

**Part 1        General**

**1.1            SUMMARY**

- .1    Section Includes:
  - .1        Materials and installation for duplex sanitary lift station pumps and fiberglass basins (LS-1 and LS-2) and domestic hot water recirculation pump (PU-2).
- .2    Related Sections:
  - .1        Section 01 33 00 - Submittal Procedures.
  - .2        Section 01 78 00 - Closeout Submittals.

**1.2            SUBMITTALS**

- .1    Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2    Product Data:
  - .1        Submit manufacturer's printed product literature, specifications and data sheet for equipment.
- .3    Shop Drawings.
  - .1        Submit shop drawings to indicate:
    - .1            Equipment, including connections, fittings, control assemblies and ancillaries. Identify whether factory or field assembled.
    - .2            Dimensions and recommended installation.
- .4    Closeout submittals: submit maintenance and engineering data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals, include:
  - .1        Manufacturers name, type, model year, capacity and serial number.
  - .2        Details of operation, servicing and maintenance.
  - .3        Recommended spare parts list with names and addresses.

**Part 2        Products**

**2.1            SANITARY LIFT STATION, LS-1:**

- .1    Packaged system shall consist of a fiberglass basin, duplex reversing submersible grinder pumps, motor, and reversing duplex panel with float alarms.
  - .1        Fiberglass Basin
    - .1            Basin shall be 6' deep and 3'-6" in diameter, constructed of fiberglass reinforced polyester and be designed to withstand wall collapse or buckling based on hydrostatic pressure of 62.4 lbs per square foot, saturated soil weight of 120 lbs per square foot, soil modulus of 700 lbs per square foot, and pipe stiffness values as specified in ASTM D3753.

- .2 The finished fiberglass basin shall be designed to withstand or exceed two times the assumed loading on any depth of the well and have a Barcol hardness of at least 90% for fully cured resin.
  - .3 Basin to be installed with a steel hatch cover with non-corroding stainless steel threaded inserts, gas tight, with top vent and discharge. Cover to be flush with floor.
  - .4 Acceptable product: "Topp Industries Incorporated" or approved equal.
- .2 Pump and Reversing Duplex Panel
- .1 Pump Performance: 40 gpm against a total dynamic head of 33 ft per pump. Shut-off head of 103 ft and maximum flow of 45 gpm at 5 ft.
  - .2 The pump shall be a fully submersible reversing grinder pump with corrosion resistant powder coated epoxy finish, cast iron impeller, and dual mechanical seals.
  - .3 Pump motor: 2 HP, 575V/3ph, 3450 RPM.
  - .4 Motor housing shall be finned and oil-filled to dissipate heat. All external-mating parts shall be machined and sealed with a Buna-n square ring. All fasteners exposed to the liquid shall be 300 series stainless steel. The motor shall be protected with an attached sealed junction box chamber which in the event of cord damage will prevent moisture entering the motor housing. The motor shall be protected on the lower side with a tandem mechanical seal arrangement, with each seal having a separate spring assembly. Motor shall be oil filled and of Class F insulated NEMA design.
  - .5 Impeller shall be a fully balanced bronze vortex design capable of passing a solid sphere of 1-1/4" diameter. It shall have pump out vanes located on the back shroud to keep debris away from the seal area. Impeller design shall be such that the gpm capacity of the pump is the same regardless of which direction it is rotating.
  - .6 The upper and lower ball bearings are permanently lubricated by the oil which fills the motor housing. The motor shaft shall be made of 416 SS and have a minimum diameter of 1 inch.
  - .7 The pump housing shall be epoxy coated class 30 cast iron. The pump housing shall be of the concentric design thereby equalizing the pressure forces inside the housing which will extend the service life of the seals and bearings. The top cap shall have a SS lifting handle.
  - .8 There shall be a seal leak probe in the seal chamber. The pump shall have a dual mechanical seal configuration with the seals mounted in tandem. Each seal assembly having a silicon carbide rotary and stationary faces with Buna-n elastomer and 316 SS spring. Seal shall be equal to Crane Type 21 Configuration.
  - .9 The cutter and palte shall be constructed of 440 SS with a Rockwell C hardness of 55-60. The stationary cutter plate shall have machined orifices to enable slurry to flow through the pump housing at an equalized pressure and velocity. The rotating cutter shall have double-sided cutting blades. The plate and cutter shall allow the motor to rotate in either direction.

- .10 Reversing duplex panel to be provided with pumps and include the following features:
  - Nema 4X thermoplastic enclosure
  - Automatic alarm reset, horn silence switch and alarm test switch
  - Horn is rated 88 decibels at 10'
  - Pre-mounted terminal block with connections to pump and float switch
  - 15' alarm (12V) tethered switch
  - Power connections are field wired
  - 5A auxiliary dry contacts
  - UL / CSA listed
- .11 Supports: provide as recommended by manufacturer.
- .12 Acceptable product: "Zoeller" model 7011 with custom control panel "Zoeller" 10-0126 alarm system or approved equal.

