

SECTION 15458 - WATER HEATERS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

- A. Extent of water heater work required by this section is indicated on drawings and schedules, and by requirements of this section.
- B. Refer to other Division 15 sections for piping, specialties, pumps, fuel piping; breechings which are required external to water heaters for installation; for field installed automatic temperature controls required in conjunction with water heaters; not work of this section.
- C. Electrical Work: Refer to Division 15 section "Mechanical/Electrical Requirements for Mechanical Equipment" for requirements.
- D. Electrical Work: Provide the following wiring as work of this section, in accordance with requirements of Division 16:
 - 1. Low voltage wiring between water heaters and remote mounted thermostats and controls.
 - 2. Provide factory-mounted and factory-wired controls and electrical devices as specified in this section.
- E. Refer to Division 16 sections for other electrical wiring including motor starters, disconnects, wires/cables, raceways, and other required electrical devices; not work of this section.

1.2 QUALITY ASSURANCE:

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacturer of water heaters of types and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Codes and Standards:
 - 1. UL Compliances: Construct water heaters in accordance with the following UL standards:
 - a. UL 174, "Electric Storage-Tank Water Heaters".
 - b. UL 1261, "Electric Water Heaters for Pools and Tubs".
 - c. UL 1453, "Electric Booster and Commercial Storage Tank Water Heaters".
 - 2. Provide water heater components which are UL-listed and labeled.
 - 3. NSF Compliance: Construct and install water heaters located in food service establishments in accordance with NSF 5, "Standard for Hot Water Generating Equipment for Food Service Establishments using Spray Type Dish washing Machines".
 - 4. NEC Compliance: Install electric water heaters in accordance with requirements of NFPA 70, "National Electrical Code".
 - 5. NFPA Compliance: Install gas-fired water heaters in accordance with requirements of NFPA 54, "National Fuel Gas Code".

6. NFPA Compliance: Install oil-fired water heaters in accordance with requirements of NFPA 31, "Installation of Oil Burning Equipment".
7. AGA and NSF Labels: Provide water heaters which are listed and labeled by American Gas Association and National Sanitation Foundation.
8. ASME Code Symbol Stamps: Provide water heaters and safety relief valves which comply with ASME Boiler and Pressure Vessel Code, and are stamped with appropriate code symbols.
9. ASHRAE Compliance: Provide water heaters with Performance Efficiencies not less than prescribed in ASHRAE 90A, "Energy Conservation in New Building Design".

1.3 SUBMITTALS:

- A. Product Data: Submit manufacturer's technical product data including rated capacities and efficiencies of selected model clearly indicated; operating weights; furnished specialties and accessories; and installation and start-up instructions.
- B. Shop Drawings: Submit manufacturer's assembly type shop drawings indicating dimensions, required clearances, and methods of assembly of components.
- C. Wiring Diagrams: Submit manufacturer's electrical requirements for electrical power supply wiring to water heaters. Submit manufacturer's ladder-type wiring diagrams for interlock and control wiring required for final installation of water heaters and controls. Differentiate between portions of wiring that are factory-installed and portions that are to be field-installed.
- D. Record Drawings: At project closeout, submit record drawings of installed systems products; in accordance with requirements of Division 15.
- E. Maintenance Data: Submit maintenance data and parts lists for each type and size of water heater, control, and accessory; including "trouble-shooting" maintenance guide. Include this data, product data, shop drawings, and wiring diagrams in maintenance manual; in accordance with requirements of Division 15.
- F. Certificates: Submit appropriate Certificates of Shop Inspection and Data Report as required by provisions of ASME Boiler and Pressure Vessel Code.

1.4 DELIVERY, STORAGE, AND HANDLING:

- A. Handle water heaters and components carefully to prevent damage, breaking, denting and scoring. Do not install damaged water heaters or components; remove from site and replace with new.
- B. Store water heaters and components in clean dry place. Protect from weather, dirt, fumes, water, construction debris, and physical damage.
- C. Comply with manufacturer's rigging and installation instructions for unloading water heaters, and moving units to final location for installation.

1.5 SPECIAL PROJECT WARRANTY:

- A. Warranty on Coil, Heat Exchanger, and Burner: Provide written warranty, signed by manufacturer, agreeing to replace/repair, within warranty period, coils, heat exchangers, and burners with inadequate or defective materials and workmanship, including leakage,

breakage, improper assembly, or failure to perform as required; provided manufacturer's instructions for handling, installing, protecting, and maintaining units have been adhered to during warranty period. Replacement is limited to component replacement only, and does not include labor for removal and reinstallation.

