**SECTION 22 3000**

**PLUMBING EQUIPMENT**

**PART 1 GENERAL**

1. DESCRIPTION
   1. All work specified in this Section is governed by the Common Work Results for Plumbing Section 22 0500.
   2. This Section 22 3000 and the accompanying drawings cover the provisions of all labor, equipment, appliances, and materials and performing all operations in connection with the construction of the water heating systems as specified herein and as shown. These systems include, but are not limited to, the following:
      1. Water Heaters
      2. Hot Water Circulator
      3. Elevator Sump Pump
2. GENERAL REQUIREMENTS
   1. All plumbing equipment installed in locations with a water hardness of 25 grains per gallon or more, shall be resistant to corrosion. Where copper materials are in the water stream, it shall be Cupro-Nickel of not more than 90% copper.
   2. All water heaters shall be NSF/ANSI 61 certified “lead free” for potable water service.
   3. All water heaters shall have ASME rated temperature and pressure relief valve(s). Valve(s) shall be provided by the Manufacturer and sized for the discharge location noted in the plans.
   4. All water heaters and tanks shall be glass-lined, 1600°F fired, with a working pressure of 150 psi, a test pressure of 300 psi, or the system pressure at the installation location, whichever is greater, and shall have magnesium anodes for electrolytic protection. Separate storage tanks may also be cement-lined. Tanks shall be ASTM stamped.
   5. All water heaters shall meet or exceed the energy efficiency requirements of the latest version of ASHRAE 90.1.
   6. All water heaters and pumps shall be UL approved and labeled, and be AGA certified where applicable.
   7. All water heaters and pumps shall be NEMA rated appropriate for the installation location in which they are installed.
   8. Water heater controls shall include an operating thermostat and manual reset high limit control for each heating element or burner. The safety high limit control shall prevent over heating in the event of a thermostat failure.
   9. All controls shall be factory-wired and require no external power source.
   10. Water heaters and tanks shall have drain with external access and hose end connection.

**PART 2 PRODUCTS**

1. WATER HEATER RESIDENTIAL
   1. The water heater shall be as scheduled. Acceptable substitute manufactures are shall be per Landmark’s Construction Appendix A – Product Selection.
   2. Water heater shall be electric.
   3. Controls shall include an operating thermostat, automatic reset high limit, secondary overheat control, and gas valve with 100% safety pilot feature. All controls shall be self-generating and require no external power source.
2. WATER HEATER \*\* COMMERCIAL ELECTRIC
   1. The water heater shall be as scheduled. Acceptable substitute manufactures are shall be per Landmark’s Construction Appendix A – Product Selection. Water heaters shall be commercial-grade.
   2. The immersion heating elements shall be low watt density with a plated incoloy sheath material for long life. The heating elements shall mount in individual screw-in tank flanges.
   3. All field electrical wiring connections to the water heater shall be made to a main terminal block. All internal wiring shall be made to solderless terminal lug wiring connections. Wiring to be color coded for ease of servicing. The water heater shall be factory assembled, wired and tested.
3. HOT WATER CIRCULATOR
   1. Hot water circulator shall be as scheduled. Acceptable substitute manufactures are shall be per Landmark’s Construction Appendix A – Product Selection.
   2. Hot water circulators used in potable water system shall be lead-free.
4. \*\*ELEVATOR SUMP PUMP
   1. Sump pump shall be as scheduled. Acceptable substitute manufactures are shall be per Landmark’s Construction Appendix A – Product Selection.
   2. Sump pump shall be provided as a complete package including alarm/control panel, float switches, oil detection system, and EMS interlock.
   3. Alarm/control panel shall be powered from a dedicated, separate, circuit from the sump pump. Alarm/control panel shall have audible and visible alarm. Coordinate installation location with Architect and Owner. Panel shall not be located in the hoistway.
   4. Where serving Fire Service elevators, associated sump pumps and panels shall be served by emergency power.

**PART 3 EXECUTION**

1. INSTALLATION
   1. The water heaters and accessories shall be installed in strict accordance with the Manufacturer's recommendations and the Contract Documents.
   2. All temperature and pressure relief valves shall be piped full size to an indirect waste such as the nearest floor drain, service sink, sink tailpiece, etc. Piping shall be in accordance with specification 22 10 00 for DWV services. Size shall be in accordance with Manufacturer’s requirements.
   3. All water heaters shall have internal heat traps or shall have heat traps installed in the cold water and hot water piping. Instantaneous water heaters shall be provided with heat traps unless Manufacturer documentation specifically allows exclusion.
   4. Water heaters shall be completely encased in high density insulation of sufficient value to meet the energy efficiency standards of latest version of ASHRAE 90.1 or shall be factory insulated with non-CFC polyurethane closed-cell foam insulation. Provide removable insulation panels to maintain access to all required components.
   5. All water heaters or boilers subject to condensing under normal steady-state operating conditions shall be provided and installed with accessory condensate neutralization kits.
   6. Specific attention is called to confirm minimum instantaneous water heater flowrate does not exceed minimum fixture use flowrate.
2. WARRANTY
   1. Provide 5-year limited warranty on all tanks and 1-year limited warranty on parts unless otherwise noted.

**END OF SECTION**