## **2.2 ELEVATOR SUMP LIFT STATION, LS-2:**

- .1 Packaged system shall consist of a fiberglass basin, duplex submersible effluent pumps, motor, and duplex panel with float alarms.
  - .1 Fiberglass Basin
    - .1 Basin shall be 8'-0" deep and 3'-0" in diameter, constructed of fiberglass reinforced polyester and be designed to withstand wall collapse or buckling based on hydrostatic pressure of 62.4 lbs per square foot, saturated soil weight of 120 lbs per square foot, soil modulus of 700 lbs per square foot, and pipe stiffness values as specified in ASTM D3753.
    - .2 The finished fiberglass basin shall be designed to withstand or exceed two times the assumed loading on any depth of the well and have a Barcol hardness of at least 90% for fully cured resin.
    - .3 Basin to be installed with a steel hatch cover with non-corroding stainless steel threaded inserts, gas tight, with top vent and discharge.
    - .4 Acceptable product: "Topp Industries Incorporated" or approved equal.
  - .2 Pump and Duplex Panel
    - .1 Pump Performance: 60 gpm against a total dynamic head of 32 ft per pump and capable of handling 3/4" diameter solids. Performance curve shall cover a range of 0 gpm at 57 ft to 100 gpm at 6 ft.
    - .2 The pump shall be a fully submersible pump with corrosion resistant powder coated epoxy finish, cast iron housing, bronze impeller, stainless steel motor shaft, dual mechanical seals and include seal leak probe detector.
    - .3 Pump motor: 1/2 HP, 575V/3ph, 1750 RPM.

- .4 Motor housing shall be finned to dissipate heat. All external-mating parts shall be machined and sealed with a Buna-n square ring. All fasteners exposed to the liquid shall be 300 series stainless steel. The motor shall be protected on the top side with an attached sealed junction box chamber which in the event of cord damage will prevent moisture entering the motor housing. The motor shall be protected on the lower side with a tandem mechanical seal arrangement ,with each seal having a separate spring assembly. Motor shall be oil filled and of Class B insulated NEMA design.
- .5 Impeller shall be a fully balanced bronze vortex design capable of passing a solid sphere of  $\frac{3}{4}$  " diameter. It shall have pump out vanes located on the back shroud to keep debris away from the seal area.
- .6 The upper and lower ball bearings are permanently lubricated by the oil which fills the motor housing. The motor shaft shall be made of 416 SS and have a minimum diameter of 5/8 inch.
- .7 The pump housing shall be epoxy coated class 30 cast iron. The pump housing shall be of the concentric design thereby equalizing the pressure forces inside the housing which will extend the service life of the seals and bearings. The top cap shall have a SS lifting handle.
- .8 There shall be a seal leak probe in the seal chamber. The pump shall have a dual mechanical seal configuration with the seals mounted in tandem. Each seal assembly having a silicon carbide rotary and stationary faces with Buna-n elastomer and 316 SS spring. Seal shall be equal to Crane Type 6a Configuration.
- .9 Control panel to be provided with pumps and include the following features:
  - Nema 4X thermoplastic enclosure
  - Automatic alarm reset, horn silence switch and alarm test switch
  - Horn is rated 88 decibels at 10'
  - Pre-mounted terminal block with connections to pump and float switch
  - 15' alarm (12V) tethered switch
  - Power connections are field wired
  - 5A auxiliary dry contacts
  - UL / CSA listed
- .10 Supports: Provide as recommended by manufacturer.
- .11 Acceptable product: "Zoeller" model 6161 with duplex control panel "Zoeller" 10-0126 alarm system or approved equal.

### **2.3 DOMESTIC HOT WATER RECIRCULATION PUMP, PU-2**

- .1 Performance: 1 gpm against a total differential head of 10 ft.

- .1 Horizontal inline, wet rotor circulation pump to be of lead-free bronze construction and suitable for installation in a domestic hot water recirculation system. Maximum operating temperature of 230°F. Maximum working pressure of 150 psi.
- .2 Pump shall include a buna-carbon ceramic seal.
- .3 Motor to be 55 W, 115V/1ph, 2800 RPM.
- .4 Supports: provide as recommended by manufacturer.
- .5 Flanged connections, 1”.
- .6 Acceptable product: “Bell & Gossett” model NBF-12F/LW or approved equal.

### **Part 3**

#### **3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

#### **3.2 INSTALLATION**

- .1 Make piping and electrical connections to pump and motor assembly and controls as indicated.
- .2 Ensure pump and motor assembly do not support piping.

