

Part 1 General

1.1 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop drawings to show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances.
- .3 Shop drawings and product data accompanied by:
 - .1 Detailed drawings of bases, supports, and anchor bolts.
 - .2 Acoustical sound power data, where applicable.
 - .3 Points of operation on performance curves.
 - .4 Manufacturer to certify current model production.
 - .5 Certification of compliance to applicable codes.
- .4 Closeout Submittals:
 - .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
 - .2 Operation and maintenance manual approved by, and final copies deposited with, Contract Administrator before final inspection.
 - .3 Operation data to include:
 - .1 Control schematics for systems including environmental controls.
 - .2 Description of systems and their controls.
 - .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
 - .4 Operation instruction for systems and component.
 - .5 Description of actions to be taken in event of equipment failure.
 - .6 Valves schedule and flow diagram.
 - .7 Colour coding chart.
 - .4 Maintenance data to include:
 - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
 - .2 Data to include schedules of tasks, frequency, tools required and task time.
 - .5 Performance data to include:
 - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
 - .2 Equipment performance verification test results.
 - .3 Special performance data as specified.
 - .4 Testing, adjusting and balancing reports as specified in Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.

- .6 Approvals:
 - .1 Submit 1 copy of draft Operation and Maintenance Manual to Contract Administrator for approval. Submission of individual data will not be accepted unless directed by Contract Administrator.
 - .2 Make changes as required and re-submit as directed by Contract Administrator.
- .7 Additional data:
 - .1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.
- .8 Site records:
 - .1 Contract Administrator will provide 1 set of reproducible mechanical drawings. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.
 - .2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.
 - .3 Use different colour waterproof ink for each service.
 - .4 Make available for reference purposes and inspection.
- .9 As-built drawings:
 - .1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.
 - .2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).
 - .3 Submit to Contract Administrator for approval and make corrections as directed.
 - .4 Perform testing, adjusting and balancing for HVAC using as-built drawings.
 - .5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.
- .10 Submit copies of as-built drawings for inclusion in final TAB report.

1.2 MAINTENANCE

- .1 Furnish spare parts in accordance with Section 01 78 00 - Closeout Submittals as follows:
 - .1 One set of packing for each pump.
 - .2 One casing joint gasket for each size pump.
 - .3 One glass for each gauge glass.
- .2 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Section 01 78 00 - Closeout Submittals.

Part 2 Products

2.1 (NOT USED)

Part 3 Execution

3.1 PAINTING REPAIRS AND RESTORATION

- .1 Prime and touch up marred finished paintwork to match original.
- .2 Restore to new condition, finishes which have been damaged.

3.2 CLEANING

- .1 Clean interior and exterior of all systems including strainers.

3.3 DEMONSTRATION

- .1 Contract Administrator will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.
- .2 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.
- .3 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.
- .4 Instruction duration time requirements as specified in appropriate sections.
- .5 Contract Administrator may record these demonstrations on video tape for future reference.

3.4 PROTECTION

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Materials and installation for plumbing pumps.

1.2 ACTION AND INFORMATIONAL 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 fixtures and 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 Wiring and schematic diagrams.

.3 Dimensions and recommended installation.

.4 Pump performance and efficiency curves.

.4 Instructions: submit manufacturer's installation instructions.

.5 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 DOMESTIC HOT WATER BOILER CIRCULATING PUMP, PU-3 & PU-4

.1 Capacity: 60 usgpm against total differential head of 36 ft W.C.

.2 All bronze body and one piece cast bronze impeller suitable for use with potable water.

.3 Centrifugal, close coupled direct drive, inline connections, alloy steel shaft with cupro nickel shaft sleeve, 2" flanged connections, maximum operating pressure of 175 psi and maximum operating temperature of 250 F. Mechanical seal: Carbon rotating element and ceramic stationary seat.

.4 Dimensions: 16" flange-to-flange, 19-1/4" length, 10" width. Weight: 110 lbs.

.5 Motor: 1-1/2 hp at 208V/3/60, 1760 RPM, sealed ball bearing design, requiring no maintenance.

- .6 Supports: provide as recommended by manufacturer.
- .7 Acceptable product: "Taco" model 1935 or approved equivalent in accordance with B7.

2.2 DOMESTIC HOT WATER CIRCULATING PUMP, PU-5

- .1 Capacity: 3 usgpm against total differential head of 17 ft W.C.
- .2 Lead-Free Bronze body and lead-free brass impeller suitable for use with potable water.
- .3 Pump shall be of horizontal, oil-lubricated type specifically designed for quiet operation. Pump shall be in-line centrifugal type with a polished steel shaft with hardened integral thrust collar. The shaft shall be supported by two horizontal sleeve bearings designed to circulate oil. The pumps are to be equipped with mechanical seal with carbon seal face rotating against a ceramic seat. The motor shall be non-overloading at any point on the curve.
- .4 Maximum operating pressure of 125 psi and Maximum operating temperature of 225 F.
- .5 Motor: 1/6 hp at 115V/1/60, 1725 RPM, open drip-proof type with thermal overload protection and include sleeve bearings and rubber mounted construction.
- .6 3/4" flanged connections. Install combination check and isolation valve accessory to mate pump with piping system.
- .7 Supports: provide as recommended by manufacturer.
- .8 Acceptable product: "Bell & Gossett" model Series PR or approved equivalent in accordance with B7.

Part 3 Execution

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.

- .3 Check settings and operation of hand-off-auto selector switch, operating, safety and limit controls, audible and visual alarms, over-temperature and other protective devices.
- .4 Adjust flow from water-cooled bearings.
- .5 Adjust impeller shaft stuffing boxes, packing glands.

