
Part 1 General

1.1 RELATED SECTIONS

- .1 Section 22 05 00 - Common Work Results for Plumbing.

1.2 REFERENCES

- .1 American Society of Sanitary Engineering (ASSE).
 - .1 ASSE 1050, Performance Requirements for Stack Air Admittance Valves for Sanitary Drainage Systems.
 - .2 ASSE 1051, Performance Requirements for Individual and Branch Type Air Admittance Valves for Sanitary Drainage Systems.
- .2 American Society for Testing and Materials International (ASTM).
 - .1 ASTM A126-95 (2001), Specification for Grey Iron Castings for Valves, Flanges and Pipe Fittings.
 - .2 ASTM A278, Standard Specification for Gray Iron Castings for Pressure-Containing Parts for Temperatures up to 650°F (350°C).
 - .3 ASTM A536, Standard Specification for Ductile Iron Castings.
 - .4 ASTM B32, Standard Specification for Solder Metal.
 - .5 ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.
 - .6 ASTM B370, Standard Specification for Copper Sheet and Strip for Building Construction.
 - .7 ASTM C140, Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
 - .8 ASTM C267, Standard Test Methods for Chemical Resistance of Mortars, Grouts, and Monolithic Surfacing and Polymer Concretes.
 - .9 ASTM C307, Standard Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacing.
 - .10 ASTM C579, Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing and Polymer Concretes.
 - .11 ASTM C580, Standard Test Method for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
 - .12 ASTM C666, Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing.
- .3 American Water Works Association (AWWA).
 - .1 ANSI/AWWA C700-02, Cold Water Meters - Displacement Type.
 - .2 ANSI/AWWA C701-02, Cold Water Meters - Turbine Type for Customer Service.

- .3 ANSI/AWWA C702-1-01, Cold Water Meters - Compound Type.
- .4 Canadian Standards Association (CSA International).
 - .1 CSA-B64-01, Backflow Preventers and Vacuum Breakers
 - .2 CAN/CSA-B64.10, Backflow Preventers and Vacuum Breakers: Choice, Installation, Maintenance and On Site Tests.
 - .3 CSA-B79, Floor Drains and Building Drains.
 - .4 CSA-B356-00, Water Pressure Reducing Valves for Domestic Water Supply Systems.
- .5 National Sanitation Foundation (NSF).
 - .1 NSF 14, Plastics Piping System Components and Related Materials.
- .6 Plumbing and Drainage Institute (PDI).
 - .1 PDI - G101, Testing and Rating Procedure for Grease Interceptors with Appendix of Sizing and Installation Data.
 - .2 PDI - WH201, Water Hammer Arrestors.
- .7 Underwriters Laboratories (UL).
 - .1 UL 73, Standard for Safety Motor-Operated Appliances.
 - .2 UL 1004, Electric Motors.
- .8 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).

1.3 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Technical Sheets:
 - .1 Submit manufacturer's printed product literature, specifications, and datasheet for fixtures and equipment.
 - .2 Technical sheets should indicate dimensions, construction details, and materials for specified items.
- .3 Shop Drawings:
 - .1 Shop drawings must include the following:
 - .1 Drawings to indicate materials, finishes, method of anchorage, number of anchors, dimensions construction and assembly details, and accessories.
 - .2 Tables and performance curves of the equipment.

- .4 Certificates:
 - .1 Submit certificates signed by the manufacturer certifying that the products and materials comply with specified performance characteristics and physical properties.
- .5 Instructions:
 - .1 Submit manufacturer's installation instructions.
- .6 Inspections performed on site by the manufacturer:
 - .1 Submit the required inspection reports.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit product data and maintenance sheets for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Maintenance Sheets:
 - .1 Maintenance sheets must include the following:
 - .1 Description of plumbing specialties and accessories, giving manufacturers name, type, model, year, and capacity.
 - .2 Details of operation, servicing, and maintenance.
 - .3 Recommended spare parts list.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.
- .5 Fold up metal and plastic banding, flatten, and place in designated area for recycling.

