

SECTION 15458 - WATER HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.
- B. Division 15 Basic Mechanical Materials and Methods sections apply to work of this section.

1.2 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 water piping, and specialties, which are required external to water heaters for installation; not work of this section.
- C. Electrical Work: Refer to Division 15 section "ELECTRICAL PROVISIONS OF MECHANICAL WORK" for requirements.
- D. 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.

1.3 QUALITY ASSURANCE:

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacturer of water heaters and water softeners 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:
UL 1453, "Electric Booster and Commercial Storage Tank Water Heaters".
 - 2. Provide water heater components which are UL-listed and labeled.
- C. NEC Compliance: Install electric water heaters in accordance with requirements of NFPA 70, "National Electrical Code".
- D. ASHRAE Compliance: Provide water heaters with Performance Efficiencies not less than prescribed in ASHRAE 90A, "Energy Conservation in New Building Design".
- E. NFPA Compliance: Install gas-fired water heaters in accordance with requirements of NFPA 54, "National Fuel Gas Code".
- F. AGA Labels: Provide water heaters which are listed and labeled by American Gas Association.

1.4 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. Submit manufacturer's ladder-type wiring diagrams for interlock and control wiring required for final installation of equipment and controls. Differentiate between portions of wiring that are factory-installed and portions that are to be field-installed.
- D. Maintenance Data: Submit maintenance data and parts lists for each type and size of water heater and softener, 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 1.

1.5 DELIVERY, STORAGE, AND HANDLING:

- A. Handle equipment and components carefully to prevent damage, breaking, denting and scoring. Do not install damaged equipment or components; remove from site and replace with new.
- B. Store equipment 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 equipment, and moving units to final location for installation.

PART 2 - PRODUCTS

2.1 GAS FIRED WATER HEATERS (STORAGE OVER 100 GALLON):

- A. General: Provide gas-fired hot water storage heaters of sizes, capacities, electrical characteristics and accessories as indicated on plans and herein.
- B. Storage Tank: The tank shall be constructed in accordance with ASME Code Section IV, stamped with the appropriate symbol, and hydrostatically tested at 190 PSI minimum. The tank shall be equipped with a removable modular energy package mounted on a flange with a minimum diameter of 23". Tank access may be gained by the removal of this energy package with ordinary hand tools. The tank shall also be equipped with an easily removable rear module access cover with a minimum diameter of 23" for simplicity of tank access and energy package cleaning maintenance. Tank shall contain a strata-baffle to divert the incoming cold water to allow 80% of the total tank storage to be effective at a useable temperature of 5-F from the set point of the operating thermostats. All fittings will be of Type K heavy copper. No tank connections of other than nonferrous alloys will be accepted.
- C. Controls: There shall be a minimum of two operating thermostats. Each thermostat shall have an adjustable range as noted below. These operating controls should be set as noted below. Maximum circulating water temperature in the plumbing system not to exceed

the upper temperature control setpoint. There shall be one temperature limiting device designed to prevent temperatures from exceeding a maximum as noted below. There shall also be an ASME temperature and pressure relief valve set at not more than 125 PSI and 210-F. There shall also be installed, in the cold section of the tank as factory standard equipment, a thermal expansion control valve set to relieve pressures exceeding 100 PSI. Equipment submitted without these redundant controls, temperature limiting device and thermal expansion control valve, will not be accepted.

Min. Thermostat Adjustment Range	Lower Temp. Control Setpoint	Upper Temp. Control Setpoint	Temp. Limiting Device Setpoint
70° F to 120° F	105° F	110° F	115° F

- D. Tank Insulation: The tank shall be insulated with a heavy density fiberglass insulation and will be jacketed with segmented panels of 22 gauge steel with a factory baked enamel finish. Each panel shall be interlocked and shall be easily removable for field replacement should damage occur. The heat loss of the insulated tank shall not exceed 14 BTU/HR per square foot of tank surface area with not less than an ambient temperature of 65°F. The minimum jacket heat loss acceptable must not exceed those of ASHRAE 90 Standards. The entire water heater shall rest on heavy duty skids for ease of movement.
- E. The Tank Lining: Tank shall be completely lined, inside and out, with 97% pure nickel. The method of applying the nickel shall be the electro-less chemical deposition method, creating a holiday-free, nonferrous layer of pure 97% nickel over the ASME code steel. The tank shall have an additional overcoat of an elastomeric, polymerized, hydrophobic cross-linked plastic to prevent any electrolysis that may develop within the plumbing system. Magnesium rods will not be installed. A copper lining may be used in lieu of nickel. Cement lining or glass lining (porcelain enamel) with magnesium rods will not be accepted as an equal.
- F. Safety Controls: The heater will be equipped with:
1. one immersion operating thermostats
 2. an automatic-reset, immersion, temperature limiting <0> device
 3. an ASME rated temperature and pressure relief valve.
 4. intermittent ignition device.
 5. barometric flue damper.
- G. Warranty: For one year, manufacturer will pay all material, labor, and freight needed to repair any failed part(s) of the heater. For three years, manufacturer will pay all material, labor, and freight needed to return the heating section to proper operating condition for defects in materials, workmanship, corrosion, and erosion.
1. For eight years, manufacturer will, at its option, repair or replace the tank should it have a manufacturer or material defect. Manufacturer will provide all freight and labor associated with remedies performed under the terms of the warranty.
 2. For the next twelve years remedies to the tanks performed under the terms of the warranty will be pro-rated and shared between manufacturer and owner. The manufacturer's warranty must be included in all submittals.
- H. Heat Exchanger: Two-pass submerged firetube heat exchanger, inserted horizontally into the storage tank, secured to the tank by way of a bolted flange. Secondary heat exchanger to preheat incoming water. Provide three year warranty on heat exchangers.

1. Heat exchanger warranty shall cover defects in material and workmanship, corrosion and erosion.
- I. Burner: Forced draft power burner with cast aluminum fan housing, UL Listed, IRI gas train. Gas shall be supplied to the burner at 2.0 PSIG maximum.
- J. The entire water heater shall meet UL requirements, shall fit properly in the space provided and shall conform to drawing specifications. The complete installation shall be in accordance with all applicable Federal, State, and Local Codes and Installation Drawings.
- K. Start Up: Start up on the unit will be performed by factory trained and authorized personnel.
- L. Accessories: Provide air intake assembly for ducted combustion air.
- M. Manufacturers: Subject to compliance with requirements, provide water to water heaters of one of the following:
 1. PVI or pre-approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION:

- A. Examine areas and conditions under which equipment is 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 equipment 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. Extend relief valve discharge to mop basin or floor drain.
- D. Gages: Provide thermometers on inlet and outlet piping of water heaters, in accordance with Basic Mechanical Materials and Methods Section "Meters and Gages."

3.3 GAS FIRED WATER HEATERS:

- A. 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.

3.4 FIELD QUALITY CONTROL:

- A. Start-Up: Start, 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.

END OF SECTION 15458