3.4 START-UP

- .1 General:
 - .1 In accordance with Section 01 91 13 - General Commissioning (Cx) Requirements: General Requirements, supplemented as specified herein.
 - .2 Procedures:
 - .1 Check power supply.
 - .2 Check starter O/L heater sizes.
 - .3 Start pumps, check impeller rotation.
 - .4 Check for safe and proper operation.
 - .5 Check settings, operation of operating, limit, safety controls, over-temperature, audible/visual alarms, other protective devices.
 - .6 Test operation of hands-on-auto switch.
 - .7 Test operation of alternator.
 - .8 Adjust leakage through water-cooled bearings.
 - .9 Adjust shaft stuffing boxes.
 - .10 Adjust leakage flow rate from pump shaft stuffing boxes to manufacturer's recommendations.
 - .11 Check base for free-floating, no obstructions under base.
 - .12 Run-in pumps for 12 continuous hours.
 - .13 Check installation, operation of mechanical seals, packing gland type seals. Adjust as necessary.
 - .14 Adjust alignment of piping and conduit to ensure full flexibility.
 - .15 Eliminate causes of cavitation, flashing, air entrainment.
 - .16 Measure pressure drop across strainer when clean and with flow rates as finally set.
 - .17 Replace seals if pump used to degrease system or if pump used for temporary heat.
 - .18 Verify lubricating oil levels.

3.5 REPORTS

- .1 In accordance with Section 01 91 13 - General Commissioning (Cx) Requirements: reports, supplemented as specified.
- .2 Include:
 - .1 PV results on approved PV Report Forms.
 - .2 Product Information report forms.

- .3 Pump performance curves (family of curves) with final point of actual performance.

3.6 TRAINING

- .1 In accordance with Section 01 91 13 - General Commissioning (Cx)
Requirements: Training of O M Personnel, supplemented as specified.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME)
 - .1 ANSI/ASME B16.15-06, Cast Bronze Threaded Fittings, Classes 125 and 250.
 - .2 ANSI/ASME B16.18-01, Cast Copper Alloy Solder Joint Pressure Fittings.
 - .3 ANSI/ASME B16.22-01, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
 - .4 ANSI/ASME B16.24-01, Cast Copper Alloy Pipe Flanges and Flanged Fittings, Class 150, 300, 400, 600, 900, 1500 and 2500.
- .2 ASTM International Inc.
 - .1 ASTM A307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .2 ASTM A536-84(2004)e1, Standard Specification for Ductile Iron Castings.
 - .3 ASTM B88M-05, Standard Specification for Seamless Copper Water Tube (Metric).
- .3 American National Standards Institute/American Water Works Association (ANSI)/(AWWA)
 - .1 ANSI/AWWA C111/A21.11-07, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- .4 Canadian Standards Association (CSA International)
 - .1 CSA B242-05, Groove and Shoulder Type Mechanical Pipe Couplings.
- .5 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act, 1999, c. 33 (CEPA).
- .6 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .7 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).
 - .1 MSS-SP-67-02a, Butterfly Valves.
 - .2 MSS-SP-70-06, Gray Iron Gate Valves, Flanged and Threaded Ends.
 - .3 MSS-SP-71-05, Gray Iron Swing Check Valves, Flanged and Threaded Ends.
 - .4 MSS-SP-80-03, Bronze Gate, Globe, Angle and Check Valves.
- .8 National Research Council (NRC)/Institute for Research in Construction
 - .1 NRCC 38728, National Plumbing Code of Canada (NPC) - 1995.
- .9 Transport Canada (TC)

- .1 Transportation of Dangerous Goods Act, 1992, c. 34 (TDGA).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature and datasheets for insulation and adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Closeout Submittals:
 - .1 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

Part 2 Products

2.1 PIPING

- .1 Domestic hot, cold and recirculation 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.
- .2 Plastic (PEX) piping between shower manifold and showers
 - .1 All pipe shall be high-density crosslinked polyethylene manufactured using the high-pressure peroxide method of crosslinking (PEXa). Pipe shall conform to ASTM F876, ASTM F877 CSA B137.5, NSF/ANSI 14 and NSF/ANSI 61.

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.
- .5 NPS 2 and larger: ANSI/ASME B16.18 or ANSI/ASME B16.22 roll grooved to CSA B242.
- .6 NPS 1 and smaller: wrought copper to ANSI/ASME B16.22 or cast copper to ANSI/ASME B16.18; with stainless steel internal components and EPDM seals. Suitable for operating pressure to 1380 kPa.

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: tin copper alloy.

- .4 Teflon tape: for threaded joints.
- .5 Grooved couplings: designed with angle bolt pads to provide rigid joint, complete with EPDM gasket.
- .6 Dielectric connections between dissimilar metals: dielectric fitting, complete with thermoplastic liner.

2.4 SWING CHECK VALVES

- .1 To MSS-SP-80, Class 125, 860 kPa, bronze body, bronze swing disc, screw in cap, regrindable seat.

2.5 BALL VALVES

- .1 NPS 2 and under, soldered:
 - .1 To ANSI/ASME B16.18, Class 150.
 - .2 Bronze body, stainless steel ball, PTFE adjustable packing, brass gland and PTFE seat, steel lever handle.

2.6 GATE VALVES

- .1 NPS 2 1/2 and over, flanged:
 - .1 Rising stem: to MSS-SP-70, Class 125, 860 kPa, flat flange faces, cast-iron body, OS Y bronze trim.

2.7 BALANCE VALVES

- .1 Lockshield globe valve, suitable for use with potable water.