1.6 ACCEPTABLE PRODUCTS AND MATERIALS

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

Part 2 Products

2.1 FLOOR DRAINS

- .1 Floor and Trench Drains: in conformity with CSA-B79.
- .2 Type AS-1 (general use): cast iron body, round, adjustable head, heavy-duty nickel bronze strainer and integral seepage pan.
 - .1 Acceptable products:
 - .1 Zurn, ZZN-211-A5;
 - .2 Watts-Drainage, FD200-1-5-7;
 - .3 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .3 Type AS-2 (general use): cast iron body, round, adjustable head, nickel bronze strainer, integral seepage pan, sealing gasket and fitting for trap seal primer.
 - .1 Acceptable products:
 - .1 Linoleum or ceramic floors:
 - .1 Zurn, ZZN-415-H-P;
 - .2 Watts-Drainage, FD100-C-L5-1;
 - .3 Jay R. Smith, fig. 2005-BHD;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .4 Type ASE (with funnel): cast iron body, round, adjustable nickel bronze strainer with integrated flat oval funnel, integral seepage pan.
 - .1 Acceptable products:
 - .1 Zurn, fig. ZN-211-BF;
 - .2 Watts, model FD-200-EG-1-7;
 - .3 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .5 AC (stainless steel with cover): 150 mm diameter round body, stainless steel strainer, integral seepage pan with sediment basket, stainless steel with a stainless steel cover 9.5 mm thick to be used to block the drain during heavy traffic.
 - .1 Acceptable products:
 - .1 Les industries Intercept, model 1003-10-15;
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.

- .6 ACE (Stainless steel with funnel): 150 mm diameter round body, stainless steel strainer, integral seepage pan with sediment basket, stainless steel with a stainless steel cover 9.5 mm thick, and oval funnel.
 - .1 Acceptable products:
 - .1 Les industries Intercept, model 1203-10-15;
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.

2.2 CLEANOUTS

- .1 Cleanout Plugs: heavy cast iron male ferrule with brass screws, threaded cast iron plug and neoprene gasket.
 - .1 Acceptable products:
 - .1 Zurn, Z-1445;
 - .2 Watts-Drainage, CO460;
 - .3 Jay R. Smith, 4510;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .2 Access Covers:
 - .1 Wall access: face or wall type, polished nickel bronze or stainless steel square cover with flush head securing screws, bevelled edge frame complete with anchoring lugs.
 - .1 Acceptable products:
 - .1 Zurn, ZANB-1460;
 - .2 Watts-Drainage, CO460-S-3;
 - .3 Jay R. Smith, 4735;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .2 Floor access: cast iron male ferrule, "Fusotec 300" or baked epoxy finish with threaded plug. Adjustable cover according to floor finish.
 - .1 For unfinished concrete floors; non-skid, round, bronze with polished nickel finish.
 - .1 Acceptable products:
 - .1 Zurn, ZX-1612;
 - .2 Watts-Drainage, CO200-RX-1-34G;
 - .3 Jay R. Smith, 4220;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.

- .2 For terrazzo tile finished floors: polished nickel bronze with recessed cover for terrazzo tile infill, complete with vandalproof locking screws.
 - .1 Acceptable products:
 - .1 Zurn, ZN-1400-10-VP;
 - .2 Watts-Drainage, CO200-U-1-6-34G;
 - .3 Jay R. Smith, 4180-U;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .3 For tile and linoleum floors: polished nickel bronze with recessed cover for linoleum or tile infill, complete with vandal proof locking screws.
 - .1 Acceptable products:
 - .1 Zurn, ZN-1400-6-VP;
 - .2 Watts-Drainage, CO200-T-1-6-34G;
 - .3 Jay R. Smith, 4140-U;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.

2.3 DRAINAGE PIT (FO)

- .1 HDPE seepage basin with black enameled extra heavy duty steel frame and grille, 600 mm x 600 mm x 600 mm, with a NPS 4 drainage connection.
 - .1 Acceptable products:
 - .1 Zurn FLO-THRU, model Z887-HD-DGE-E4;
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.

2.4 EXTERIOR NON-FREEZE WALL HOSE BIBS

- .1 RAE Type: recessed, with housing, with integral vacuum breaker, NPS $\frac{3}{4}$, hose outlet, removable operating key. Polished bronze finish.
 - .1 Acceptable products:
 - .1 Zurn, ZN-1320;
 - .2 Watts-Drainage, HY-725;
 - .3 Jay R. Smith, fig. 5509QTNB;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.