1. Warranty Period: 5 years from Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Light Duty Gas-Fired:
 - a. Lochinvar Water Heater Corp.
 - b. Rheem Water Heater Div; City Investing Co.
 - c. Ruud Water Heater Div; City Investing Co.
 - d. Smith Corp. (A.O.); Consumer Products Div.
 - e. State Industries, Inc.
 - f. Viking Superior Corp.
2. Commercial Gas-Fired:
 - a. Bock Water Heaters, Inc.
 - b. Lockinvar Water Heater Corp.
 - c. PVI Industries, Inc.
 - d. Rheem Water Heater Div; City Investing Co.
 - e. Ruud Water Heater Div; City Investing Co.
 - f. Smith Corp. (A.O.); Consumer Products Div.
 - g. State Industries, Inc.
 - h. Viking Superior Corp.
3. Commercial gas-fired, packaged tank and boiler:
 - a. Lochinvar
 - b. Ray Pack
 - c. Teledyne Laars
4. Light Duty Electric:
 - a. Lockinvar Water Heater Corp.
 - b. Rheem Water Heater Div; City Investing Co.
 - c. Ruud Water Heater Div; City Investing Co.
 - d. Smith Corp. (A.O.); Consumer Products Div.
 - e. State Industries, Inc.
 - f. Viking Superior Corp.
5. Commercial Electric:
 - a. Rheem Water Heater Div; City Investing Co.
 - b. Ruud Water Heater Div; City Investing Co.
 - c. Smith Corp (A.O.); Consumer Products Div.
 - d. State Industries, Inc.
 - e. Viking Superior Corp.

6. Hot Water Dispensers:
 - a. In-Sink-Erator Div; Emerson Electric Co.
 - b. International Technology Sales Corp.

2.2 LIGHT DUTY GAS-FIRED WATER HEATERS:

- A. General: Provide residential gas-fired water heaters of sizes and capacities as indicated on schedule.
- B. Heater: Construct for Working pressure of 150 psi; 3/4inch tapping for relief valve; magnesium anode rod; glass lining on internal surfaces exposed to water.
- C. Safety Controls: Equip with automatic gas shutoff device to shut off entire gas supply in event of excessive temperature in tank; and pilot safety shutoff.
- D. Draft Hood: Equip with AGA certified draft hood.
- E. Jacket: Insulate tank with vermin-proof glass fiber insulation. Provide outer steel jacket with baked enamel finish.
- F. Accessories: Provide brass drain valve; 3/4inch relief valve; radiant floor shield; and cold water dip tube.
- G. Controls: Provide gas pressure regulator; pilot gas regulator; and adjustable thermostat.

2.3 COMMERCIAL GAS-FIRED WATER HEATERS:

- A. General: Provide commercial gas-fired water heaters of sizes and capacities as indicated on schedule. Provide certification of design by AGA under Volume III tests for commercial water heaters for delivery of 180 degrees F (82 degrees C) water.
- B. Heater: Construct for working pressure of 150 PSI; boiler type hand hole cleanout; magnesium anode rod; 3/4inch tapping for relief valve; glass lining on internal surfaces exposed to water.
- C. Safety Controls: Equip with automatic gas shutoff device to shut off entire gas supply in event of excessive temperature in tank; and pilot safety shutoff.
- D. Draft Hood: Equip with AGA certified draft hood.
- E. Jacket: Insulate tank with vermin-proof glass fiber insulation. Provide outer steel jacket with baked enamel finish over bonderized undercoating.
- F. Accessories: Provide brass drain valve; 3/4inch pressure and temperature relief valve; and radiant floor shield.
- G. Controls: Provide gas pressure regulator; pilot gas regulator; thermostat; and temperature limit control.

2.4 COMMERCIAL GAS-FIRED WATER HEATER- PACKAGED TANK AND BOILER:

- A. General: Provide commercial gas-fired water heater of size and capacity listed on schedule.
- B. Configuration: Copper tube domestic water boiler factory mounted on top of water storage tank with inter-connection piping and tank circulating pump.