Part 3 Execution

3.1 APPLICATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Install in accordance with Canadian Plumbing Code, Provincial Plumbing Code and local authority having jurisdiction.
- .2 Install pipe work in accordance with Section 23 05 05 - Installation of Pipework, supplemented as specified herein.
- .3 Assemble piping using fittings manufactured to ANSI standards.
- .4 Install CWS piping below and away from HWS and HWC and other hot piping so as to maintain temperature of cold water as low as possible.
- .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. Minimize use of fittings.
- .7 PEX Piping Bend Radius: Refer to manufacturers recommendations for minimum bend radius.

3.3 VALVES

- .1 Isolate equipment, fixtures and branches with ball valves.
- .2 Balance recirculation system using lockshield globe valves. Mark settings and record on as-built drawings on completion.

3.4 PRESSURE TESTS

- .1 Test pressure: greater of 1 times maximum system operating pressure or 860 kPa.

3.5 FLUSHING AND CLEANING

- .1 Flush entire system for 8 h. Ensure outlets flushed for 2 hours. Let stand for 24 hours, then draw one sample off longest run. Submit to testing laboratory to verify that system is clean. Let system flush for additional 2 hours, then draw off another sample for testing.

3.6 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 pressure booster systems are operating properly.
- .4 Ensure that air chambers, expansion compensators are installed properly.

3.7 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 authority having jurisdiction.

3.8 START-UP

- .1 Timing: start up 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 Start-up procedures:

- .1 Establish circulation and ensure that air is eliminated.
- .2 Check pressurization to ensure proper operation and to prevent water hammer, flashing and/or cavitation.
- .3 Bring HWS storage tank up to design temperature slowly.
- .4 Monitor piping HWS and HWC piping systems for freedom of movement, pipe expansion as designed.
- .5 Check control, limit, safety devices for normal and safe operation.
- .4 Rectify start-up deficiencies.

3.9 PERFORMANCE VERIFICATION

- .1 Scheduling:
 - .1 Verify system performance after pressure and leakage tests and disinfection are completed, and Certificate of Completion has been issued by authority having jurisdiction.
- .2 Procedures:
 - .1 Verify that flow rate and pressure meet Design Criteria.
 - .2 TAB HWC in accordance with Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
 - .3 Adjust pressure regulating valves while withdrawal is maximum and inlet pressure is minimum.
 - .4 Sterilize HWS and HWC systems for Legionella control.
 - .5 Verify performance of temperature controls.
 - .6 Verify compliance with safety and health requirements.
 - .7 Check for proper operation of water hammer arrestors. Run outlet for 10 seconds, then shut of water immediately. If water hammer occurs, replace water hammer arrestor or re-charge air chambers. Repeat for outlets and flush valves.
 - .8 Confirm water quality consistent with supply standards, and ensure no residuals remain as result of flushing or cleaning.
- .3 Reports:
 - .1 Include certificate of water flow and pressure tests conducted on incoming water service, demonstrating adequacy of flow and pressure.

3.10 OPERATION REQUIREMENTS

- .1 Co-ordinate operation and maintenance requirements including, cleaning and maintenance of specified materials and products with Section 23 05 05 - Installation of Pipework.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 ASTM International Inc.
 - .1 ASTM D2235-04, Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
 - .2 ASTM D2564-04e1, Standard Specification for Solvent Cements for Poly(Vinyl-Chloride) (PVC) Plastic Piping Systems.
- .2 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-Series B1800-06, Thermoplastic Nonpressure Pipe Compendium - B1800 Series.
- .3 Green Seal Environmental Standards (GSES)
 - .1 Standard GS-36-00, Commercial Adhesives.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 South Coast Air Quality Management District (SCAQMD), California State
 - .1 SCAQMD Rule 1168-A2005, Adhesive and Sealant Applications.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature and datasheets for piping and adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.

Part 2 Products

2.1 PIPING AND FITTINGS

- .1 Buried and above ground PVC-DWV piping to:
 - .1 CAN/CSA B1800.

2.2 JOINTS

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

Part 3 Execution

3.1 APPLICATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 In accordance with Section 23 05 05 - Installation of Pipework.
- .2 Install in accordance with Manitoba Plumbing Code and local authority having jurisdiction.

3.3 TESTING

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

3.4 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 Storm water drainage:
 - .1 Verify domes are secure.
 - .2 Ensure weirs are correctly sized and installed correctly.
 - .3 Verify provisions for movement of roof system.
- .4 Ensure fixtures are properly anchored, connected to system and effectively vented.
- .5 Affix applicable label (storm, sanitary, vent, pump discharge) c/w directional arrows every floor or 4.5 m (whichever is less).