2.5 EXTERIOR HOSE BIBS FOR CONCRETE WALLS.

- .1 Recessed, with housing, with integral vacuum breaker, NPS $\frac{3}{4}$, hose outlet, removable operating key. Polished bronze finish.
 - .1 Acceptable products:
 - .1 Zurn, Z1350;

- .2 Replacement materials or products: approved by addendum according to Instructions to bidders.

2.6 WATER HAMMER ARRESTORS

- .1 Stainless steel construction, bellows type: to PDI WH201.
 - .1 Acceptable products:
 - .1 Zurn, Z-1700;
 - .2 Watts-Drainage, SG Series or P.P.P. Inc.;
 - .3 Jay R. Smith, 5000 Series;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.

2.7 BACKFLOW PREVENTER

- .1 Backflow Preventer: to CAN/CSA B-64 Series. Contractor must obtain a test certificate for each device.
- .2 Selection of the backflow preventer: to CAN/CSA B-64 Series or any more restrictive indication.
- .3 Bronze or fused epoxy coated cast iron body, double check valves, intermediate relief valve, test valves, and double isolating valves. Working pressure 1,210 kPa at a temperature of 43°C.
- .4 Integrated strainer.
- .5 Connection to drain with air gap for reduced pressure backflow preventer.
- .6 Acceptable products:
 - .1 Double check valve backflow preventer:
 - .1 Watts, 709 Series;
 - .2 Zurn Wilkins, model 350;
 - .3 Apollo, DC-4A Series;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .2 Reduced pressure backflow preventer:
 - .1 Watts, 009 and 909 Series;
 - .2 Zurn Wilkins, model 375;
 - .3 Apollo, RP-4A Series;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.

2.8 VACUUM BREAKERS

- .1 Breakers in conformity with CSA-B64 Series.
- .2 Atmospheric Vacuum Breaker.
 - .1 Acceptable products:
 - .1 Watts, No. 288A;
 - .2 Zurn Wilkins, 30;
 - .3 Apollo 38-100/200;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .3 Vacuum breaker with hose connection.
 - .1 Acceptable products:
 - .1 Watts, No. 8;
 - .2 Zurn Wilkins, BFP-8;
 - .3 Apollo, 38-314;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.

2.9 ANTI-BACKFLOW VALVES (CAR)

- .1 With Floor Access:
 - .1 For cast iron or copper pipes: extra heavy cast iron body with bronze seat, revolving bronze flapper and threaded or bolted cover, with interlocking joint.
 - .1 Access pipe with cover.
 - .2 Cast iron housing and cast iron cover with gasket.
 - .1 Acceptable products:
 - .1 Zurn ZN1095-15-BV;
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .2 Without Floor Access:
 - .1 For cast iron or copper pipes: extra heavy cast iron body with bronze seat and revolving bronze flapper.
 - .1 Acceptable products:
 - .1 Zurn ZN1095-BV.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.

2.10 INTERIOR HOSE BIBS

- .1 Type RAI: brass valve with bronze finish complete with integral backflow preventer, and a NPS $\frac{3}{4}$ threaded hose spout.
 - .1 Acceptable products:
 - .1 Zurn ZN1341-PB;
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .2 Drainage Valves.
 - .1 Unless otherwise specified valves shall be NPS $\frac{3}{4}$, bronze construction, with a threaded hose spout and a cap mounted on a chain.
 - .3 Acceptable Products:
 - .1 Toyo-R/W, 5046;
 - .2 Newman Hattersley, 1969CAP;
 - .3 Milwaukee;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.

2.11 WATER MAKE UP ASSEMBLY FOR HEATING AND COOLING CIRCUITS

- .1 Make-up assembly complete with:
 - .1 Backflow preventer, pressure gauge on inlet and outlet, pressure relief valve on low pressure side, and gate valves on inlet and outlet.
 - .1 Acceptable products:
 - .1 Zurn Wilkins, 375;
 - .2 Watts, 009 Series;
 - .3 Conbraco, 40-400.200;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .2 Strainer.
 - .3 Pressure reducing valve to CSA B356 Standard.
 - .1 Acceptable products:
 - .1 Zurn Wilkins, 600-G ;
 - .2 Watts, U5B-GG;
 - .3 Conbraco, 36G;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .4 Safety valve on low pressure side.
 - .1 Acceptable products:
 - .1 Wilkins, P-1000;

- .2 Watts, 174A;
 - .3 Conbraco, 10-600;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .2 Install each water make-up assembly between two-ball valves.
 - .3 Install water make-up assembly with a by-pass and valve.
 - .4 Install a pressure gauge on the low pressure side of make-up assembly.

