

- 1 General
 - 1.1 **SUMMARY**
 - .1 Section Includes
 - .1 Labour, Products, equipment and services necessary to complete the Work of this section.
 - 1.2 **CODES AND REGULATIONS**
 - .1 Conform to the latest edition of the codes and standards referenced herein.
 - .2 Pressure Ratings
 - .1 Suitable for working pressure of 860 kPa (125 psi) (1035 kPa (150 psi))
 - .3 Efficiency and Stand-by Loss Ratings
 - .1 To ASHRAE/IES 90.1b
 - .4 Electric Hot Water Heaters to:
 - .1 CSA C22.2 No. 110
 - .2 CSA C191 Series M
 - .5 Relief Valves
 - .1 Temperature, pressure and combination: To CAN1-4.4, or ANSI Z21.22
 - 1.3 **SUBMITTALS**
 - .1 Shop Drawings
 - .1 Submit Shop Drawings in accordance with Section 01 33 00.
 - .2 Provide certification for compliance to ASHRAE 90.1 for efficiency and stand-by loss ratings.
 - .2 Operation and Maintenance Data
 - .1 Submit printed operation instructions and maintenance data in accordance with Section 01 33 00.
 - .2 Minimum warranty on tanks, accessories and parts shall be minimum of 5 years.
- 2 Products
 - 2.1 **GENERAL REQUIREMENTS**
 - .1 Connections up to NPS 3 to be screwed and over NPS 3 to be flanged.
 - .2 Water heaters to be factory pre-piped and pre-wired, except where devices are specified to be shipped loose to be installed by others.

2.2 LIGHT COMMERCIAL ELECTRIC TANK-TYPE

.1 Construction

- .1 Glass lined steel tank with replaceable magnesium anode
- .2 50 mm mineral wool or foam injected insulation
- .3 Baked enamelled steel jacket housing
- .4 Zinc plated copper sheathed medium watt immersion elements arranged for flip-flop operation controlled by close tolerance positive snap action thermostats
- .5 Manual reset high temperature limit switch
- .6 Built-in and factory pre-wired controls including contactors
- .7 Hose threaded drain valve
- .8 ASME rated temperature and pressure relief valve

.2 Electrical

- .1 Capacities to 54 kW
- .2 As indicated on Drawings.

.3 Manufacturer

- .1 A.O. Smith
- .2 J.H Wood
- .3 Bradford White
- .4 Rheem

2.3 HEAVY DUTY ELECTRIC TANK-TYPE

.1 Construction

- .1 Glass lined steel tank with replaceable magnesium anode
- .2 R16 50 mm mineral wool or foam injected insulation
- .3 Baked enamelled steel jacket housing
- .4 Incoloy medium watt immersion elements arranged for flip-flop operation controlled by close tolerance positive snap action thermostats
- .5 Manual reset high temperature limit switch
- .6 Built-in and factory pre-wired controls including contactors, complete with pilot light and switch, sequencing, time clock, low water cutoff, circuit fusing, alarm bell, modulating step control
- .7 Handhold cleanout
- .8 Hose threaded drain valve

- .9 ASME rated temperature and pressure relief valve
 - .2 Electrical
 - .1 As indicated on Drawings.
 - .3 Manufacturer
 - .1 A.O.Smith
 - .2 J.H Wood
 - .3 Bradford White
 - .4 Rheem
- 2.4 **HIGH CAPACITY/HIGH STORAGE ELECTRIC TANK**
 - .1 Construction
 - .1 Glass lined steel tank with replaceable magnesium anode
 - .2 ASME construction
 - .3 50 mm fibreglass insulation
 - .4 Baked enamelled steel jacket housing
 - .5 Incoloy medium watt immersion elements arranged for flip-flop operation controlled by close tolerance positive snap action thermostats
 - .6 Manual reset high temperature limit switch
 - .7 Built-in and factory pre-wired controls including contactors, complete with pilot light and switch, sequencing, time clock, low water cutoff, control and power circuit fusing, alarm bell, modulating step control, terminal blocks, safety door interlock, manual limiting switches
 - .8 Magnetic contactors UL rated for 100,000 cycles
 - .9 Handhold cleanout
 - .10 Hose threaded drain valve
 - .11 ASME rated temperature and pressure relief valve
 - .2 Electrical
 - .1 As indicated on Drawings.
 - .3 Manufacturer
 - .1 A.O.Smith
 - .2 J.H Wood
 - .3 PVI
 - .4 Rheem

