR HEATING SYSTEMS.

(a) Definition. "Forced warm air heating system", when used in this section, shall mean one or more warm air heating and cooling units within individual housing or within one common housing, one or more motor driven blowers, smoke or vent pipes, individual leader pipes or trunk line systems, or both, with necessary control dampers for supply and return air, automatic controls, registers, faces, and grilles and with provisions for other appurtenances, such as filters, air washers, ozonators, humidifiers, etc., as may be desired.

(b) Design. The heat loss of the structure, the furnace size, blower size, registers, and grilles, individual pipe or trunk line duct size, register air temperature, controls and construction details shall be in accordance with the requirements of Design Manuals "J", "K", "No. 4." and "No. 9." of the "National Warm Air Heating and Air Conditioning Association," latest editions.

(c) Cold Air Ducts. The heads of all cold air ducts shall be lined with metal. All cold air ducts shall be connected to the furnace. On counter-flow oil or gas units, cold air returns shall be completely lined with metal from the registers to the furnace.

(d) Limit Controls. Limit controls shall be installed on all forced-air heating units.

(e) Combustion Air. All forced-air heating equipment installed in confined spaces shall be supplied with combustion air in accordance with procedures outlined in American Standards "Installation of Gas Appliances and Gas Piping," latest edition.

(f) Return Air Registers. In no case shall installation of a return air register be permitted in a confined space also containing any fuel-burning device.

(g) Areas of Return and Supply Ducts and Risers. The total cross-sectional area of all return air ducts and risers shall be at least equal to the total cross-sectional area of all supply ducts and risers. The maximum permissible velocities for residential heating shall be in accordance with the A.S.H.R.A.E. "Guide," latest edition.

## (2) GRAVITY WARM AIR HEATING SYSTEMS.

(a) Definition. When used in this chapter, "gravity warm air heating system" means any and all warm air furnaces enclosed with all appurtenances thereto or connections therewith intended to heat any building or enclosure by gravity circulation only, wherein no mechanical force or equipment is applied.

(b) Design. The heat loss of the structure, selection of the furnace, registers, and grilles, pipe sizes, and installation details shall be in accordance with the requirements of the "National Warm Air Heating and Air Conditioning Association," latest edition.

(c) Cold Air Ducts. The heads of all cold air ducts shall be lined with metal. All cold air ducts shall be connected to the furnace.

(d) Limit Controls. Limit controls shall be installed on all gravity heating units.

(e) Combustion Air. All gravity heating equipment installed in confined spaces shall be supplied with combustion air in accordance with procedures outlined in Z21.30, American Standards "Installation of Gas Appliances and Gas Piping," latest edition.

(f) Return Air Register. In no case shall the installation of a return air register be permitted in a confined space also containing any fuel-burning device.

(g) Areas of Return and Supply Ducts and Risers. The total cross-sectional area of all return air ducts and risers shall be at least equal to the total cross-sectional area of all supply ducts and risers and shall be in accordance with A.S.H.R.A.E. "Guide," latest edition.

## (3) SUPPLY AND RETURN AIR DUCTS.

(a) The following table of U. S. standard metal gauges shall be considered the minimum for ducts and flues constructed of galvanized iron. Ducts constructed of other metal shall be of the equivalent thickness for equal strength. Black iron shall not be permitted.

**TABLE NO. 1**

| <u>Round Ducts</u><br><u>Diameter in Inches</u> | <u>Gauge</u> | <u>Rectangular Ducts</u><br><u>Width in Inches</u> | <u>Gauge</u>   |
|---|--------------|--|----------------|
| 1 – 12  | 30           | 1 – 14   | 28             |
| 13 – 24   | 26           | 15 – 24<br>Over 24                                 | 26<br>24       |
| Underground                                     | 24           | Plenums<br>Up to 24<br>Over 24                     | 26<br>26<br>24 |

(b) All rectangular ducts shall be constructed with diagonal cross-breaks on the top and bottom to stiffen the sheets; or the sheet metal in the ducts or flues shall be at least one gauge heavier than specified in Table No. 1. Fiberglass duct board may be used.

(c) Joints and seams of all ducts, risers, round pipes, and fittings shall be securely fastened and made substantially airtight. Slip joints shall have a lap of at least one inch and be individually fastened. All duct joints shall be "S" and drive cleat, or locked.