2.12 WATER METERS

- .1 The water meters will be supplied and installed by the Contractor according to the requirements of the local authority.
- .2 Supply and install shut-off valves, unions, strainer, etc., required for the installation of the water meter according to Municipal Requirements.
- .3 Water Meter: to AWWA C700 Standard.
- .4 Characteristics: according to the requirements of the local authority.

2.13 STRAINERS

- .1 "Y" Type: pressure rating of 860 kPa, with monel, bronze or stainless steel removable screen.
- .2 NPS 2 and under:
 - .1 Bronze body to ASTM-B-62 Standard or cast iron to ASTM A-278M Standard, Class 30, purge cap.
 - .2 Screwed ends.
 - .3 Stainless steel removable screen with 0.8 mm (0.032 in.) perforations.
 - .4 Purge plug to be adapted to the diameter of strainer, with ball valve and brass cap.
 - .5 Acceptable products:
 - .1 Armstrong, F4SC - A1SC;
 - .2 Apollo, 59 Series;
 - .3 Zurn Wilkins, S Series;
 - .4 Newman Hattersley, T807;
 - .5 Mueller, 351M;
 - .6 Watson-McDaniel, WCSY Series;
 - .7 Replacement materials or products: approved by addendum according to Instructions to bidders.

- .3 NPS 2-½ and over:
 - .1 Cast iron to ASTM A-278M, Class 30, purge cap.
 - .2 Flanged ends.
 - .3 Stainless steel removable screen with 3.2 mm (0.125 in.) perforations.
 - .4 Purge plug to be adapted to the diameter of strainer, with ball valve and brass cap.
 - .5 Acceptable products:
 - .1 Armstrong, AIFL;
 - .2 Apollo 125YF;
 - .3 Watson-McDaniel, WCIY;
 - .4 Newman Hattersley, T810;
 - .5 Mueller, 758;
 - .6 Zurn Wilkins, FS Series;
 - .7 Replacement materials or products: approved by addendum according to Instructions to bidders.

2.14 GREASE INTERCEPTOR

- .1 Grease interceptor with integral extension, steel construction covered with a rubber based paint, removable baffles, flow regulator and reinforced epoxy coated non-slip cover. Mounted flush with the finished floor.
- .2 Characteristics - IG1:
 - .1 Zurn, model 1200;
 - .2 Capacity: 567 L/m;
 - .3 Grease capacity: 136 kg.
- .3 Characteristics - IG2:
 - .1 Zurn, model 900;
 - .2 Capacity: 284 L/m;
 - .3 Grease capacity: 68 kg.
- .4 Acceptable Products:
 - .1 Grease interceptor:
 - .1 Zurn, 1172 Series;
 - .2 Watts-Drainage, GI-100 or GI-200;
 - .3 Jay R. Smith, 8000 Series;
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .2 Flow regulator:
 - .1 Zurn, 1408-L;

- .2 Watts-Drainage;
- .3 Jay R. Smith, Flo Series;
- .4 Replacement materials or products: approved by addendum according to Instructions to bidders.

2.15 TRAP PRIMER

- .1 Primer operating through pressure differential:
 - .1 Acceptable products:
 - .1 Trap primer:
 - .1 P.P.P. Inc., model PO-500;
 - .2 Mifab, model MR500;
 - .3 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .2 Multiple distributors:
 - .1 P.P.P. Inc., models PU-2, 3, and 4;
 - .2 Mifab, model MI-DU;
 - .3 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .2 Connect floor drains and open drains to automatic primer system as follow:
 - .1 Above ground: rigid copper, complying with requirements.
 - .2 Underground: one-piece flexible aluminum hose, with inner and outer polyethylene coating.
 - .3 Provide dielectric connection for underground to aboveground passage, complying with requirements.