#### **3.3 FIELD QUALITY CONTROL**

- .1 Site Tests/Inspection:
  - .1 Check power supply.
  - .2 Check starter protective devices.
- .2 Start-up, check for proper and safe operation.

**END OF SECTION**



**Part 1            General**

**1.1                SECTION INCLUDES**

- .1        Materials and installation for domestic water service used in the following:
  - .1            Hard drawn copper domestic hot water, cold water and hot water recirculation services inside building.
  - .2            Isolation valves and check valves for domestic water service.

**1.2                RELATED SECTIONS**

- .1        Section 01 33 00 - Submittal Procedures.
- .2        Section 01 78 00 - Closeout Submittals.
- .3        Section 21 05 01 - Common Work Results - Mechanical.
- .4        Section 23 05 05 - Installation of Pipework.
- .5        Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.

**1.3                REFERENCES**

- .1        American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME).
  - .1            ANSI/ASME B16.15, Cast Bronze Threaded Fittings, Classes 125 and 250.
  - .2            ANSI/ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
  - .3            ANSI/ASME B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
  - .4            ANSI/ASME B16.24, Cast Copper Alloy Pipe Flanges and Flanged Fittings, Class 150, 300, 400, 600, 900, 1500 and 2500.
- .2        American Society for Testing and Materials International, (ASTM).
  - .1            ASTM B88M, Standard Specification for Seamless Copper Water Tube (Metric).
- .3        Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).
  - .1            MSS-SP-80, Bronze Gate, Globe, Angle and Check Valves.
- .4        National Research Council (NRC)/Institute for Research in Construction.
  - .1            NRCC 38728, National Plumbing Code of Canada (NPC).

## **1.4 SUBMITTALS**

- .1 Submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit product data for following: Back Flow Preventers, Water Meters.
- .3 Provide maintenance data for incorporation into manual specified in Section 21 05 01 - Common Work Results - Mechanical.

## **Part 2 Products**

### **2.1 PIPING**

- .1 Domestic hot and cold water systems, within building.
  - .1 Above ground: copper tube, hard drawn, Type L: to ASTM B88M.
  - .2 Buried or embedded: copper tube, soft annealed, Type K: to ASTM B88M, in long lengths and with no buried joints or concealed joints.

### **2.2 FITTINGS**

- .1 Bronze pipe flanges and flanged fittings, Class 150: to ANSI/ASME B16.24.
- .2 Cast bronze threaded fittings, Class 125: to ANSI/ASME B16.15.
- .3 Cast copper, solder type: to ANSI/ASME B16.18.
- .4 Wrought copper and copper alloy, solder type: to ANSI/ASME B16.22.

### **2.3 JOINTS**

- .1 Rubber gaskets, latex-free 1.6 mm thick: to AWWA C111.
- .2 Bolts, nuts, hex head and washers: to ASTM A307, heavy series.
- .3 Solder: 95/5 silver solder Alloy Grade E (lead & antimony free).
- .4 Teflon tape: for threaded joints.
- .5 Dielectric connections between dissimilar metals: dielectric fitting to ASTM F492, complete with thermoplastic liner.

### **2.4 GATE VALVES**

- .1 NPS 2 and under, soldered:
  - .1 Non-rising stem: to MSS-SP-80, Class 125, 860 kPa, bronze body, screw-in bonnet, solid wedge disc, suitable for potable water use.
  - .2 Acceptable Material: Toyo Fig 281A, Kitz 41 or approved equal



- .2 NPS 2 and under, screwed:
  - .1 Non-rising stem: to MSS-SP-80, Class 125, 860 kPa, bronze body, screw-in bonnet, solid wedge disc.
  - .2 Acceptable Material: Toyo Fig 280A, Kitz 41 or approved equal

## **2.5 BALL VALVES**

- .1 NPS 2.5 and under, screwed:
  - .1 Class 150.
  - .2 600 pound.
  - .3 Bronze body, chrome plated brass ball, PTFE adjustable packing, brass gland and PTFE seat, steel lever handle.
  - .4 Acceptable Material: Toyo Fig 5044A, Kitz 58 or approved equal
- .2 NPS 2.5 and under, soldered:
  - .1 To ANSI/ASME B16.18, Class 150.
  - .2 600 pound.
  - .3 Bronze body, chrome plated brass ball, PTFE adjustable packing, brass gland and PTFE seat, steel lever handle, with NPT to copper adaptors.
  - .4 Acceptable Material: Toyo Fig 5049A, Kitz 59 or approved equal.