2.5 **INSTANTANEOUS WATER HEATER**

.1 Construction

- .1 Low watt density, copper sheathed electric heating elements, flange mounted for easy removal.
- .2 Hot dipped galvanized steel tank, with minimum of 25 mm thick insulation, and baffles to direct flow of water across all elements.
- .3 Full automatic controls and control panel mounted on heater, including manual reset high temperature safety cut-out, thermostat, magnetic contactor and control transformer.
- .4 Pressure temperature relief valve.

.2 Manufacturers

- .1 Rheem
- .2 Patterson-Kelly
- .3 Bosch
- .4 A.O. Smith

2.6 **CONTROL AND MONITORING SYSTEMS (~~FUTURE~~ BAS INTEGRATION)**

.1 Any vendors that are authorized dealers or distributors of the following control systems are acceptable:

- .1 Delta Controls
- .2 Reliable Controls
- .3 Schneider Electric SmartX Series
- .4 Distech Controls
- .5 Johnson Controls Facility Explorer
- .6 Honeywell CIPer series, Spyder Models 5 or 7

.2 BAS System Integration:

- .1 All control systems must be integrated to the City's J2 Innovations Fluid Integration (FIN) serve, including but not limited to the following:
 - .1 Graphical user interface (monitoring and control)
 - .2 Alarming
 - .3 Data Trending
 - .4 Data Archiving
 - .5 Project Haystack naming convention
- .2 The installer must be licensed by J2 Innovations to sell, install, program and configure Fluid Integration (FIN).

- .3 Building Controllers (BC) must be Tridium Niagara JACE with the Haystack module and driver. The installer must be a licensed Tridium system integrator for any Tridium BCs or embedded or edge Niagara Framework products used. Soft JACE is not accepted.
- .3 Licensing Requirements
 - .1 Licenses shall be provided to and in the name of the City of Toronto
 - .2 Licenses shall be perpetual, transferrable, assignable and royalty free.
 - .3 Tridium Licenses shall allow all workbench/supervisor brands complete system access and functionality.
- .1 Installer and Manufacturer Qualifications
 - .1 Installer shall have an established working relationship with Control System Manufacturer.
 - .2 Installer shall have successfully completed control system's control system training. Upon request, installer shall present record of completed training including course outlines.
 - .3 It is the intent of these specifications to define an open protocol state-of-the-art distributed computerized Building Management and Control System, which is user friendly, has known reliability, is extremely responsive, and which is to be designed, installed, implemented, and supported by a local office of approved bidders.
 - .4 BAS Contractor provides three locations for successful installations of similar open protocol computer-based systems. Sites provided must consist of more than 150 hardware inputs/outputs. Project sites must be local to the location of this project.
- 3 Execution
- 3.1 **INSTALLATION**
 - .1 General
 - .1 Provide structural steel for horizontal mounted tanks and for instantaneous heaters.
 - .2 Provide valved drain from each tank to nearest funnel or hub drain.
 - .3 Pipe-up T&P relief valve down to floor.
 - .4 Connect up to cold water supply lines and domestic hot water distribution piping.
 - .5 Provide thermometer on outlet piping from hot water tank (and as shown).
 - .2 Electric Hot Water Heaters
 - .1 Power wiring and unfused disconnected by electrical Division 26.
- End of Section

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