2.16 TRAP GUARD

- .1 Elastomer membrane that automatically closes after letting the drained fluid pass. System must be resistant to scaling and microbiological growth.
- .2 Acceptable Products:
 - .1 Proset Systems, "Trap Guard";
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.

2.17 SLEEVE FOR ROOF VENTS (MULTILAYERED OR MODIFIED BITUMEN MEMBRANE)

- .1 Insulated and caulked sleeve made of 1100 Series aluminum 1.62 mm thick and 340 mm high. One-piece construction, factory made, with preformed aluminum cap. Sleeve insulated on the interior with polyurethane foam weather stripping injected in factory.

2.18 VENT VALVES

- .1 PVC vent valves, in conformity with ANSI/ASSE 1051, ASSE 1050, and NSF 14 Standards.
- .2 Acceptable Products:
 - .1 STUDOR, model Mini-Vent for NPS 1¼ to NPS 2, and model Maxi-Vent for NPS 3 and NPS 4;
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.

2.19 BUFFER TANK (RES-1)

- .1 Translucent HDPE buffer tank for drainage use during fire protection tests. One-piece construction without joints and with a 3,630 L (800 Imp. Gal.) capacity. Dimensions: 1,830 mm dia. x 1,880 mm, sloped towards the NPS 2 drainage connection with ball valve. Reservoir must be self-supporting with a polyethylene base. Top mounted inspection window.
- .2 Acceptable Products:
 - .1 ACO Container, model SB-800;
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.

2.20 PITS AND SUMPS

- .1 Basin constructed on site according to indications on drawings. Frame and cover in galvanized steel. Basin, frame, and cover supplied by the General Contractor.

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 equipment in accordance with National Plumbing Code of Canada, provincial codes, and local authority having jurisdiction.
- .2 Install special plumbing equipment in accordance with manufacturer's instructions and as specified.

3.3 CLEANOUTS

- .1 Install cleanouts at base of soil and waste stacks (drain connectors and down pipes) at code required locations and as indicated.
- .2 Install cleanouts flush with the finished wall or floor, unless it is floor-mounted, with a maintenance access from beneath the floor.
- .3 Size of cleanouts, mounted over main collectors and sanitary waste columns must be equal to the size of canalisation, but never over NPS 4.

3.4 NON-FREEZE WALL HOSE BIBS

- .1 Install 900 mm above finished grade, unless otherwise indicated.
- .2 The exterior wall hose bibs have a stop valve installed on a branch line on the inside of the building and are recessed in the wall, the wall plate resting firmly against the exterior face of the masonry. The space surrounding the body of the hydrant must be sealed with humidity resistant sprayed insulation.

3.5 EXTERIOR HOSE BIBS FOR CONCRETE WALLS

- .1 Supply two exterior hose bibs to the General Contractor.
- .2 The hose bibs will be installed by others.

3.6 WATER HAMMER ARRESTORS

- .1 Install on fixtures or group of fixture supply branches, upstream of all quick-close valves such as solenoids and washing machines, and wherever indicated.

3.7 BACK FLOW PREVENTERS

- .1 Install in accordance with CSA-B64 Series, where indicated and elsewhere as required by Code.
- .2 Connect indirectly the intermediate chamber of reduced pressure backflow preventer to the closest floor funnel.

3.8 PRIMER DEVICES

- .1 Install device on all floor drains (AS), at all open drain connectors and as indicated on plans, and as prescribed by prescriptions of the National Plumbing Code, except in mechanical rooms.
- .2 Install primer devices in accessible locations.

3.9 TRAP GUARD

- .1 Install device on all floor drains (AS), at all open drain connectors in mechanical rooms, as indicated on plans and as prescribed by prescriptions of the National Plumbing Code.

3.10 ANTI-BACKFLOW VALVES

- .1 Install a check valve at indicated locations.
- .2 Install check valves according to indications.

3.11 DRAINAGE VALVES

- .1 Unless otherwise indicated install at bottom of risers, at low points to drain systems near isolation valves, and as indicated

3.12 INTERIOR HOSE BIBS

- .1 Install 900 mm above finished grade, unless otherwise indicated.

3.13 STRAINERS

- .1 Install with sufficient room to remove basket.

3.14 WATER METERS

- .1 Install the meters supplied by the local water distribution Authority.
- .2 Install the meters according to indications.