## **2.6 CHECK VALVES**

- .1 NPS 2.5 and under, screwed:
  - .1 Class 125.
  - .2 Bronze body, cap and disc, integral seat, swing type, Y-pattern, screwed cap.
  - .3 Acceptable Material: Toyo Fig 236 or approved equal
- .2 NPS 2.5 and under, soldered:
  - .1 Class 125.
  - .2 Bronze body, cap and disc, integral seat, swing type, Y-pattern, screwed cap.
  - .3 Acceptable Material: Toyo 237 or approved equal.

## **2.7 BACKFLOW PREVENTER, BFP-1**

- .1 Main Domestic Water Service:

- .1 NPS 2, ASSE Listed 1015, rate to 180°F, supplied with full port cast bronze ball valves, cast bronze main body, reinforced nylon housing, stainless steel fasteners, buna nitrile elastomers. The check valves shall be accessible for maintenance without removing the device from the line.
- .2 Acceptable Product: “Zurn/Wilkins” model 350 or approved equal.

## **2.8 BACKFLOW PREVENTER, BFP-2**

- .1 Domestic Water Supply for Hydronic System:
  - .1 Reduced pressure zone assembly, NPS ¾”, lead free bronze body, internal pressure differential relief valve, two inline positive check valves, captured springs, replaceable silicone seat discs, two resilient seated isolation valves, four resilient seated ball valve test cocks, air gap drain fitting. Maximum supply pressure: 175 psi. Operating water temperature: 33°F to 180°F. Service of all internal components shall be through a single access cover secured with stainless steel bolts. ASSE Listed 1015, CSA approved.
  - .2 Acceptable Product: “Watts” Series LF009

## **2.9 EXPANSION TANK, EXP-2**

- .1 Domestic Hot Water System:
  - .1 ASME rated, pre-pressurized diaphragm expansion tank with 1” stainless steel system connection. 50 psig factory precharge.
    - .1 Volume: 13 gallons
    - .2 Acceptance Volume: 11 gallons
    - .3 Fluid: Water
    - .4 Height: 37-1/16 in. Diameter: 12 in.
    - .5 Maximum Working Pressure: 150 psi
    - .6 Maximum Working Temperature: 240°F
    - .7 Shell: Carbon Steel Diaphragm: Heavy duty butyl
  - .2 Acceptable Product: “Amtrol” ST-50-CL

## **Part 3 Execution**

### **3.1 INSTALLATION**

- .1 Install in accordance with NPC and local authority having jurisdiction.
- .2 Cut piping and/or tubing square, ream and clean tubing and tube ends, clean recesses of fitting and assemble without binding.

- .3 Install pipe work in accordance with Section 23 05 05 - Installation of Pipework, supplemented as specified herein.
- .4 Assemble piping using fittings manufactured to ANSI standards.
- .5 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.
- .6 Buried tubing:
  - .1 Lay in well compacted washed sand in accordance with AWWA Class B bedding.
  - .2 Bend tubing without crimping or constriction. No buried fittings or joints.
- .7 Provide trap primers for all floor drains.
- .8 Install atmospheric and pressure vacuum breakers at a height that is in accordance with manufacturer's recommendations. Provide a drip pan below the vacuum breakers in areas where minor leakage cannot be tolerated.

### **3.2 VALVES**

- .1 Isolate all equipment, and all branches with ball valves.
- .2 Isolate fixtures with gate valves or angle stops.

### **3.3 PRESSURE TESTS**

- .1 Conform to requirements of Section 21 05 01 - Common Work Results for Mechanical.
- .2 Test pressure: greater of 1 times maximum system operating pressure or 860 kPa.

### **3.4 FLUSHING AND CLEANING**

- .1 Domestic water system:
  - .1 Flush entire system for 8 hrs. Ensure outlets flushed for 2 hrs. Let stand for 24 hrs, then draw one sample off longest run. Submit to testing laboratory to verify that system is clean to Provincial potable water guidelines. Let system flush for additional 2 hrs, then draw off another sample for testing.

### **3.5 PRE-START-UP INSPECTIONS**

- .1 Systems to be complete, prior to flushing, testing and start-up.
- .2 Verify that system can be completely drained.
- .3 Ensure that air chambers, expansion compensators are installed properly.

### **3.6 DISINFECTION**

- .1 Flush out, disinfect and rinse system to requirements of authority having jurisdiction.

- .2 Upon completion, provide laboratory test reports on water quality for Contract Administrator approval.

**3.7 START-UP**

- .1 Start up after:
  - .1 Pressure tests have been completed.
  - .2 Disinfection procedures have been completed.
  - .3 Certificate of static completion has been issued.
- .2 Provide continuous supervision during start-up.
- .3 Start-up procedures:
  - .1 Establish circulation and ensure that air is eliminated.
  - .2 Bring HWS storage tank up to design temperature slowly.
  - .3 Monitor DHW and DCW piping systems for freedom of movement and pipe expansion is as designed.
  - .4 Check control, limit, and safety devices for normal and safe operation.
- .4 Rectify start-up deficiencies.

