

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 22 05 00 - Common Work Results for Plumbing.
- .2 Section 23 05 05 - Pipe Installation.
- .3 Section 23 05 17 - Pipe Welding.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM).
 - .1 ASTM A53, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded, and Seamless.
 - .2 ASTM A105, Standard Specification for Carbon Steel Forgings for Piping Applications.
 - .3 ASTM A182, Standard Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fitting, and Valves and Parts for High Temperature Service.
 - .4 ASTM A312, Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
 - .5 ASTM A403, Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings.
 - .6 ASTM B32, Specification for Solder Metal.
 - .7 ASTM B306, Specification for Copper Drainage Tube (DWV).
 - .8 ASTM C564, Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
 - .9 ASTM C1277, Standard Specification for Shielded Coupling Joining Hubless Cast Iron Soil Pipe and Fitting.
- .2 American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME).
 - .1 ANSI/ASME B16.3, Malleable-Iron Threaded Fittings, Classes 150 and 300.
 - .2 ANSI/ASME B16.4, Gray Iron Threaded Fittings, Classes 125 and 250.
 - .3 ANSI B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
- .3 Association canadienne de normalisation (CSA)/CSA International.
 - .1 CAN/CSA B70, Cast Iron Soil Pipe, Fittings and Means of Joining.
 - .2 CAN/CSA B125, Plumbing Fittings.
 - .3 CAN/CSA B158.1, Cast Brass Solder Joints Drainage, Waste, and Vent Fittings

- .4 CAN/CSA B602, Mechanical Couplings for Drain, Waste, and Vent Pipe and Sewer Pipe
- .4 American Welding Society (AWS).
 - .1 AWS-A5.8/A5.8M, Specification for Filler Metals for Brazing and Braze Welding.
- .5 International Association of Plumbing and Mechanical Officials (IAPMO).
 - .1 UPC-IAPMO, Uniform Plumbing Code.
- .6 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).
 - .1 MSS-SP-67, Butterfly Valves.
 - .2 MSS-SP-70, Cast Iron Gate Valves, Flanged and Threaded Ends.
 - .3 MSS-SP-71, Cast Iron Swing Check Valves, Flanged and Threaded Ends.
 - .4 MSS-SP-80, Bronze Gate, Globe, Angle and Check Valves.
- .7 International standards organisation (ISO).
 - .1 ISO 9000, Quality Management System.
 - .2 ISO 14001, Environmental Management System.
- .8 Underwriters Laboratories of Canada (ULC).
 - .1 CAN/ULC S102, Surface Burning Characteristics of Building Materials and Assemblies.
 - .2 CAN/ULC S102.2, Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies.

1.3 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
 - .1 Drawings to indicate materials, finishes, method of anchorage, number of anchors, dimensions construction and assembly details, and accessories.

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 HEALTH AND SAFETY

- .1 Take necessary measures to ensure health and safety on construction site in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.6 WASTE MANAGEMENT AND REMOVAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Collect and separate for disposal paper, plastic, polystyrene, and corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with the Waste Management Plan.

1.7 QUALITY CONTROL

- .1 An ISO 9000 Quality Control Certificate for gray cast iron parts must be provided on demand.
- .2 An ISO 140001 Environmental Control Certificate for gray cast iron parts must be provided on demand.
- .3 Ferrous matters used for gray cast iron parts production to be installed must be subject to a radiation detection test, complying with CSA B70, article 4.1.1, Standard. Documentation must be provided on demand, according with this article.
- .4 The manufacturer of previous parts must have all certificates and approvals, in order to know its exact origin and the links between product and certificate.
- .5 All assembled parts, such as gray cast iron piping and fittings, must come from the same manufacturer to ease the responsibility and warranty.
- .6 All products and materials to be installed, such as stainless steel sheath couplings (MJ joint), must come from the same manufacturer to ease the responsibility and warranty.

1.8 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 COPPER PIPES AND CONNECTED FITTINGS

- .1 The drainage pipes for sanitary water, sump pumps, storm water and ventilation, of a nominal diameter less than NPS 3, made to be installed above ground, as well as the connected fittings, will be of DWV type and in accordance with the ASTM B306 Standard.
 - .1 Fittings:
 - .1 Fittings in cast brass: in accordance with CAN/CSA-B125 and CAN/CSA B158.1 Standards.
 - .2 Fittings in forged copper: in accordance with the CAN/CSA-B125 Standard.
 - .2 Solder: lead free, tin/antimony 95/5 in accordance with ASTM B32 Standard.