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American National Standards Institute/Canadian Standards Association (ANSI/CSA)
 - .1 ANSI Z21.10.1-2004/CSA 4.1-2004, Gas Water Heaters - Volume I, Storage Water Heaters With Input Ratings of 75,000 Btu Per Hour or Less.
 - .2 ANSI Z21.10.1A-2006/CSA 4.1A-2006, Addenda 1 to ANSI Z21.10.1-2004/CSA 4.1-2004, Gas Water Heaters Volume I, Storage Water Heaters With Input Ratings of 75,000 Btu Per Hour or Less.
 - .3 ANSI Z21.10.1b-2006/CSA 4.1b-2006, Addenda 2 to ANSI Z21.10.1-2004/CSA 4.1-2004, Gas Water Heaters - Volume I, Storage Water Heaters With Input Ratings of 75,000 Btu Per Hour or Less.
 - .4 ANSI Z21.10.3A-2007/CSA 4.3-2007, Gas Water Heaters - Volume III - Storage Water Heaters, with Input Ratings Above 75,000 Btu Per Hour, Circulating and Instantaneous.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA B51-03(R2007), Boiler, Pressure Vessel, and Pressure Piping Code.
 - .2 CAN/CSA-B139-04, Installation Code for Oil Burning Equipment.
 - .3 CAN/CSA-B140.0-03, Oil Burning Equipment: General Requirements.
 - .4 CAN/CSA-B149.1-05, Natural Gas and Propane Installation Code.
 - .5 CAN/CSA-B149.2-05, Propane Storage and Handling Code.
 - .6 CSA B140.12-03, Oil-Burning Equipment: Service Water Heaters for Domestic Hot Water, Space Heating, and Swimming Pools.
 - .7 CAN/CSA C22.2 No.110-94(R2004), Construction and Test of Electric Storage Tank Water Heaters.
 - .8 CAN/CSA-C191-04, Performance of Electric Storage Tank Water Heaters for Household Service.
 - .9 CAN/CSA-C309-M90(R2003), Performance Requirements for Glass-Lined Storage Tanks for Household Hot Water Service.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature and datasheets for domestic water heater, and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Indicate:

- .1 Equipment, including connections, fittings, control assemblies and ancillaries, identifying factory and field assembled.

1.3 CLOSEOUT SUBMITTALS

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

Part 2 Products

2.1 DOMESTIC HOT WATER BOILERS, B-3 & B-4

- .1 The heater shall be rated at 600,000 BTUH input and 582,000 output, 97% thermal efficiency, 394 lb unit weight, 39"x38"x25 (HxWxL) unit dimensions.
- .2 The heater shall modulate 20-100% of full fire. The unit(s) shall be design-certified to comply with the current edition of the Harmonized ANSI Z21.10.3 / CSA 4.3 Standard for Gas Water Heaters. The unit(s) shall be designed and constructed in accordance with the ASME Boiler & Pressure Vessel Code, Section IV requirements for 160 psi (1103 kPa) maximum working pressure, and shall bear the ASME "H" Stamp and be listed by the National Board. The unit(s) shall be constructed to comply with the efficiency requirements of the latest edition of ASHRAE Standard 90.1. Minimum thermal efficiency shall be 97%. The heater shall be equipped with an ASME certified pressure relief valve set at 125psi (861kPa). Optional pressure relief valves with settings of 30psi (207kPa), 50psi (345 kPa), 60psi (413 kPa), 75psi (517 kPa) or 150psi (1034 kPa) shall be available.
- .3 The water tube heat exchanger shall be stainless steel, rated for 160 psi (1103 kPa) working pressure. The heat exchanger shall be a low water volume design, welded construction, with no gaskets, o-rings or bolts in the header. Heat exchanger shall be accessible for visual inspection and cleaning of all surfaces of the flue side of the heat exchanger. The heater shall be fully condensing design with built-in condensate drain and trap. The heat exchanger shall have a limited five-year warranty.
- .4 Each heater shall be fully test fired, (with water, gas, and venting connected), and all safety components tested, at the factory.
- .5 The heater shall be sealed combustion, and removal of jacket panels shall not affect the combustion seal. The heater jacket shall be a unitized shell finished with acrylic thermo-set paint baked at not less than 325°F (163°C). The frame shall be constructed of galvanized steel for strength and protection. Chamber shall include a sight glass for viewing flame. Heater shall be certified for zero clearance to combustible surfaces.
- .6 All water, gas, vent and air connections shall be on the top of the heater, and the top jacket panels shall be split, such that they are removable without disconnecting the water, gas, vent or air pipes.
- .7 Heater shall operate on 4-13" w.c. gas pressure, and shall need no component changes to operate at high altitude, up to 10,000 feet.

- .8 The heater shall use a premix burner with a stainless steel woven metal fiber wrap, and a negative pressure gas valve to burn cleanly, with NOx emissions not exceeding 10ppm. The heater shall meet the emissions requirements of SCAQMD 2012.
- .9 The heater shall be designed for vertical or horizontal Category IV venting, up to 100 equivalent feet, in a balanced vent/air system, with 6" diameter PVC, CPVC, polypropylene or stainless steel vent material. Air may be ducted directly to the heater in a balanced vent/air system, using up to 100 equivalent feet of 6" diameter ABS, PVC, CPVC or galvanized pipe. The heater shall be designed to be used with room air or in an unbalanced vent/air system with up to 40 equivalent feet of 4" diameter PVC, CPVC, polypropylene or stainless steel vent material, and up to 40 equivalent feet of 4" diameter ABS, PVC, CPVC or galvanized air pipe. The heater shall be shipped with PVC sidewall vent and air terminals, for use with horizontal systems.
- .10 Unit shall be 120VAC, single phase, 2 Amps (including pump) for connection to a 15A breaker. The control circuit shall be 24VAC.
- .11 The heater control shall be an integrated electronic PID temperature and ignition control with LCD and touchpad and shall control the heater operation and firing rate. The control shall have three menu structures for user mode, set-up mode, and diagnostic model. The heater display shall be visible without the removal of any jacket panels or control panels.
- .12 When a display or control is field-replaced, the device shall have the ability to read parameter setpoints from the original set-up, so the system does not have to be re-programmed.
- .13 The control shall have the ability to control the heater pump with delay features. The control shall be able to cascade and lead-lag with other controllers, without additional system controllers. An optional display that is full-color, high definition LCD with touch-screen shall be available, to allow for additional communication ports.
- .14 The control shall have the ability to recognize a domestic water sensor or closure from a tank stat on the same terminals. The heater shall be shipped with the domestic water heater sensor, as standard equipment.
- .15 The control shall have the ability to accept a 4-20mA or 0-10VDC input connection from an external control or building automation system, to modulate the flame. The control shall have dry alarm contacts for ignition failure.
- .16 The control shall monitor flue gas temperature and shall stop the heater from firing if temperature is excessive.
- .17 The control shall have a display button that allows a user to choose one of six menus, including: Login; Display Setup; Quick Start; Advanced Setup; Test; Diagnostics. The display button shall be active at all times, regardless of what menu the control is showing.
- .18 Login shall allow an installer to adjust password-protected parameters.
- .19 A Display Setup menu shall allow the user to adjust the LCD contrast, and to customize the display's homescreen. The user shall be able to choose five of the