- C. Boiler: Finned copper tube heat exchanger, lined cast iron or bronze headers, stainless steel burners, integral draft diverter, and spark pilot ignition. The boiler shall operate at a minimum of 81percent thermal efficiency.
 - D. Tank: Glass lined steel tank constructed in accordance with ASME standards for 150 psig working pressure, with hand hole, T&P relief valve, foam insulation to exceed ASHRAE 90.1 requirements, and galvanized steel jacket.
 - E. Pump: All bronze circulating pump.
 - F. Control: Immersion aquastat to start pump and boiler when tank temperature drops below setpoint (140degrees F-adjustable), and high limit control.
- 2.5 LIGHT DUTY ELECTRIC WATER HEATERS:
- A. General: Provide residential electric water heaters of sizes, capacities, and electrical characteristics as indicated on schedule.
 - B. Heater: Construct for working pressure of 150 PSI; magnesium anode rod; glass lining on internal surfaces exposed to water.
 - C. Heating Elements: Low watt density with zinc plated copper sheath; double element, non-simultaneous operation.
 - D. Safety Controls: Equip with high temperature cutoff for each element, factory wired.
 - E. Jacket: Equip with full size control compartments with front panel opening. Insulate tank with vermin-proof glass fiber insulation. Provide outer steel jacket with baked enamel finish.
 - F. Accessories: Provide brass drain valve; 3/4inch relief valve; cold and water dip tube.
 - G. Controls: Provide thermostat for each element, factory wired.
- 2.6 COMMERCIAL ELECTRIC WATER HEATERS:
- A. General: Provide commercial electric water heaters of sizes, capacities, and electrical characteristics as indicated on schedule.
 - B. Heater: Working pressure of 150 PSI, magnesium anode rod; glass lining on internal surfaces exposed to water.
 - C. Heating Elements: Heavy-duty, medium watt density, with incoloy sheath, thermostat stepped through magnetic contactors.
 - D. Safety Controls: Double pole, manual reset, high limit; probe type electric low water cutoff; both factory wired.
 - E. Jacket: Equip with full size control compartments with front panel opening. Insulate tank with vermin-proof glass fiber insulation. Provide outer steel jacket with bonderized undercoat and baked enamel finish.
 - F. Accessories: Provide brass drain valve; 3/4inch temperature and pressure relief valve; ASME tank construction for 125 PSI working pressure; and 4inch x 6inch hand hole cleanout.

- G. Controls: Adjustable immersion thermostat; power circuit fusing; pilot light and switch controlling control circuit; 3-stage time delay sequencer; and 7-day time clock.

2.7 HOT WATER DISPENSERS:

- A. General: Provide hot water dispensers as indicated, consisting of insulated tank with drain plug, chrome-plated faucet, instant self-closing valve, and adjustable thermostat.
- B. Capacity: 1/2 gal., 100 cups of water per hour at 190 degrees F.
- C. Thermostat: Snap action, adjustable from 140 degrees F to 200 degrees F, factory preset at 190 degrees F.
- D. Electrical: 1,300 watts, 115-volts, UL listed. Provide 3- wire cord with NEMA 3-prong grounding plug.

PART 3 - EXECUTION

3.1 EXAMINATION:

- A. Examine areas and conditions under which water heaters are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 INSTALLATION OF WATER HEATERS:

- A. General: Install water heaters in accordance with manufacturer's installation instructions. Install units plumb and level, firmly anchored in locations indicated, and maintain manufacturer's recommended clearances.
- B. Support: Place units on concrete pads, orient so controls and devices needing service and maintenance have adequate access.
- C. Piping: Connect hot and cold water piping to units with shutoff valves and unions. Connect recirculating water line to unit with shutoff valve, check valve, and union. Extend relief valve discharge to closest floor drain, or as indicated.
- D. Gauges: Provide thermometers on inlet and outlet piping of water heaters, in accordance with Basic Mechanical Materials and Methods Section "Meters and Gauges."
- E. Gas-Fired Water Heaters: Connect gas supply to gas line with drip leg, tee, gas cock, and union; full size of unit inlet connection. Locate piping so as not to interfere with service of unit.
 - 1. Flue: Connect flue to draft hood with gas-tight connection. Provide flue of minimum size as flue outlet on heater. Comply with gas utility requirements.
- F. Electric Water Heaters:
 - 1. Electrical Wiring: Install electrical devices furnished by manufacturer but not specified to be factory-mounted. Furnish copy of manufacturer's wiring diagram submittal to Electrical Installer.
 - a. Verify that electrical wiring installation is in accordance with manufacturer's submittal and installation requirements of Division-16 sections. Do not proceed with water heater start-up until wiring installation is acceptable to water heater Installer.

3.3 FIELD QUALITY CONTROL:

- A. Start-Up: Start-up, test, and adjust gas-fired water heaters in accordance with manufacturer's start-up instructions, and utility company's requirements. Check and calibrate controls, adjust burner for maximum efficiency.
- B. Start-up: Start-up, test, and adjust electric water heaters in accordance with manufacturer's start-up instructions. Check and calibrate controls.

3.4 CLOSEOUT PROCEDURES:

- A. Training: Provide services of manufacturer's technical representative for 1-half day to instruct Owner's personnel in operation and maintenance of water heaters.
 - 1. Schedule training with Owner, provide at least 7-day notice to Contractor and Engineer of training date.

END OF SECTION 15458