2.2 CAST IRON PIPES AND CONNECTED FITTINGS

- .1 Sanitary waste, rain water, and ventilation piping, to be installed underground and related couplings, must be made from Class 4000 gray cast iron, united or interlock ends, complying with CAN/CSA-B70 Standard, and have a bituminous coating.
- .2 Sanitary waste, rain water, and ventilation piping NPS 3 and over, to be installed above ground and related couplings, must be made from Class 4000 gray cast iron, complying with CAN/CSA-B70 Standard, and have a bituminous coating.
- .3 Contractor may use cast iron piping instead of previously described DWV copper, for indoors piping under NPS 3.
- .4 Trademark, size, and CSA and ASTM signs must be stamped on the whole length of piping, in accordance with CAN/CSA B70 Standard.
- .5 Fitting must have notches to ensure positioning.
- .6 Couplings:
 - .1 Standard couplings for united end gray cast iron fittings and pipes (MJ), under and above ground and piping up to NPS 6.
 - .1 Mechanical joints with neoprene trim reinforced with 0.2 mm (0.008 in) stainless steel sheath and equipped with T-304 stainless steel clamp. Joints must comply with CAN/CSA B70 M, CSA B602, and CAN/ULC S102 or CAN/ULC S102.2 Standards. The mechanical joints must be certified "Listed Pipe Coupling" according to the "Warnock Hersey" certification.

- .2 Couplings for united end (MJ) gray cast iron piping and above ground DWV copper pipes.
 - .1 Mechanical joints with neoprene trim reinforced with 0.2 mm (0.008 in) stainless steel sheath and equipped with T-304 stainless steel clamp. Joints must comply with CAN/CSA B70 M, CSA B602, and CAN/ULC S102 or CAN/ULC S102.2 Standards. The mechanical joints must be certified "Listed Pipe Coupling" according to the "Warnock Hersey" certification.
 - .2 Threaded cast iron fittings meant to receive male brass adaptor. Use approved jointing compound or 100% Teflon ribbon
- .3 Fittings for united ends (MJ) gray cast iron piping under and above ground, up to NPS 10 and all pipes installed below road level.
 - .1 Mechanical joints with neoprene trim reinforced with 0.4 mm (0.016 in) stainless steel corrugated sheath and equipped with T 304 stainless steel clamp with hex head bolt 9.5 mm., tightened at 550 kPa. Joints must comply with CAN/CSA B70 M, CSA B602, ASTM C1277, UPC-IAPMO, FM, and CAN/ULC S102 or CAN/ULC S102.2 Standards.
- .4 Couplings for gray cast iron pipes and fittings with interlocking ends (HUB), above and below ground, and pipes equal to or less than NPS 15.
 - .1 Neoprene compression joints, according to CAN/CSA B70 and CSA B602 Standards.
- .7 Clamps:
 - .1 Carbon steel clamps.

2.3 SUMP PUMP SUPPLY PIPES

- .1 "L" Type copper pipes for above ground installations and copper pipes type for underground installations, in accordance with ASTM B88 Standard.
 - .1 Joints: lead free solder, tin/antimony 95/5. Silfoss silver solder for buried and above ground installations NPS 2½ and larger. Alloys must be in accordance with AWS-A5.8/A5.8M.
- .2 Stainless steel pipes, above ground installation:
 - .1 Stainless steel, Schedule 10S, Grade 304/304L, in accordance with ASME A112.3.1.
 - .2 Welded assembly:
 - .1 Stainless steel fittings, Schedule 10S, Grade 304/304L, butt welded extremities, in accordance with ASME A112.3.1.
 - .3 Roll grooved assembly:
 - .1 Stainless steel fittings, Schedule 10S, RX roll grooved ends, in accordance with ASME A112.3.1, Grade 304/304L.

- .2 Ductile cast iron couplings for pipes with FX roll grooved ends, rigid joint with EPDM gasket -34°C to 110°C with central tab; UL approved according to ANSI/NSF 61 Standard for use with water at 30°C.
- .4 Loose flange assembly:
 - .1 Galvanized, forged carbon steel flanges in accordance with ASTM A105 and ASTM B16.5 Standards.
 - .2 "Stub-End" stainless steel collars in accordance with ASTM A240, Grade 304/304L, Standard.

2.4 VALVES AND CHECK VALVES FOR PRESSURISED PIPES

- .1 Ball Valves:
 - .1 Ball valves NPS 2½ and under, screwed:
 - .1 Class 150.
 - .2 Bronze body, chromed brass solid ball, adjustable PTFE teflon sealing gasket, brass packing assembly, PTFE teflon seat, and steel handle.
 - .3 Acceptable products:
 - .1 Crane No. F9202;
 - .2 Anvil No. F 171 N;
 - .3 Milwaukee No. BA-100;
 - .4 Toyo-R/W No. 5044 A;
 - .5 Kitz No. 58;
 - .6 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .2 Ball valves NPS 2½ and under, welded:
 - .1 In accordance with the ANSI B16.18 Standard, Class 150.
 - .2 Bronze body, chromed brass solid ball, adjustable PTFE teflon sealing gasket, brass packing assembly, PTFE teflon seat, steel handle, and adaptors for NPT threading.
 - .3 Acceptable products:
 - .1 Crane No. F9222;
 - .2 Anvil No. F 171 S;
 - .3 Milwaukee No. BA-150;
 - .4 Toyo-R/W No. 5049 A;
 - .5 Kitz No. 59;
 - .6 Replacement materials or products: approved by addendum according to Instructions to bidders.