following parameters to display on the homescreen – domestic hot water setpoint, operating temperature, outlet temperature, inlet temperature, heater temperature rise (delta T), lead-lag operating temperature, lead-lag system setpoint, fan speed, flame signal, firing rate, stack temperature, and 4-20mA input level. The homescreen shall also indicate the heater name, what firing state the heater is in, if there is a demand on the heater, if the system is in password-level status, and shall show any holds, alerts, or lockouts that are present. The homescreen shall be accessible at any time by pressing a homescreen button on the display.

- .20 A Quick Start menu shall present only the select few parameters that are needed for a simple, single heater installation.
- .21 The Advanced Setup menu shall give the installer access to all adjustable parameters, for more complex installations, including; all lead-lag set up parameters, boiler high limit, boiler temperature setpoint and on/off differentials, domestic water temperature setpoint and on/off differentials, domestic water priority time, heater stack temperature limit, pump delay and exercise values, PID parameters, automatic remote signal detection, anti-short-cycle feature adjustment, and °F or °C display.
- .22 The control shall have a Test menu that allows the user to force the heater into minimum or maximum firing rate for 10 minutes, for set-up purposes. The test menu shall also allow the burner to be turned on or off, and the pump to be set to on or auto, for testing purposes. The control shall show a count-down timer, enabling the user to see how much time is left for the test segment.
- .23 A Diagnostics menu shall allow the user to see analog inputs, digital inputs, and the history of alerts and lockouts. Analog inputs shall include – outlet temperature, inlet temperature, temperature rise (delta T), domestic water temperature, stack temperature, fan speed, flame signal, firing rate, 4-20mA input level. Digital inputs shall include – main valve state, alarm status, demand status, safety chain status, and interlock status. The control shall display information about holds, alerts, and errors in both text form, and with codes numbers for further analysis.
- .24 Acceptable Product: “Laars” model NTV600 or approved equivalent in accordance with B7.

2.2 DOMESTIC HOT WATER BOILER VENT PIPE

- .1 ULC-S636 certified BH vent - Stainless Steel. Provide vent shop drawings including vent calculations for review and approval.

2.3 DOMESTIC HOT WATER STORAGE TANK, HWT-1 & HWT-2

- .1 119 Gallon storage capacity, 28-1/4” diameter, 63” height, 2” insulation, meets efficiency criteria in ASHRAE 90.1b, steel tank, interior glass lining, 150 PSI working pressure rating, magnesium anode rods for corrosion protection, 2” NPT rear make up water, hot water outlet and bottom circulation connections, 3/4” NPT aquastat connection, 1” NPT temperature and pressure relief valve opening, handhole cleanout.

- .2 Acceptable Product: “Laars” model A0078800 or approved equivalent in accordance with B7.

Part 3 Execution

3.1 APPLICATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Install in accordance with manufacturer's installation instructions and authority having jurisdiction.
- .2 Provide external low water cut off per requirements of the authority having jurisdiction.
- .3 Install natural gas fired domestic water heaters in accordance with CAN/CSA-B149.1. Provide natural gas piping per Section 231123.
- .4 Controls:
 - .1 Provide aqua-stat in one storage tank and connect to master boiler. Boilers to operate in master/slave configuration. Provide all control wiring as per manufacturer's instructions.
 - .2 Boilers B-3 and B-4 shall control associated circulating pumps PU-3 and PU-4 respectively. Provide control wiring between boilers and pumps per manufacturer's instructions.
 - .3 All controls wiring shall be run in conduits.

3.3 FIELD QUALITY CONTROL

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

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 ASTM International
 - .1 ASTM A126-04(2009), Standard Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
 - .2 ASTM B62-09, Standard Specification for Composition Bronze or Ounce Metal Castings.
- .2 American Water Works Association (AWWA)
 - .1 ANSI/AWWA C700-09, Standard for Cold Water Meters-Displacement Type, Bronze Main Case.
 - .2 ANSI/AWWA C701-12, Standard for Cold Water Meters-Turbine Type for Customer Service.
 - .3 ANSI/AWWA C702-10, Standard for Cold Water Meters-Compound Type.
- .3 CSA International
 - .1 CSA-B64 Series-11, Backflow Preventers and Vacuum Breakers.
 - .2 CSA B79-08, Commercial and Residential Drains and Cleanouts.
 - .3 CAN/CSA-B356-10, Water Pressure Reducing Valves for Domestic Water Supply Systems.
- .4 Plumbing and Drainage Institute (PDI)
 - .1 PDI-G101-R2010, Testing and Rating Procedure for Grease Interceptors with Appendix of Installation and Maintenance.
 - .2 PDI-WH201-R2010, Water Hammer Arresters Standard.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedure.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for plumbing products and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Indicate on drawings to indicate materials, finishes, dimensions, construction and assembly details, and accessories.