(d) All ducts, risers, and round pipes shall be securely supported by metal hangers, straps, lugs, or brackets which do not obstruct the flow of air.

(e) Joist liners for return air shall be tightly fitted and securely fastened to make an airtight and vibration-free installation.

(f) Volume dampers of the locking type shall be placed in each supply air outlet.

(g) Whenever perimeter heating will be installed underground in a concrete slab at grade level, the perimeter of such slabs shall be insulated with one inch of styrofoam underground insulation, or the equivalent, to a depth of 2' below the grade. Duct work under a concrete slab shall be installed in accordance with the recommendations of the National Warm Air Heating and Air Conditioning Association's "Established Standards for Ducts," latest edition.

**19.09 AIR-CONDITIONING SYSTEMS.**

(1) DEFINITION. "Air conditioning system" means an assembly of equipment which provides ventilation, air circulation, air cleaning, cooling, and dehumidification with means for controlling room temperature and humidity within prescribed limits.

(2) APPLICABILITY. This section shall not apply to units serving one room and having all of the components within one housing.

(3) DESIGN. The cooling load of the structure, selection of equipment, and design of the air distribution system shall be in accordance with "A.R.I. Standards," latest edition.

(4) REFRIGERANTS. Only units using Type 1 refrigerants, as classified by A.S.H.R.A.E. "Standard 34-57," latest edition, shall be permitted in occupancies governed by this section.

(5) INSTALLATION.

(a) All equipment shall be supported or mounted with sufficient space allowed for servicing and inspection.

(b) All moving machinery shall be guarded.

(c) All plumbing and electrical connections shall be in accordance with the City Plumbing and Electrical Codes.

(d) Air conditioning equipment governed by this section shall be tested by a recognized testing laboratory.

(e) Systems in which a refrigeration coil is provided with a warm air furnace shall have the refrigeration coil located downstream from the heating surface, unless otherwise approved by the manufacturer. Coils located parallel to the heating units, dampers, or other means used to control air flow shall prevent chilled air from entering the furnace section. Condensate shall be disposed of so as to prevent dripping on the heating element.

(f) All air conditioning equipment governed by this section shall have the cooling capacity rated in BTU per hour at the conditions stated in the A.R.I. Standards.

(g) All duct work installed in conjunction with air conditioning systems shall conform to §19.08, Green Bay Municipal Code.

(h) All pipe work shall conform to §19.07, Green Bay Municipal Code.

(i) All ducts installed in air conditioned areas, except basements, shall be insulated with a minimum of 1/2" of duct insulation.

**19.10 GAS-FIRED EQUIPMENT, PIPING AND VENTS.**

(1) PURPOSE. The purpose of this section is to provide minimum standards for the design and installation of gas-fired equipment and associated piping.

(2) GENERAL INSTALLATION STANDARDS.

(a) All gas pace heating equipment installed shall be subject to the inspection and approval of the Inspector.

(b) Heating equipment shall not be installed in any location where flammable vapors are likely to be present, unless the design, operation, and installation will prevent the ignition of such vapor.

(c) Equipment shall be readily accessible for operation and servicing.

(d) Equipment shall be supported and connected to prevent undue strain on the gas supply.

(e) Equipment hereafter installed shall be properly adjusted by the person making the installation; and following installation, no such equipment shall be left connected to the gas piping unless every reasonable precaution has been employed to insure safe operation of the burners and proper combustion of the gas, due attention being given to draft conditions and ventilation.

(f) Equipment shall not be adjusted to pass a greater amount of gas than the maximum name plate rated capacity.

(g) All gas heating equipment shall be vented to the outside with a minimum vent size as recommended by the manufacturer.

(h) Combustion air shall be provided for all equipment. Equipment installed in concealed areas shall have a minimum vent of 100 sq. in.

(i) No permit or license shall be required to vent a hot water heater; the installation shall, however, conform to the provisions of this chapter.

(j) The requirements of this chapter are minimum requirements, and any questions concerning the safe installation of gas burning equipment which is not specifically covered herein shall be resolved in accordance with the American Standard manual entitled "Installation of Gas Appliances and Gas Piping," latest edition.

(3) ELECTRONIC FLAME FAILURE SAFETY DEVICES. All new installations of gas-fired burners with an input of 500,000 BTU per hour capacity or more shall be equipped with electronic flame failure safety devices.