**END OF SECTION**

**Part 1        General**

**1.1            SUMMARY**

- .1    Section Includes:
  - .1    The supply and installation of drainage waste piping as indicated on the drawing and in accordance with the NPC of Canada.
  - .2    The design, supply and installation of vent piping by the Contractor in accordance with the National Plumbing Code of Canada, Provincial Plumbing Code and local authority having jurisdiction.
  - .3    Piping in return air plenums shall have fire retardant coating acceptable to the City of Winnipeg.

**1.2            REFERENCES**

- .1    American Society for Testing and Materials International, (ASTM).
  - .1    ASTM D2235, Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
  - .2    ASTM D2564, Specification for Solvent Cements for Poly (Vinyl-Chloride) (PVC) Plastic Piping Systems.
- .2    Canadian Standards Association (CSA International).
  - .1    CSA-Series B1800, Plastic Nonpressure Pipe Compendium.
  - .2    CSA-B181.2, PVC Drain, Waste and Vent Pipe and Pipe Fittings.
  - .3    CSA-B182.1-02, Plastic Drain and Sewer Pipe and Pipe Fittings.

**Part 2        Products**

**2.1            PIPING AND FITTINGS**

- .1    For above ground DWV piping to:
  - .1    CSA-B181.1.
  - .2    CSA-B181.2.
  - .3    CSA-B182.1.

**2.2            JOINTS**

- .1    Solvent weld for PVC: to ASTM D2564.

**Part 3 Execution**

**3.1 INSTALLATION**

- .1 Install in accordance with Canadian Plumbing Code and local authority having jurisdiction.
- .2 Install buried piping in accordance with the manufacturer's recommendations, including requirements for pipe bedding, etc.
- .3 Install vent piping so as to group vents for all fixtures in a building area together and penetrate the roof only once for each general building area. Use no more than six (6) roof penetrations unless prior written authorization from Contract Administrator.
- .4 All vent piping is to be concealed within walls, bulkheads or ceiling spaces. No exposed vent piping will be accepted.

**3.2 TESTING**

- .1 Pressure test buried systems before backfilling.
- .2 Hydraulically test to verify grades and freedom from obstructions.

**3.3 PERFORMANCE VERIFICATION**

- .1 Cleanouts:
  - .1 Ensure accessible and that access doors are correctly located.
  - .2 Open, cover with linseed oil and re-seal.
  - .3 Verify cleanout rods can probe as far as the next cleanout, at least.
- .2 Test to ensure traps are fully and permanently primed.
- .3 Ensure fixtures are properly anchored, connected to system and effectively vented.
- .4 Affix applicable label (sanitary, vent, pump discharge etc.) c/w directional arrows every 15 ft.

**END OF SECTION**

**Part 1            General**

**1.1                SCOPE OF WORK**

- .1            Supply and install HWT-1.

**1.2                RELATED SECTIONS**

- .1            Section 01 33 00 - Submittal Procedures.
- .2            Section 01 78 00 - Closeout Submittals.

**1.3                REFERENCES**

- .1            Canadian Standards Association (CSA International)
  - .1            CSA B51, Boiler, Pressure Vessel, and Pressure Piping Code.
  - .2            CAN/CSA C22.2No.110, Construction and Test of Electric Storage Tank Water Heaters.

**1.4                SHOP DRAWINGS**

- .1            Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2            Indicate:
  - .1            Equipment, including connections, fittings, control assemblies and ancillaries, identifying factory and field assembled.

**1.5                CLOSEOUT SUBMITTALS**

- .1            Provide maintenance and engineering data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

**1.6                WARRANTY**

- .1            For the Work of this Section 22 30 05 - Domestic Water Heaters, the 12 months warranty period prescribed in subsection GC 32.1 of General Conditions "C" is extended to number of years specified for each product.

**Part 2            Products**

**2.1                GAS HOT WATER HEATER, HWT-1:**

- .1            To ANSI Z21.10.3 – CSA 4.3 Standards for glass-lined storage tanks, submerged combustion chamber with helical coated heat exchanger coil for a total heating capacity of 199,900 BTUH input, storage capacity of 100 US gallons, minimum efficiency of 95%, and maximum hydrostatic working pressure of 160 PSI.
- .2            Heater shall be constructed of a seamless glass-lined steel tank, with glass lining applied to all water-side surfaces after the tank has been assembled and welded. The outer jacket shall