1.3 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for plumbing specialties and accessories for incorporation into manual.

- .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.

Part 2 Products

2.1 DOMESTIC WATER EXPANSION TANK, EXP-1

- .1 Diaphragm expansion tank suitable for use with potable water systems, 17.5 Gallon tank volume, 11.4 Gallon acceptance volume, 3/4" stainless steel system connection, 200°F maximum operating temperature, 150 psi maximum working pressure, carbon steel shell, heavy duty butyl diaphragm, stand for floor installation, 16-1/4" diameter, 24-1/4" height, 90 lb weight. ASME rated.
- .2 Acceptable Product: "Bell & Gossett" model PTA-42V or approved equivalent in accordance with B7.

2.2 ROOF DRAINS (RD)

- .1 Epoxy coated cast iron roof drain with deep sump, wide serrated flashing flange, flashing clamp device with integral gravel stop and self-locking polyethylene dome strainer. Sizes as per drawings.
- .2 Acceptable Product: "Watts" model RD-100 or approved equivalent in accordance with B7.

2.3 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:
 - .1 Wall Access: face or wall type, polished nickel bronze square cover with flush head securing screws, bevelled edge frame complete with anchoring lugs.
 - .2 Floor Access: rectangular cast iron body and frame with adjustable secured nickel bronze top and:
 - .1 Plugs: bolted bronze with neoprene gasket.
 - .2 Cover for Unfinished Concrete Floors: nickel bronze square, gasket, vandal-proof screws.
 - .3 Cover for Terrazzo Finish: polished nickel bronze with recessed cover for filling with terrazzo, vandal-proof locking screws.
 - .4 Cover for Tile and Linoleum Floors: polished nickel bronze with recessed cover for linoleum or tile infill, complete with vandal-proof locking screws.
 - .5 Cover for Carpeted Floors: polished nickel bronze with deep flange cover for carpet infill, complete with carpet retainer vandal-proof locking screws.

2.4 WATER HAMMER ARRESTORS

- .1 Copper construction, piston type: to PDI-WH201.

2.5 BACK FLOW PREVENTER, BFP-1

- .1 Double check valve assembly suitable for use with potable water, 3" size, two positive seating check modules with captured springs and rubber seat discs, check module seats and seat discs shall be replaceable, single access cover secured with stainless steel bolts, fused epoxy coated cast iron body, two resilient seated isolation valves, four top mounted resilient seated test cocks, 33°F to 110°F continuous temperature range, 175 psi maximum working pressure, 5.5 psi pressure drop at 100 gpm, 33-1/8" flange-to-flange. Meets requirements of ASSE Std. 1015 and AWWA Std. C510.
- .2 Acceptable Product: "Watts" model LF007QT-FDA or approved equivalent in accordance with B7.

2.6 BACK FLOW PREVENTER, BFP-2

- .1 Reduced pressure zone assembly suitable for use with potable water, 2" size, internal pressure differential relief valve located in a zone between two positive seating check modules with captured springs and silicone seat discs, seats and seat discs shall be replaceable in both check modules and the relief valve, no threads or screws in the waterway exposed to line fluids, single access cover secures with stainless steel bolts, body and shutoffs constructed using lead free cast copper silicon alloy, two resilient seated isolation valves, four resilient seated test cocks and an air gap drain fitting, 33°F to 180°F water temperature range, 175 psi maximum working pressure, 13 psi pressure drop at 100 gpm, 21-3/8" length. Meets requirements of ASSE Std. 1013, AWWA Std. C511, CSA B64.4.
- .2 Acceptable Product: "Watts" model LF009 or approved equivalent in accordance with B7.

2.7 TRAP SEAL PRIMERS

- .1 Brass, with integral vacuum breaker, NPS 1/2 solder ends, NPS 1/2 drip line connection.

Part 3 Execution

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 Install in accordance with Provincial Plumbing Code of Canada, and local authority having jurisdiction.
- .2 Install in accordance with manufacturer's instructions and as specified.

3.3 CLEANOUTS

- .1 Install cleanouts at base of soil and waste stacks, and rainwater leaders, at locations required 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 NPS 4.

3.4 WATER HAMMER ARRESTORS

- .1 Install on branch supplies to fixtures or group of fixtures.

3.5 BACK FLOW PREVENTERS

- .1 Install in accordance with CSA-B64 Series, where indicated and elsewhere as required by code.

3.6 HOSE BIBBS AND SEDIMENT FAUCETS

- .1 Install at bottom of risers, at low points to drain systems, and as indicated.

3.7 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 tubing to floor drain.

3.8 STRAINERS

- .1 Install with sufficient room to remove basket for maintenance.

3.9 WATER METERS

- .1 Install water meter provided by local water authority.
- .2 Install water meter as indicated.

3.10 START-UP

- .1 General:
 - .1 In accordance with Section 01 91 13 - General Commissioning (Cx) Requirements: General Requirements, supplemented as specified herein.
- .2 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.
- .3 Provide continuous supervision during start-up.