(4) GENERAL RULES FOR GAS PIPING.

(a) All pipe or tubing used for the installation, extension, alteration, or repair of any gas piping shall be of standard weight and standard dimension, and such pipe or tubing shall either be new or have been used previously for no purpose other than the conveying of gas. All such pipe shall be free from internal obstructions, splits, or other imperfections which render it unfit for the purpose intended, and the ends thereof shall be properly reamed.

(b) Cast iron fittings shall not be used.

(c) Threaded joints shall be made up with an approved pipe thread compound.

(d) All unions shall be ground joint unions.

(e) All gas piping shall be securely strapped with metal straps or approved wire hangers.

(f) Unions, tubing fittings, running threads, right and left couplings, bushings, and swing joints made by combinations of fittings shall not be used in the installation of gas piping which is to be concealed.

(g) Semi-rigid gas tubing may be used to connect free-standing space heating equipment.

(h) Gas piping in solid floors such as concrete shall be laid in channels in the floor suitably covered to permit access to such piping.

(i) Flexible hose shall not be used for the connection of space heating or water heating equipment.

(j) When used on natural gas or liquefied petroleum gas, the joints on seamless copper, brass, steel, or non-ferrous gas tubing shall be made by means of approved gas tubing fittings or brazed or approved flared fittings with a material having a melting point exceeding 1,000°F.

(k) Gas pipe or tubing inside any building shall not be run in or through an air duct, clothes chute, chimney or flue, ventilating duct, dumb waiter, or elevator shaft but through a duct proper for the purpose.

(l) Each outlet, including a valve or cock outlet, shall be securely closed and gas-tight and equipped with a positive plug or cap if the equipment is not to be connected at that time. When equipment is removed from an outlet and the outlet is not to be reconnected at that time, it shall be securely closed and made gas-tight with a positive plug or cap. In no case shall the outlet be closed with a tin cap, wooden plug, cork, etc.

(m) Where condensation of liquefied petroleum gas may occur, the piping shall be pitched back to the container; or suitable means shall be provided for vaporization of the condensate. Compounds used in making up joints shall be resistant to the action of liquefied petroleum gases.

(n) Gas supply lines shall be of adequate size as per the recommendations of the American Gas Association Capacity Tables.

(o) All gas heating equipment shall have a manual main shutoff valve provided ahead of all controls within 5' of the main burner.

(p) A ground joint union connection shall be provided downstream from the main manual shutoff valve to permit removal of the controls.

(q) All shutoff devices installed for use on liquefied petroleum heating equipment shall be designed to shut off the gas supply to both the main burner and the pilot burner when the pilot flame is extinguished.

(r) All natural gas-fired heating equipment shall be equipped with an automatic shutoff device which will shut off the gas supply to the main burner whenever the pilot flame is extinguished, in accordance with the requirements of the A.G.A.

(s) All automatic control devices shall be so located as to be accessible for service work, and the location of heating equipment with respect to adjacent walls and other equipment shall allow easy access to all parts which may require repair or adjustment.

(t) All outside storage tanks for the storage of liquefied petroleum gas of 500 gallons capacity or more shall be on a solid, nonflammable footing. All such storage tanks shall be a minimum distance of 10' from any residence or property line. For other regulations concerning such storage, see §18.15, Green Bay Municipal Code, and Ch. 18 generally.

(u) All other installation procedures and sizing of gas piping shall be in accordance with Manual Z21.30, American Standards "Installation of Gas Appliances and Gas Piping," latest edition.

(5) GAS FLUES AND VENTS.

(a) All types of central heating equipment, space heaters, unit heaters, and water heaters hereafter installed shall be connected to adequate vents conforming to the provisions of this subsection.

(b) All flue pipes from a heating unit to the chimney shall be of standard metal or approved Type "B" vents. When the vent connector must be located in or pass through a crawl space or cold areas such as an attic, that portion of the vent connector shall be of listed Type "B" vent material. Single-wall metal pipe shall not pass through any floor or ceiling or anywhere it will create a fire hazard.

(c) All gas-fired equipment requiring a vent shall be vented to a masonry, metal, or factory-built chimney so products of combustion are safely conducted to the outside atmosphere.

(d) No manually-operated damper shall be placed in any flue, vent pipe, or vent connector of any gas-fired heating equipment.

