

Part 1 General

1.1 Regulatory Requirements

- .1 Refer carefully to other parts of the specifications.
- .2 Conform to the requirements and recommendations of all local municipal, provincial and federal by-laws and ordinances.
- .3 Do not reduce the quality of work specified and/or shown on the drawings because of the Regulatory requirements.

1.2 Applicable Codes And Standards

- .1 In general and as applicable, the physical and chemical properties, the characteristics and the performance of items in this Division shall be as noted in the following:
 - .1 Canadian Standards Association.
 - .2 American National Standards Institute.
 - .3 National Building Code.
 - .4 National Plumbing Code of Canada
 - .5 National Fire Code of Canada
 - .6 Occupational Health and Safety Act
 - .7 Civic Building By-Laws.
 - .8 Civic Water Works By-Laws and Sewer By-Laws.
 - .9 National Fire Code.
 - .10 Worker's Compensation Board Requirements.
 - .11 American Society for Testing and Materials.
 - .12 Canadian Government Specifications Board.
 - .13 National Fire Protection Association.
 - .14 Canadian Council of Ministers of the Environment Codes.
 - .15 Underwriters' Laboratories of Canada.
 - .16 Provincial Workplace Safety and Health Regulations.
 - .17 Provincial Labour Regulations.

1.3 Action And Informational Submittals

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for specified equipment and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province where work is taking place.

- .2 Indicate on drawings:
 - .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 In addition to transmittal letter referred to in Section 01 33 00 - Submittal Procedures: use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.

1.4 QUALITY ASSURANCE

- .1 Pre-Installation Meeting:
 - .1 Convene pre-installation meeting one week prior to beginning on-site installations
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.
- .2 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.5 Closeout Submittals

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.
 - .1 Operation and maintenance manual approved by, and final copies deposited with, Departmental Representative before final inspection.
 - .2 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.
 - .3 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.
- .4 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.
- .5 Approvals:
 - .1 Submit 2 copies of draft Operation and Maintenance Manual to Departmental Representative for approval. Submission of individual data will not be accepted unless directed by Departmental Representative.
 - .2 Make changes as required and re-submit as directed by Departmental Representative.
- .6 Additional data:
 - .1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.
- .7 Site records:
 - .1 Departmental Representative 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.
 - .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.
- .8 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 Departmental Representative 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.
- .9 Submit copies of as-built drawings for inclusion in final TAB report.

1.6 Maintenance Material Submittals

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Furnish spare parts 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.
- .3 Provide one set of special tools required to service equipment as recommended by manufacturers.
- .4 Furnish one commercial quality grease gun, grease and adapters to suit different types of grease and grease fittings.

1.7 Delivery, Storage And Handling

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

Part 2 Products

2.1 Not Used

- .1 Not used.

Part 3 Execution

3.1 Examination

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 Painting Repairs And Restoration

- .1 Do painting in accordance with Section 09 91 23 - Interior Painting.

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

3.3 System Cleaning

- .1 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and air handling units.

3.4 Field Quality Control

- .1 Site Tests: conduct following tests in accordance with Section 01 45 00 - Quality Control and submit report as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
- .2 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.5 Demonstration

- .1 Departmental Representative will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.
- .2 Trial usage to apply to following equipment and systems:
- .3 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.
- .4 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.
- .5 Instruction duration time requirements as specified in appropriate sections.
- .6 Departmental Representative will record these demonstrations on video tape for future reference.

3.6 Cleaning

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.7 Protection

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

3.8 Manufacturer'S Recommendation

- .1 Install, adjust, test, start-up, and maintain all mechanical equipment in strict accordance with the manufacturer's recommendations. If in conflict with the drawings and specifications, contact the Engineer for clarification. Include edited data in O&M manuals.
- .2 Ensure that the manufacturer recommends the product for its intended use. If in doubt, contact the Engineer.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Section Includes:
 - .1 Materials and installation for plumbing specialties and accessories.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM).
 - .1 ASTM A126, Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
 - .2 ASTM A536, Specification for Ductile Iron Castings.
 - .3 ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.
- .2 American Water Works Association (AWWA).
 - .1 AWWA C116/A21.16, American National Standard for Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Water Supply Service.
 - .2 AWWA C700, Cold Water Meters-Displacement Type, Bronze Main Case.
- .3 Canadian Standards Association (CSA International).
 - .1 CAN/CSA-B45 Series, Plumbing Fixtures.
 - .2 CAN/CSA-B125.3, Plumbing Fittings.
 - .3 CAN/CSA-B651, Accessible Design for the Built Environment.
 - .4 CSA-B64 Series, Backflow Preventers and Vacuum Breakers.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .5 Plumbing and Drainage Institute (PDI).
 - .1 PDI-WH 201, Water Hammer Arresters.

1.3 SUBMITTALS

- .1 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit following additional information:
 - .1 Submit a single set of shop drawing for all backflow prevention devices.
 - .2 Indicate the location and type of each backflow preventer.