- enclose the tank with foam insulation. A CSA Certified and ASME rated T&P relief valve shall be supplied with the heater.
- .3 Heater shall be designed with a down-fired power burner designed for precise mixing of air and gas for optimum efficiency, requiring no special calibration on start-up and be approved for 0" clearance to combustibles.
  - .4 Heater shall be supplied with maintenance-free powered anode.
  - .5 The control shall be an integrated solid-state temperature and ignition control device with integral diagnostics, graphic user interface, fault history display, and shall have a digital temperature readout.
  - .6 The drain valve shall be located in the front for ease of servicing.
  - .7 Power direct venting: water heater shall be suitable for power direct venting using 4" diameter PVC pipe for a total distance of 120 equivalent feet of vent piping and 120 equivalent feet of intake air piping, complete with 4" concentric vent termination.
  - .8 Tank: 100 US gallons, glass lined steel, 27-3/4" diameter x 75-1/2" high, foam insulation, baked enamel steel jacket, 3-year warranty certificate.
  - .9 Acceptable Product: "A.O. Smith" model BTH 199 or approved equal.

## **2.2 TRIM AND INSTRUMENTATION**

- .1 Drain valve: NPS 1 with hose end.
- .2 Thermometer: 100 mm dial type with red pointer and thermowell filled with conductive paste.
- .3 Pressure gauge: 75 mm dial type with red pointer, and shut-off cock.
- .4 Thermowell filled with conductive paste for control valve temperature sensor.
- .5 ASME rated temperature and pressure relief valve sized for full capacity of heater, having discharge terminating over floor drain and visible to operators.

## **Part 3 Execution**

### **3.1 INSTALLATION**

- .1 Install in accordance with manufacturer's recommendations and authority having jurisdiction.
- .2 Provide insulation between tank and supports.

### **3.2 FIELD QUALITY CONTROL**

- .1 Manufacturer's factory trained, certified Engineer to start up and commission DHW heaters.

**END OF SECTION**



**Part 1            General**

**1.1                SUMMARY**

- .1 Section Includes:
  - .1 The supply and installation of plumbing fixtures and trim.
- .2 Products Installed but not Supplied Under this Section:
  - .1 Install rough-in for equipment supplied by others, complete with valves on hot and cold water supplies, waste and vent.
  - .2 Equipment installed by others.
    - .1 Connect with unions.
  - .3 Equipment not installed.
    - .1 Capped for future connection by others.
- .3 Related Sections:
  - .1 Section 01 33 00 - Submittal Procedures.
  - .2 Section 01 78 00 - Closeout Submittals.

**1.2                REFERENCES**

- .1 Canadian Standards Association (CSA International).
  - .1 CAN/CSA-B45 Series, Plumbing Fixtures.
  - .2 CAN/CSA-B125, Plumbing Fittings.
  - .3 CAN/CSA-B651, Barrier-Free Design.

**1.3                SUBMITTALS**

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Indicate, for all fixtures and trim:
    - .1 Dimensions, construction details, roughing-in dimensions.
- .3 Closeout Submittals:
  - .1 Submit maintenance data in accordance with Section 01 78 00 - Closeout Submittals.

- .2 Include:
  - .1 Description of fixtures and trim, giving manufacturer's name, type, model, year, capacity.

**Part 2 Products**

**2.1 P-1: FLOOR MOUNTED BARRIER FREE WATERCLOSET**

- .1 Toilet to be single piece, vitreous china, #03 bone finish, ADA design with a 1.28 gpf siphon jet flushing system. Toilet shall be floor mounted with elongated front bowl. Unit to have a 12" rough-in dimension and operate down to a minimum water pressure of 35psi (flowing). Toilet to have a one year manufacturer warranty.
- .2 Flush Valve: Automatic infrared sensor activated, toilet flush valve. Heavy-duty zinc die cast cover with polished chrome finish. Vandal resistant hex head screws. Low water consumption of 1.28 gallons per flush. Automatic sensor adjustment on installation. Manual override button incorporated. Piston valve and solenoid with self-cleaning mechanism. Automatic flush every twenty four hours if not used. Angle stop and vacuum breaker included with accessories.
- .3 Seat : Seat shall be solid white plastic with open front seat. Seat shall have integral bumpers. Hinges to be color matched with noncorrosive nylon stud and nut.
- .4 ADA compliant, CSA certified.
- .5 Acceptable Product: "Toto", model CT705ELNG toilet, "Toto" model SC534 seat and "Toto" model TET1LN32#CP flush valve.