3.11 TESTING AND ADJUSTING

- .1 General:
 - .1 Test and adjust plumbing specialties and accessories in accordance with Section 01 91 13- General Commissioning (Cx) Requirements: General Requirements, supplemented as specified.
- .2 Timing:
 - .1 After start-up deficiencies rectified.
 - .2 After certificate of completion has been issued by authority having jurisdiction.
- .3 Application tolerances:
 - .1 Pressure at fixtures: +/- 70 kPa.
 - .2 Flow rate at fixtures: +/- 20%.
- .4 Adjustments:
 - .1 Verify that flow rate and pressure meet design criteria.
- .5 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, removability of strainer.
 - .5 Clean out baskets.
- .6 Vacuum breakers, backflow preventers, backwater valves:
 - .1 Test tightness, accessibility for O&M of cover and of valve.
 - .2 Simulate reverse flow and back-pressure conditions to test operation of vacuum breakers, backflow preventers.
 - .3 Verify visibility of discharge from open ports.
- .7 Roof drains:
 - .1 Check location at low points in roof.
 - .2 Check security, removability of dome.
 - .3 Adjust weirs to suit actual roof slopes, meet requirements of design.
 - .4 Clean out sumps.
 - .5 Verify provisions for movement of roof systems.
- .8 Access doors:
 - .1 Verify size and location relative to items to be accessed.
- .9 Cleanouts:
 - .1 Verify covers are gas-tight, secure, yet readily removable.
- .10 Water hammer arrestors:
 - .1 Verify proper installation of correct type of water hammer arrester.

- .11 Wall, ground hydrants:
 - .1 Verify complete drainage, freeze protection.
 - .2 Verify operation of vacuum breakers.
- .12 Strainers:
 - .1 Clean out repeatedly until clear.
 - .2 Verify accessibility of cleanout plug and basket.
 - .3 Verify that cleanout plug does not leak.
- .13 Hose bibbs, sediment faucets:
 - .1 Verify that flow and pressure meet design criteria.
 - .2 Check for leaks, replace compression washer if required.
- .14 Hydronic system water Make-up Assembly:
 - .1 Verify flow, pressure, and connection.
- .15 Water meters:
 - .1 Verify location and accessibility.
 - .2 Test meter reading accuracy.

3.12 CLOSEOUT ACTIVITIES

- .1 Commissioning Reports: in accordance with Section 01 91 13 - General Commissioning (Cx) Requirements: reports, supplemented as specified.
- .2 Training: provide training in accordance with Section 01 91 13 - General Commissioning (Cx) Requirements: Training of O&M Personnel, supplemented as specified.

3.13 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by plumbing specialties and accessories installation.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-B45 Series-02(R2008), Plumbing Fixtures.
 - .2 CAN/CSA-B125.3-05, Plumbing Fittings.
 - .3 CAN/CSA-B651-04, Accessible Design for the Built Environment.
- .2 Green Seal Environmental Standards (GSES)
 - .1 Standard GS-36-00, Commercial Adhesives.
- .3 South Coast Air Quality Management District (SCAQMD), California State
 - .1 SCAQMD Rule 1168-A2005, Adhesive and Sealant Applications.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature and datasheets for washroom fixtures, and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Indicate fixtures and trim:
 - .1 Dimensions, construction details, roughing-in dimensions.
 - .2 Factory-set water consumption per flush at recommended pressure.

1.3 CLOSEOUT SUBMITTALS

- .1 Provide operation and maintenance data for washroom fixtures, for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Include:
 - .1 Description of fixtures and trim, giving manufacturer's name, type, model, year, capacity.
 - .2 Details of operation, servicing, maintenance.
 - .3 List of recommended spare parts.

Part 2 Products

2.1 P-1 WATER CLOSET - FLUSH VALVE

- .1 Bowl: White, vitreous china, 1.6 GPF, elongated bowl, floor mount, for use with flushometer valve, 2-1/8" trapway, 1-1/2" top and back inlet spud. Stain, mold and mildew resistant surface treatment. 28-1/4" x 14" x 16-1/2" nominal dimensions. To meet or exceed ASME A112.19.2.

- .2 Flush Valve: Manual operation, 1.6 GPF, self-cleaning brass piston, integral wiper spring, non-hold open handle, chrome-plated brass construction, EPDM seals.
- .3 Seat: Soft close open front toilet seat.
- .4 Minimum MaP rating: 1,000 grams.
- .5 Acceptable Products: Bowl: “American Standard”, Madera model 3461.001, Flush Valve: “American Standard”, model 6047.161 or approved equivalent in accordance with B7.

2.2 P-2 BARRIER FREE WATER CLOSET - FLUSH VALVE

- .1 Bowl: ADA compliant: white, vitreous china, 1.6 GPF, elongated bowl, floor mount, for use with flushometer valve, 2-1/8” trapway, 1-1/2” top and back inlet spud. Stain, mold and mildew resistant surface treatment. 28-1/4” x 14” x 16-1/2” nominal dimensions. To meet or exceed ASME A112.19.2.
- .2 Flush Valve: ADA compliant, manual operation, 1.6 GPF, self-cleaning brass piston, integral wiper spring, non-hold open handle, chrome-plated brass construction, EPDM seals.
- .3 Seat: Soft close open front toilet seat.
- .4 Minimum MaP rating: 1,000 grams.
- .5 Acceptable Products: Bowl “American Standard” Madera model 3461.001, Flush Valve “American Standard”, model 6047.161 or approved equivalent in accordance with B7.

2.3 P-3 WATER CLOSET - TANK TYPE

- .1 White, vitreous china, 1.6 GPF, elongated bowl, pressure-assisted siphon jet flush action, fully-glazed 2-1/8” trapway, 10x12” water surface area, metal chrome trip lever, meets or exceeds AMSE A112.19.2-2008, CSA B45.1-08. Dimensions: 30-1/4”x20-1/2”x29-1/4” (LxWxH). c/w tank cover locking device.
- .2 Seat & Supply: Soft close toilet seat.
- .3 Acceptable Product: “American Standard” Cadet model 2462.016 with alternate tank, tank cover, and cover locking device 4142.600 or approved equivalent in accordance with B7.