(e) Horizontal vent pipes shall be as short as possible and in no case shall the length exceed 75 percent of the vertical height of the flue or chimney to which it is attached. Such vent pipes shall have a minimum pitch of 1/4" per lineal ft. upward from the draft hood to the chimney. When conditions exist that preclude compliance with the above, an induced draft fan shall be provided.

(f) All vent pipe shall be securely fastened. The vent pipe on design equipment shall not be smaller than indicated by the draft hood.

(g) The flue pipe and draft hood size for conversion burners shall be such as to provide not less than one sq. in. cross-sectional area per 6,500 hourly BTU input. If the flue pipe exceeds 10' in length or contains more than two elbows, the next larger size pipe and draft hood shall be used. Where the draft hood is a part of the equipment or is supplied by the equipment manufacturer, it shall be installed without alteration in accordance with the manufacturer's installation instructions.

(h) When entering a passageway in a masonry or metal chimney, the vent connector shall be installed above the extreme bottom to avoid stoppage. The vent connector shall be prevented from entering so far as to restrict the space between its end and the opposite wall of the chimney.

(i) Single wall vent pipes shall not be closer than 2" to any combustible material; and in all cases where single wall vent pipes are less than 6" from any combustible material, the same shall be protected with asbestos mill board of not less than 1/8" in thickness.

(j) No flue or vent connector shall be connected to a chimney serving a fireplace unless the fireplace opening is permanently sealed.

(k) Approved Type "B" vents may be used for the venting of gas-fired equipment requiring a vent, provided Type "B" vents shall not be used for the venting of incinerators, solid fuel, or oil-burning equipment.

(l) All vented equipment, except incinerators and units designed for power burners or for forced venting, shall be equipped with a draft hood and shall be of the same size as the equipment flue collar or as recommended by the manufacturer.

(m) All other venting procedures shall comply with the American Standard "Installation of Gas Appliances and Gas Piping," latest edition.

(6) GAS-FIRED CENTRAL HEATING EQUIPMENT (DESIGN AND CONVERSION TYPES).

(a) All new gas-fired central heating equipment of either the design or conversion type shall be approved and listed by the American Gas Association Laboratories or the Underwriters Laboratories. The manufacturer's name, model, and BTU input shall be down on a permanent marker attached to the furnace or boiler. The manufacturer's operating instructions shall be securely attached in a conspicuous location on or near the heating plant.

(b) Central heating boilers or furnaces shall be erected in accordance with the manufacturer's instructions and shall be installed on firm, level fire-resistive foundations unless listed by the manufacturer for installation on a combustible floor or unless the floor is protected in an approved manner.

(c) Central heating boilers and furnaces shall be installed with clearances not less than those specified in Table 2, below, except that equipment listed by the manufacturer for installation at lesser clearances may be installed in accordance with its listings.

**TABLE 2**

MINIMUM CLEARANCES  
For Listed Central Heating Boilers and Furnaces  
Distances from Combustible Construction in Inches

| <u>Type of Equipment</u> | <u>Above and Rear</u> |   | <u>Front</u> | <u>Projection Box or Draft Hood</u> |
|--------------------------|-----------------------|---|--------------|-------------------------------------|
| Boilers                  | 6                     | 6 | 18           | 6                                   |
| Furnaces                 | 18                    | 6 | 18           | 6                                   |

(d) Furnaces of the revertible flue type shall be designed or modified to prevent the accumulation of gas in any part thereof. All gas-fired units of either the design or conversion type shall have an escape door to allow pressure to escape. One-inch steel pipe shall be fastened to the radiator (seal joint) at one end and the other end shall terminate in breaching or the chimney.

(e) The furnace and chimney shall be clean. The chimney shall be examined if a liner is required; such liner shall be aluminum or stainless steel. All furnaces being converted to gas shall be subjected to a sulfur or other suitable test and examined thoroughly for any cracks or defects. If cracks or defects are found, they shall be remedied before installation. All other standards regulating the installation of gas conversion burners shall be in accordance with American Standard "Installation of Domestic Gas Conversion Burners," Manual Z21.8, latest edition, and American Standard "Installation of Gas Appliances and Gas Piping," Manual Z21.30, latest edition.

(7) ROOM HEATERS.

