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**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 22 05 00 - Plumbing - General Requirements Concerning Work Results.
- .2        Section 22 42 01 - Plumbing - Special Equipment.
- .3        Section 23 05 19 - Thermometers and Pressure Gauges - Piping Systems.
- .4        Section 23 08 02 - Cleaning and Commissioning of Pipework for Mechanical Installations.

**1.2                REFERENCES**

- .1        American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).
  - .1        ANSI/ASHRAE/IESNA Standard 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings.
- .2        Canadian Standards Association (CSA)/CSA International.
  - .1        CSA B51, Boiler, Pressure Vessel, and Pressure Piping Code.
  - .2        CSA-B149.1, Installation for Natural Gas and Propane.
  - .3        ANSI Z21.10.3/CSA 4.3, Gas Water Heaters - Volume III, Storage Water Heaters with Input Ratings above 75,000 Btu per Hour, Circulating and Instantaneous.

**1.3                SUBMITTALS**

- .1        Submittals in accordance with Section 01 33 00 - Submittal Procedures
- .2        Technical Sheets and Shop Drawings.
  - .1        Technical sheets and shop drawings must include the following:
    - .1        The equipment and accessories, including connections, pipes, control equipment, and identification of assemblies either in factory or on-site.

**1.4                CLOSEOUT SUBMITTALS**

- .1        Submit product data and maintenance sheets for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

- .2 Maintenance Sheets:
  - .1 Maintenance sheets must include the following:
    - .1 Description of plumbing specialties and accessories, giving manufacturers name, type, model, year, and capacity.
    - .2 Details of operation, servicing and maintenance.
    - .3 Recommended spare parts list.

## **1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Place toxic and dangerous wastes into containers designated for this purpose.
- .4 Handle and dispose of dangerous materials in accordance with municipal and regional regulations.
- .5 Collect and separate for disposal packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .6 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.

## **1.6 ACCEPTABLE PRODUCTS AND MATERIALS**

- .1 Where a particular brand name is stipulated, see Instructions to Bidders for procedure for requesting approval of substitute materials and products.

## **Part 2 Products**

### **2.1 HIGH EFFICIENCY, NATURAL GAS WATER HEATER (CEG -1 AND CEG-2)**

- .1 Gas water heater conforming to norms ANSI Z21.10.3/CSA 4.3, CAN/CSA-B149.1, ASME and ANSI/ASHRAE/IESNA Standard 90.1.
- .2 Porcelain enameled reservoir with 50 mm (2 in) of insulation and an enameled steel sheet covering.
- .3 The water heater is to be designed for sealed combustion, connected with plastic intake and exhaust ducts.
- .4 Gas Burner: Sealed combustion, complete with high limit control, gas valve, gas pressure regulator, 100% safety shut-off, firepower gas burner with air distribution ring.

- .5 Characteristics:
  - .1 Capacity: 379 L.
  - .2 Input power: 73 kW.
  - .3 Recovery rate: 2,090 L/h based on a temperature rise of 56°C.
  - .4 Minimum combustion efficiency 96%.
  - .5 Dimensions:
    - .1 Diameter: 705 mm.
    - .2 Height: 1,930 mm.
  - .6 Pressure rating: 1,035 kPa.
  - .7 Electrical supply: 120 V, 1 ph, 60 Hz.
- .6 Acceptable Products:
  - .1 A.O. Smith, model BTH-250.
  - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .7 Accessories:
  - .1 Vacuum breaker safety valve (T&P) and expansion tank, Model ST-60V-C;
  - .2 Therm-X-Trol from Amtrol;
  - .3 Expanflex;
  - .4 Bell & Gossett;
  - .5 Replacement materials or products: approved by addendum according to Instructions to bidders.

## 2.2 TRIM AND INSTRUMENTATION

- .1 Drain Valve: NPS 1 with hose end.
- .2 Thermometer:
  - .1 100 mm diameter thermometer, cadran type, with red indicating needle and thermowell filled with conductive paste for control valve temperature sensor.
  - .2 Refer to 23 05 19 - Meters and Gauges for HVAC Piping.
- .3 Pressure Gauge:
  - .1 175 mm diameter pressure gauge, cadran type, red indicating needle, equipped with siphon and isolating valve.
  - .2 Refer to 23 05 19 - Meters and Gauges for HVAC Piping.
- .4 Thermo well filled with conductive paste for control valve temperature sensor.
- .5 ASME rated temperature and pressure relief valve sized for full capacity of heater control valve, having discharge terminating over floor drain and visible to operators.

- .6 Magnesium anodes adequate for 20 years of operation and located for easy replacement.
- .7 Expansion Tank:
  - .1 Steel tank with polypropylene liner, butyl diaphragm, adjustable air pressure NSF, ASME - Sections VIII and IX.

### **Part 3 Execution**

#### **3.1 INSTALLATION**

- .1 Install drinking water heater in accordance with the manufacturer's recommendations and the requirements of the authority having jurisdiction.
- .2 Supply and install steel construction elements as required for the mounting and installation of the tanks and water heaters.
- .3 All water heaters must have a test lever equipped heat and pressure safety valve in accordance with ASME.
- .4 Install a drainage valve piped to the closest floor drain in a secure manner.
- .5 Magnesium anodes adequate for 20 years of operation and located for easy replacement.
- .6 Supply and install anti-siphon device as per CSA B64-01 and Section 22 42 01 - Plumbing Specialties and Accessories.
- .7 Adjust thermostats to 80°C.
- .8 Supply and install insulation between the reservoir and its supports.
- .9 Install natural gas water heaters in accordance with the norm CAN/CSA-B149.1.

#### **3.2 FIELD QUALITY CONTROL**

- .1 The start-up and commissioning of the water heater must be performed by the manufacturer or his representative.

**END OF SECTION**