1.4 CLOSEOUT SUBMITTALS

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

Part 2 Products

2.1 MANUFACTURED UNITS

- .1 Fixtures: manufacture in accordance with CAN/CSA-B45 series.
- .2 Trim, fittings: manufacture in accordance with CAN/CSA-B125.3.
- .3 Exposed plumbing brass to be chrome plated.
- .4 Number, locations: architectural drawings to govern.
- .5 Fixtures in any one location to be product of one manufacturer and of same type.
- .6 Trim in any one location to be product of one manufacturer and of same type.
- .7 Individual shower stall showerhead.
 - .1 SHO-1 : individual showerhead.
 - .1 Bradley SXWS9151 wall panel mounted shower c/w mounting frame, 14 gage type 304 stainless steel, satin finish exterior. Furnished with fixed shower head, hand shower with on/off button, remote touch-time metering valve and vacuum breaker. Limit maximum flow rate to 5.7 l/minute at 550 kPa.
 - .2 Master Thermostatic Mixing valve:
 - .1 Bronze body, non-corrosive parts, liquid-filled thermostatic element, safety limit feature set at 45 degrees C maximum, built-in union-strainer-stop-check on each inlet, balanced independently seated hot and cold water poppets, tamper-resistant outlet temperature to hold as set even with:
 - .1 50% drop in either inlet pressure.
 - .2 13 degrees C maximum fluctuation in hot water temperatures.
 - .3 85% restriction in outlet flow.
 - .2 Capacity: 5.7 L/min shower head at 550 kPa.
- .8 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 cleanout on each fixture not having integral trap.
 - .2 Chrome plated in all exposed places.

2.2 CLEANOUTS

- .1 Cleanouts:
 - .1 Walls: heavy lacquered cast iron body.
 - .2 Floors: heavy lacquered cast iron body with adjustable head suitable for recessed access cover, and neoprene gasket or inside caulk connection. Provide anchor flange with clamping collar for units located in waterproof floors.
 - .3 Plugs: tapered threaded bronze with raised head, gas- and water-tight seal.
- .2 Access Covers:

- .1 Walls: flush mounted, square, prime-coated, 1.9 mm thick steel construction with concealed hinge, door with rounded corners, and screwdriver-operated cam lock.
- .2 Floors:
 - .1 Unfinished concrete: nickel bronze, heavy duty, round scoriated top with retaining screws.
 - .2 Tile: nickel bronze, square scoriated top with retaining screws.
 - .3 Sheet goods: nickel bronze, round scoriated top with retaining screws.
 - .4 Carpet: nickel bronze, round scoriated top with carpet marker and retaining screws.

2.3 WATER HAMMER ARRESTERS

- .1 Stainless steel construction, bellows type: tested and certified to PDI-WH 201.

2.4 STRAINERS

- .1 860 kPa (125 psi) maximum working pressure, Y-type with 20 mesh, removable stainless steel screen.
- .2 NPS 2 and under, bronze body, screwed ends, with brass cap.
- .3 NPS 2-1/2 and over, cast iron body, flanged ends, with bolted cap.

2.5 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 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 comply with manufacturer's recommendations unless otherwise indicated or specified.
 - .2 Physically handicapped: to comply with most stringent of either Authority Having Jurisdiction or 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 Checks:

- .1 Aerators: operation, cleanliness.
- .2 Vacuum breakers, backflow preventers: operation under all conditions.
- .4 Thermostatic controls:
 - .1 Verify temperature settings, operation of control, limit and safety controls.

3.4 CLEANOUTS

- .1 Size: line size up to NPS 4. Not less than NPS 4 on larger pipes.
- .2 Install cleanouts where easily utilized, at the base of soil and waste stacks, and rainwater leaders, at locations required by local code and authority having jurisdiction, and as indicated.
- .3 Bring cleanouts to wall or finished floor unless serviceable from below floor.
- .4 In finished areas, ensure a neat installation level within the surrounding floor or wall. Beneath vanities located as high as permissible for good access and minimum visibility.

3.5 WATER HAMMER ARRESTERS

- .1 Provide water hammer arresters:
 - .1 At all equipment utilizing quick closing valves such as automatic dishwashers, clothes washers, etc.
 - .2 On branch supplies to fixtures or group of fixtures.
 - .3 Where recommended by Plumbing and Drainage Institute Standard PDI-WH 201 "Water Hammer Arresters".
 - .4 Where indicated on the drawings.
- .2 Size in conformance with Plumbing and Drainage Institute Standard PDI-WH 201 "Water Hammer Arresters".

3.6 STRAINERS

- .1 Install with sufficient room to remove screen.
- .2 Install Y-pattern strainers for water on supply side of each control valve, water pressure-reducing valve, solenoid valve, and pump.

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 Departmental Representative.
- .3 Install soft copper tubing to floor drain.

3.8 TESTING AND ADJUSTING

- .1 Access doors:
 - .1 Verify size and location relative to items to be accessed.

- .2 Cleanouts:
 - .1 Verify covers are gas-tight, secure, yet readily removable.
- .3 Water hammer arresters:
 - .1 Verify proper installation of correct type and size of water hammer arrester.
- .4 Strainers:
 - .1 Clean out repeatedly until clear.
 - .2 Verify accessibility of cleanout plug and basket.
 - .3 Verify that cleanout plug does not leak.

END OF SECTION