(a) Definition. "Room heater" means a free-standing type of circulatory heater installed in the room or area which it is intended to heat.

(b) Room heaters shall be placed so as not to cause a hazard to walls, floors, curtains, furniture, doors when open, etc., or to the free movement of persons within the room. Room heaters shall be installed with clearances not less than those specified in Table No. 3 below, except equipment shall be installed in accordance with its listings. In no case shall the clearance interfere with the requirements for combustion air and accessibility.

**TABLE 3**

MINIMUM CLEARANCES  
For Listed Gas-Fired Room Heaters  
Distance from Combustible Construction in Inches

| <u>Type</u>          | <u>Jacket, Sides,<br/>and Rear</u> | <u>Projecting Flue<br/>Box or Draft Hood</u> |
|----------------------|------------------------------------|--|
| Warm Air Circulators | 6                                  | 6  |
| Radiant Heaters      | 6                                  | 6  |
| Water Heaters        | Flush                              | ---  |

(c) No floor furnaces of any type shall be installed or used.

(8) RECESSED WALL HEATERS. Recessed heaters approved by the American Gas Association shall be installed in accordance with the manufacturer's instructions, provided they shall be accessible for cleaning of heating surfaces; for removal of burners; for replacement of sections, motors, controls, filters, and other work parts; and for adjustment and lubrication of parts requiring such attention.

(9) DUCT FURNACES.

(a) Gas-fired duct furnaces shall be installed with clearances of at least 6" between adjacent walls, ceilings, and floors of combustible construction and the equipment, projecting flue box, or draft hood, provided duct furnaces listed for installation at lesser clearances may be installed in accordance with their listings. In no case shall the clearance interfere with the requirements for combustion air and accessibility.

(b) The installation of duct furnaces shall be such as to make them accessible for cleaning the heating surfaces; removal of burners; replacement of sections, controls, draft hoods, and other working parts; and for adjustment of parts requiring such attention.

(c) The ducts connected to or enclosing duct furnaces shall have removable access panels on both upstream and downstream sides of the furnace, unless all controls are accessible from the outside.

(d) The controls and draft hoods for duct furnaces shall be located outside the ducts. Draft hoods shall be located in the same enclosure from which combustion air is taken.

(e) Circulating air shall not be taken from the enclosure in which the furnace is located.

(f) Duct furnaces shall be erected and firmly supported in accordance with the manufacturer's recommendations.

(10) UNIT HEATERS. Suspended type gas-fired unit heaters shall be safely and adequately supported, with due consideration given to their weight and vibration characteristics. Gas-fired unit heaters shall be installed with a minimum clearance of 6" between the unit, projecting flue box, or draft hood and combustible construction. The control side of a unit heater shall be not less than 18" from any wall or partition.

#### 19.11 **OIL-BURNING EQUIPMENT.**

##### (1) DEFINITION.

(a) When used in this section, "oil burner" means any device used in connection with a heating system, designed to burn fuel oil having a minimum flash point of 100°F., as determined by the Tag Closed Tester in accordance with the method of testing adopted by the American Society for Testing Materials, latest edition, and having a fuel tank or container with a capacity of more than 10 gallons connected thereto.

(b) "Oil-burner equipment" shall include all tanks, piping, pumps, control devices, and accessories used in connection therewith.

##### (2) GENERAL PROVISIONS.

(a) The approval of oil burners, fuel oil, use of non-automatic burners, gravity feed to oil burners, pressure tanks, underground tanks, tanks inside the buildings, tank construction, tank vents, tank fill and overflow pipes, gauges, pumps, piping valves, heating oil, test of tank coverings, burner controls modifications, fire-proofing, and all other installation and venting details shall conform with the specification as follows in this section, as provided in the National Board of Fire Underwriters, latest edition.

(b) For either high pressure or low pressure conversion oil burners, there shall be at least 1" block insulation under the combustion chamber. The sides of the combustion chamber shall be filled in with high heat-resistant wool.

(c) Combustion air shall be supplied to any automatic fired heating unit where such unit has no other means of receiving air to the burner. All oil burning installation shall have a properly installed barometric draft stabilizer.

(d) Inside fuel tanks shall not be more than 275 gallons capacity, but two such tanks may be connected with a three-way valve. Any larger tank shall be enclosed by a three-hour rated fire wall. No tank shall be more than 500 gallons capacity.