**2.2 P-2: WALL MOUNTED BARRIER FREE WATER CLOSET**

- .1 Toilet to be single piece, vitreous china, #03 bone finish, ADA design with a 1.28 gpf siphon jet flushing system. Toilet shall be wall mounted with elongated front bowl. Unit to have a 2-1/8" trap and operate down to a minimum water pressure of 35psi (flowing). Toilet to have a one year manufacturer warranty.
- .2 Flush Valve: Automatic infrared sensor activated, toilet flush valve. Heavy-duty zinc die cast cover with polished chrome finish. Vandal resistant hex head screws. Low water consumption of 1.28 gallons per flush. Automatic sensor adjustment on installation. Manual override button incorporated. Piston valve and solenoid with self-cleaning mechanism. Automatic flush every twenty four hours if not used. Angle stop and vacuum breaker included with accessories.
- .3 Seat : Seat shall be solid white plastic with open front seat. Seat shall have integral bumpers. Hinges to be color matched with noncorrosive nylon stud and nut.
- .4 ADA compliant, CSA certified.
- .5 Acceptable Product: "Toto", model CT708EG toilet, "Toto" model SC534 seat and "Toto" model TET1LN32#CP.

**2.3 P-3: BARRIER FREE URINAL**

- .1 Urinal: Vitreous china, 0.5 gpf, washout flush system, ¾” top inlet spud and ADA compliant. Unit to be complete with one year manufacturer warranties.
- .2 Flush Valve: Electronic proximity infrared sensor activated urinal flush valve shall feature self-cleaning piston valve. Includes fully mechanical manual over-ride, cast brass valve body, vandal resistant stop cap, chrome finish metal cover, lithium battery, angle stop with backflow protection and vacuum breaker.
- .3 ADA compliant, CSA certified.
- .4 Acceptable Product: “American Standard” model 6042.005 urinal and “American Standard” model 6063.051.002 flush valve.

**2.4 P-4: BARRIER FREE SEMI-COUNTER TOP LAVATORY**

- .1 Sink: Fireclay china, self rimming, rear overflow, 19” diameter, barrier free design. Sink to have single hole installation and come complete with installation template and sealing compound.
- .2 Faucet: Battery powered electronic faucet with proximity operation and 0.5gpm flow rate. Vandal resistant solid brass construction with single post mounting and aerator. Single inlet 3/8” compression, built-in checks and flexible stainless steel inlet hose. Thermostatic mixing valve and flex hose to be supplied.
- .3 ADA compliant, CSA Certified
- .4 Acceptable Product: “American Standard” model Mezzo 9960 001 sink and “American Standard” model 2506 155 DC powered electronic faucet.

**2.5 P-5: MOP SINK**

- .1 Sink: 16 gauge, type 316 stainless steel, polished satin finish, radius coved bowl corners, 12” integral splashguard back and side, corner installation, undercoated to reduce condensation and resonance, one piece wall hangers, 3-½” grid strainer, 21-½” x 21-½” x 10” compartment size, 22” overall height.
- .2 Faucet: 8” centers cast brass wallmount service sink faucet, two 3” lever blade ADA compliant handles, vandal resistant screws, integral check stops, polished chrome plated finish, heavy duty ½” IPS brass pipe rigid pail hook 10-½” spout, 90% flow with first ¼ turn of operation, body mounted angle vacuum breaker with garden hose end outlet on spout, complete with 48” long hose.
- .3 Stainless steel mop hanger complete with three spring loaded rubber grip holders.
- .4 Acceptable Product: “Kindred” FSS2210/316-1 sink and “Delta” 28T2383 faucet

**2.6 P-6: BARRIER FREE DRINKING FOUNTAIN**

- .1 Drinking fountain shall be barrier free design and provide 8.0 gph of 50°F water at 90°F ambient and 80°F inlet water. Unit shall be supplied with vandal resistant push button to

activate water flow, drained basin, stainless steel cabinet, heavy duty galvanized steel frame, galvanized steel louver and bottom screen.

- .2 Cooling system shall use R-134a refrigerant and ¼ HP compressor.
- .3 Unit shall be powered by 115 V / 60 Hz / 1 PH.
- .4 ADA compliant, CSA certified.
- .5 Acceptable Product: "Oasis" model PV8AC.

## **2.7 P-7: FLOOR DRAIN**

- .1 TO CSA B79. Dura-coated cast iron body with heavy duty cast iron strainer, adjustable "Type A" heavy-duty polished nickel bronze round strainer, complete with ½" trap primer connection.
- .2 Acceptable Product: "Zurn" model ZX-211-A-P

## **2.8 P-8: TRIPLE COMPARTMENT SINK**

- .1 Sink: Triple compartment scullery sink, 16 gauge, type 304, 18-10 stainless steel, polished satin finish compartments coved front and back only, rolled rim, 9" backsplash and 14" deep compartments, sink compartments sloped to drain, stainless steel tubular less with adjustable feet, waste fitting included, 2 hole 8" centerset faucet hole, 3-½" crumb cup waster assembly, 27-3/16" x 60" overall dimensions.
- .2 Faucet: 8" centers cast brass wallmount sink faucet, two 3" lever blade ADA compliant handle, vandal resistant screws, polished chrom plated finish, 90% flow with first ¼ turn of operation, 14" tubular swing spout, 1.5 USGPM vandal resistant aerator.
- .3 Acceptable Product: "Kindred" model TL2454-1 sink and "Delta" 28T4233-S8 faucet