2.4 P-4 COUNTERTOP LAVATORY

- .1 Basin: 18-10 Stainless steel, 18 gauge, single centre faucet hole, counter mounted, undercoated, silk finished rim, radiant silk finished bowl, front overflow c/w assembly, 1-1/4” waste opening. Dimensions: 18” Height x 21” Width x 7” Depth.
- .2 Faucet: Brass body, polished chrome finish, automatic infrared sensor activation, hydropower self-generating system, aerated flow, thermal mixing, anti-scald safety feature, self adjusting with control box and mounting hardware, Maximum discharge of 0.17 gallons per 10 second cycle, single hole mounting. Complies to ASME A112.18.1M/CSA B125.1, NSF 61-9, and ASSE 1070, ADA Compliant.

- .3 Acceptable Products: Basin “Kindred” model KSOV1821/7/1, faucet “Toto” TEL5GS10 or approved equivalent in accordance with B7.

2.5 P-5 BARRIER FREE LAVATORY

- .1 Basin: 18-10 Stainless steel, 18 gauge, single centre faucet hole, counter mounted, undercoated, silk finished rim, radiant silk finished bowl, front overflow c/w assembly, 1-1/4” waste opening. Dimensions: 18” Height x 21” Width x 7” Depth.
- .2 Faucet: Brass body, polished chrome finish, automatic infrared sensor activation, hydropower self-generating system, aerated flow, thermal mixing, anti-scald safety feature, self adjusting with control box and mounting hardware, Maximum discharge of 0.17 gallons per 10 second cycle, single hole mounting. Complies to ASME A112.18.1M/CSA B125.1, NSF 61-9, and ASSE 1070, ADA Compliant.
- .3 Provide insulated trap and drain to meet barrier free requirements.
- .4 Acceptable Products: Basin “Kindred” model KSOV1821/7/1, faucet “Toto” TEL5GS10 or approved equivalent in accordance with B7.

2.6 P-6 SHOWER (EXISTING TO BE REUSED)

2.7 P-7 URINAL

- .1 Urinal: White, vitreous china, 0.125 GPF, flushing rim, elongated 14” rim from finished wall, extended sides, 3/4” inlet spud, 2” inside NPTF outlet connection, strainer included, nominal dimensions 14-1/8” x 18-7/8” x 26-1/8”. c/w all required wall-mounting supports and hardware.
- .2 Flush Valve: 0.125 GPF, manual urinal flush valve, self-cleaning brass piston valve with integral wiper spring in bypass orifice to prevent clogging. Valve remains closed and does not need to be reset after loss of water pressure. Cast brass valve body and cover, chrome finish, vandal resistant stop cap. Includes sweat solder kit with wall flange and cover tube. 3/4” angle stop with back-flow protection and vacuum breaker included.
- .3 Acceptable Products: Urinal “American Standard” model 6590.503 and flush valve “American Standard” model 6045.013, or approved equivalent in accordance with B7.

2.8 P-8 WALL HYDRANT

- .1 Encased, non-freeze, anti-siphon, automatic draining, wall hydrant for flush installation. Complete with integral backflow preventer, copper casing, all bronze interior parts with 1/2 turn ceramic disk cartridge and combination 3/4” female solder and 3/4” male pipe thread inlet. Stainless steel box and hinged cover with operating key lock and “WATER” stamped on cover. Wall opening 3-3/16” x 8-1/2”.
- .2 Acceptable Products: “Zurn” model Z1320-EZ or approved equivalent in accordance with B7.

2.9 P-9 SINK (EXISTING)

2.10 P-10 FLOOR DRAIN

- .1 Dura-Coated cast iron body with bottom outlet, adjustable "Type B" polished nickel bronze and round strainer. Provide trap seal primer and vandal proof secured top.
- .2 Acceptable Products: "Zurn" model ZN-211-B or approved equivalent in accordance with B7.

2.11 P-11 DECK DRAIN

- .1 Dura-Coated cast iron body with bottom outlet, adjustable "Type B" polished nickel bronze and round strainer. Provide vandal proof secured top. 5" diameter strainer.
- .2 Acceptable Products: "Zurn" model ZN-211-B or approved equivalent in accordance with B7.

2.12 P-12 HOSE BIBB

- .1 Brass body, lockshield bonnet, removable loose key wheel handle, replaceable cartridge , vacuum breaker, lead free, polished chrome plated, 3/4" connection.
- .2 Acceptable Products: "Acorn" model 8121CP-LF or approved equivalent in accordance with B7.

Part 3 Execution

3.1 APPLICATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Mounting heights:
 - .1 Standard: to manufacturer's recommendations, measured from finished floor.
 - .2 Wall-hung fixtures: measured from finished floor.
 - .3 Barrier free: to most stringent standard (Manitoba Building Code, CAN/CSA B651)

3.3 ADJUSTING

- .1 Conform to water conservation requirements specified this section.
- .2 Adjustments:
 - .1 Adjust water flow rate to design flow rates.
 - .2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.

- .3 Adjust flush valves to suit actual site conditions.
 - .4 Adjust urinal flush timing mechanisms.
 - .5 Set controls of automatic flush valves for WCs and urinals to prevent unnecessary flush cycles.
- .3 Checks:
- .1 Water closets, urinals: flushing action.
 - .2 Aerators: operation, cleanliness.
 - .3 Vacuum breakers, backflow preventers: operation under all conditions.
- .4 Thermostatic controls:
- .1 Verify temperature settings, operation of control, limit and safety controls.

END OF SECTION