(e) Where a fuel line crosses a floor, adequate protection shall be provided. Fuel oil tanks located in the basement shall be a minimum of 5'5" from the burner. The fill pipe shall be a 2" pipe, and the vent pipe shall be a 1" pipe.

(f) Every fuel oil tank shall be supplied with an oil filter of the proper size.

(g) Every fuel oil tank installed inside shall be supplied with a fuel oil gauge.

(h) All fuel oil fill and vent pipes shall be vented to the outside of the building.

(i) Oil tanks inside using overhead systems to the burner shall have return line systems (Two Pipe System). No oil floor furnace shall be installed or used.

**19.12 STOKERS AND STOKER-FIRED HEATING.**

(1) For the purposes of this section, "stoker" means an automatically or manually controlled mechanical device for feeding solid fuel into the combustion chamber used in connection with a heating plant.

**(2) GENERAL RULES.**

(a) No stoker not equipped with automatic means of preventing excessive pressure or temperature of the heating medium shall be installed or operated.

(b) The approval of coal stokers, their installation, venting, controls, etc., shall conform with the specifications of the Stoker Manufacturers Association, latest edition.

**19.13 ELECTRIC AND ELECTRIC PANEL HEATING.**

**(1) ELECTRIC HEATING.**

(a) The following provisions for electric heating shall cover installation, central boilers, furnaces, heat pumps, and the like. Electric baseboard radiation and resistance heating equipment shall be designed or engineered by professional engineers or contractors licensed under the provisions of this chapter, but all electrical wiring, conduits, boxes, and connections shall be made by licensed electrical contractors. All resistance heating equipment shall be installed to comply with manufacturer's installation instructions or with the City Electrical Code, whichever is more restrictive.

(b) Heating units and control devices shall be listed by Underwriters Laboratories and shall be installed in compliance with the State Electrical Code.

(c) The labeled voltage of all equipment shall be within 5 percent of the service voltage provided.

(d) Unless otherwise indicated, installation recommendations contained in the A.S.H.R.A.E. "Guide," latest edition, and those of the manufacturer shall be followed.

(e) Thermostatic control shall be provided in each heated room or space, except where a central heating boiler or furnace is installed.

**(2) ELECTRIC PANEL HEATING.**

(a) The average panel output required under design conditions shall not exceed the BTU per sq. ft. per hour permitted by the U.L. "Listing Report."

(b) Every cable shall bear a label identifying the manufacturer and rating of the unit. Cables shall be of standard length and shall not be cut.

(c) The wattage rating of any cable shall not exceed the rating of the controlling thermostat and relay combination.

(d) Prefabricated Conductive Materials.

1. Panels shall be thermostatically controlled and shall have maximum surface temperatures of 150°F.

2. Panels shall not be cut and lighting fixtures shall not be fastened or cut into the active area of the panel.

(3) BATHROOM WALL INSERT HEATERS. Bathroom wall insert heaters and switches shall be located as far as practical from plumbing fixtures and at least 30" from the tub or shower.

19.14 CHIMNEYS. All equipment shall be installed in accordance with the manufacturer's recommendations, subject to the approval of the City Heating and Air Conditioning Inspector's Department.

(1) "Chimney", as used in this section, means a prefabricated chimney. For provisions regulating masonry chimneys, see the Building Code.

(2) Manufacturers of prefabricated chimneys shall clearly label temperature and fuel design for such chimneys as per U.L. ratings.

(3) For oil-fired equipment, prefabricated chimneys shall provide protection based on flue gas temperatures of no less than 800°F.

(4) For incinerators, temperature requirements may vary depending on the capacity of the incinerator and the items being burned. The following are examples:

1. Two-Bushel Fuelless. Minimum prefabricated chimney designed for 800°F.

2. Three-Bushel Fuelless. Minimum prefabricated chimney designed for 1,200°F.

3. Four-Bushel and Larger. Minimum prefabricated chimney designed for 1,600°F. to 2,000°F. See requirements of the Department of Industry, Labor, and Human Relations.

(5) No incinerator shall be installed on a Type "B" vent.

19.20 GENERAL PENALTY. Any person who shall violate any provisions of this chapter or any rule, regulation, or order made hereunder shall be subject to a penalty as provided in §40.05, Green Bay Municipal Code.