3.15 GREASE INTERCEPTORS

- .1 When installing grease interceptors allow for enough space to perform maintenance operations and respect all indications.
- .2 Install flow regulators at the discharges of all equipment connected to the grease interceptor.

3.16 DRAINS

- .1 Clean "P-Traps/ and sediment baskets of all floor drains and prime them.
- .2 Clean roof drains.
- .3 Correct any deficiencies noted during start-up.
- .4 All floor drains must be equipped with a "P-Trap".

3.17 TESTING AND ADJUSTING

- .1 Timing:
 - .1 After start-up deficiencies rectified.
 - .2 After certificate of completion has been issued by authority having jurisdiction.
- .2 Application Tolerances:
 - .1 Pressure at fixtures: ± 70 kPa.
 - .2 Flow rate at fixtures: $\pm 20\%$.
- .3 Adjustments:
 - .1 Verify that flow rate and pressure meet design criteria.
 - .2 Make adjustments while flow rate or withdrawal is at maximum or at 25% of maximum and while pressure is at maximum.
- .4 For the requirements of the present article, "verify" a characteristic or "ensure" a state or significant action means equally "demonstrate the fact" to the Departmental Representative on demand.
- .5 Commissioning:
 - .1 Floor drains:
 - .1 Verify operation of trap seal primer or trap guard.
 - .2 Ensure that sediment baskets are well attached and that there is room to easily remove them for maintenance.
 - .3 Ensure good operation of trap primer or trap guard.
 - .4 Prime the "P-Trap".
 - .5 Check security, accessibility, and removability of strainer.
 - .6 Clean out sediment basket.
 - .2 Cleanouts:
 - .1 Ensure that the plug is airtight, well fixed in place, and easy to remove.
 - .2 Ensure that the cleaning rod easily reaches the next cleanout.
 - .3 Non-freeze wall hose bibs:
 - .1 Verify complete drainage, freeze protection.
 - .2 Verify operation of vacuum breakers.
 - .4 Water hammer arresters:
 - .1 Ensure ease of accessibility to arresters.
 - .2 Verify proper installation of correct type of water hammer arrester.
 - .5 Vacuum breakers, backflow preventers:
 - .1 Verify that the appropriate devices have been installed.
 - .2 Perform necessary adjustments.
 - .3 Simulate reverse flow and back-pressure conditions to test operation of vacuum breakers, backflow preventers.

- .4 Verify visibility of discharge from open ports.
- .6 Anti-backflow valves:
 - .1 Ensure that the valve flaps and inspection covers are easily accessible.
 - .2 Ensure that the device and plug are well sealed and accessible for maintenance purposes.
 - .3 Simulate reverse flow and back-pressure conditions to test operation.
- .7 Trap primers:
 - .1 Verify proper functioning of devices.
 - .2 Adjust the flow rate of each device according to existing conditions.
- .8 Strainer:
 - .1 Ensure that the strainers are easily accessible.
 - .2 Clean out repeatedly until the fluid in the pipes is clear.
 - .3 Verify accessibility of cleanout plug and strainer.
 - .4 Verify that cleanout plug does not leak.
- .9 Grease interceptors:
 - .1 Put into operation using manufacturer's recommended procedures and materials.
- .6 Access Doors:
 - .1 Verify size and location relative to items to be accessed.
- .7 Commissioning Reports:
 - .1 Note all information and data gained during the commissioning on the appropriate forms.
 - .2 Have the reports signed by the person responsible for the tests and the supervisor.
 - .3 Have the reports countersigned.
- .8 Verification of Tests and Test Reports:
 - .1 Advise the owner 24 hours before starting the tests.
 - .2 The tests and other similar activities must be performed in the Owner's presence.
 - .3 The test reports must be verified by the person responsible for the commissioning.
 - .4 The Contractor must test each anti-backflow device installed and obtain a certificate in conformity with CAN/CSA B64.10-01.
- .9 Training:
 - .1 Ensure that operation and maintenance personnel have been trained on the proper procedures for the start-up, operation, maintenance, supervision, and shutdown of the installed equipment.
- .10 Demonstration of Conformity:
 - .1 Demonstrate that the installed equipment satisfies the calculation criteria.

- .2 The conformity demonstration must permit the evaluation of the training levels of the operations and maintenance personnel.

END OF SECTION