## **2.9 CLEANOUTS**

- .1 Cleanout Plugs: heavy cast iron male ferrule with brass screws and threaded brass or bronze plug. Sealing-caulked lead seat or neoprene gasket.
- .2 Access Covers: face or wall type, polished stainless steel round cover with flush head securing screws, bevelled edge frame complete with anchoring lugs.
- .3 Floor Clean-outs: Adjustable floor cleanout. Dura-coated cast iron upper and lower bodies, neoprene flex gasket, bronze plug, isolation ferrule with polished bronze top.  
  
Acceptable Product: "Zurn" ZN-626-BP.
- .4 Wall Clean-outs: Wall cleanout, dura-coated cast iron body, bronze plug, and round, smooth stainless steel access cover with securing screw.  
  
Acceptable Product: "Zurn" Z-1441-BP.

**2.10 WATER HAMMER ARRESTORS**

- .1 Stainless steel construction, bellows type.

Acceptable Product: "Zurn" Z-1700

**2.11 TRAP SEAL PRIMERS**

- .1 Bronze, with integral vacuum breaker, ½" IPS copper solder ends, ½" IPS drip line connection.

Acceptable Product: "Zurn" Z-1022.

**2.12 FIXTURE PIPING**

- .1 Hot and cold water supplies to each fixture:

.1 Chrome plated flexible supply pipes each with screwdriver stop, reducers, escutcheon.

- .2 Waste:

.1 Brass P trap with clean out on each fixture not having integral trap.

.2 Chrome plated in all exposed places.

.3 Insulated where required by NBC.

**Part 3 Execution**

**3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

**3.2 INSTALLATION**

- .1 Install all items in strict accordance with the National Plumbing Code of Canada.

- .2 Mounting heights:

.1 Standard: to comply with manufacturer's recommendations unless otherwise indicated or specified.

.2 Wall-hung fixtures: as indicated, measured from finished floor.

.3 Physically handicapped: to comply with most stringent of either NBCC or CAN/CSA B651.

**3.3 CLEANOUTS**

- .1 Install cleanouts at base of soil and waste stacks, and rainwater leaders, at locations required by code, and as indicated.
- .2 Bring cleanouts to wall or finished floor unless serviceable from below floor.
- .3 Building drain cleanout and stack base cleanouts: line size to maximum NPS4.

**3.4 WATER HAMMER ARRESTORS**

- .1 Install on branch supplies to fixtures or group of fixtures and at the end of all long runs.

**3.5 DRAIN VALVES**

- .1 Install at bottom of risers, at low points to drain systems, and as indicated. Use ball valves c/w chain and cap. Ensure cap is tightened.

**3.6 TRAP SEAL PRIMERS**

- .1 Install for floor drains and elsewhere, as indicated.
- .2 Install on cold water supply to nearest frequently used plumbing fixture, in concealed space, to approval of Contract Administrator.
- .3 Install soft copper (type K) or plastic tubing to floor drain.

**3.7 START-UP**

- .1 Timing: start-up only after:
  - .1 Pressure tests have been completed.
  - .2 Disinfection procedures have been completed.
  - .3 Certificate of static completion has been issued.
  - .4 Water treatment systems operational.
- .2 Provide continuous supervision during start-up.

**3.8 TESTING & ADJUSTING**

- .1 Adjustments:
  - .1 Adjust water flow rate to design flow rates.
  - .2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.
  - .3 Adjust drinking fountain flow stream to ensure no spillage.
  - .4 Adjust flush valves to suit actual site conditions.

- .2 Checks:
  - .1 Aerators: operation, cleanliness.
  - .2 Vacuum breakers, backflow preventers: operation under all conditions.
  - .3 Water closets & urinals: flushing action.
- .3 Thermostatic controls:
  - .1 Verify temperature settings, operation of control, limit and safety controls.
- .4 Floor drains:
  - .1 Verify operation of trap seal primer.
  - .2 Prime, using trap primer. Adjust flow rate to suit site conditions.
  - .3 Check operations of flushing features.
  - .4 Check security, accessibility, removeability of strainer.
  - .5 Clean out baskets.
- .5 Access doors:
  - .1 Verify size and location relative to items to be accessed.
- .6 Cleanouts:
  - .1 Verify covers are gas-tight, secure, yet readily removable.
- .7 Water hammer arrestors:
  - .1 Verify proper installation of correct type of water hammer arrester.

**END OF SECTION**