.2 Butterfly Valves:

.1 Valves equal to or greater than NPS 2½, flangeless with lugs:

- .1 In accordance with the norm MSS-SP-67, Class 150, category 1 MPa, EHG type, ferrosteel body, stainless steel ball, stainless steel stem, EPDM rubber seat, replaceable, lever, and blocking handle.
- .2 Acceptable products:
 - .1 Keystone, model AR2;
 - .2 Anvil No. L5271;
 - .3 Milwaukee No. ML224E;
 - .4 Romatec, series ABZ, fig. 102;
 - .5 Replacement materials or products: approved by addendum according to Instructions to bidders.

.3 Swing Check Valves:

.1 Check valve NPS 2 and under, screwed:

- .1 In accordance with the norm MSS-SP-80, type 3, Class 125, category 860 kPa, bronze body, bronze swing disc, screw in cap, and regrindable seat.
- .2 Acceptable products:
 - .1 Crane No. 37;
 - .2 Nibco No. TE 413;
 - .3 Milwaukee No. 509-T;
 - .4 Toyo-R/W No. 236;
 - .5 Conbraco, series 61-100;
 - .6 Kitz No. 22;
 - .7 Replacement materials or products: approved by addendum according to Instructions to bidders.

.2 Check valves equal or greater than NPS 2½, flanged:

- .1 In accordance with norm MSS-SP-71, type 1, Class 125, category 860 kPa, cast iron body, end face flanges, replaceable or regrindable seat, bronze swing disc, bolted cap.
- .2 Acceptable products:
 - .1 Crane No. 373;
 - .2 Nibco No. FE 918 B;
 - .3 Milwaukee No. F-2974;
 - .4 Toyo-R/W No. 435 A;
 - .5 Kitz No. 78;
 - .6 Replacement materials or products: approved by addendum according to Instructions to bidders.

Part 3 Execution

3.1 INSTALLATION

- .1 Install pipe work in accordance with Section 23 05 05 - Installation of Pipework, supplemented as specified herein.
- .2 Install in accordance with the National Plumbing Code and the requirements of local competent authorities.
- .3 Install buried piping on a bed of clean sand, washed, 150 mm thick, shaped so as to match the shape of the fitting and female ends. Observe the slope lines and levels indicated. Backfilled with a layer of 150 mm of washed sand.
- .4 Install piping close to walls and ceilings to reduce overcrowding of space. Group piping and install parallel to walls. Respect slopes and indicated levels.
- .5 Test in accordance with the National Plumbing Code and the requirements of local competent authorities.
- .6 Lay a copper drainage piping of NPS 1¼, to link to the nearest floor drain, the drainage fittings (with deep water guard trap) the drip pans for coils, the air inlets and outlets, and the drip bowls of air ducts.
- .7 Storm drain, NPS 10 and greater:
 - .1 Install clamping collars at each change of direction.
- .8 Sanitary and storm drains, NPS 10 and greater:
 - .1 Install clamping collars at all joints on networks installed below street level.
- .9 Sanitary and storm drains, NPS 6 and greater:
 - .1 Install clamping collars on all plugs.
- .10 Sanitary and storm drains:
 - .1 Anchor and lock the bottom of the columns.

3.2 STAINLESS STEEL

- .1 Clean the cuts and grooves formed by rolling to ensure that there is no black steel residue on the stainless steel.

3.3 VENT

- .1 Extend vents without decreasing the size up to 450 mm below the roof. At this point, increase the diameter: minimum NPS 4. Make the change in diameter with a conical connection.

3.4 TESTS

- .1 Every opening and piping outlet of the entire installation must be perfectly sealed as well as the sanitary waste and rain water drainage installations, including upward vents, connections, horizontal drains, and main ducts. Piping must be filled with water up to the highest level for at least two 2 hours. If it is not possible to test the whole installation at once, it can be divided in sections, individually tested as described before. However, water level in column must be at least 3 m over the tested section.
- .2 Piping must be tested up to the roof.
- .3 Testing to National Plumbing Code of Canada, provincial codes, and local authority having jurisdiction. Testing must be realised with the presence of plumbing inspectors or Departmental Representative.

3.5 PERFORMANCE VERIFICATION

- .1 Cleanouts:
 - .1 Ensure cleanouts are accessible and that access doors are correctly located.
 - .2 Open, cover with linseed oil and re-seal.
 - .3 Verify that 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 that fixtures are properly anchored, connected to system and effectively vented.
- .5 Affix applicable label (storm, sanitary, vent, pump discharge, etc.) c/w directional arrows at every floor or 4.5 m (whichever is less).

END OF SECTION