

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 09 91 23 – Interior Painting.
- .2 Section 23 05 93 – Testing, Adjusting and Balancing for HVAC.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Shop drawings; submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .3 Shop drawings to show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances.
 - .4 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.
 - .5 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.
 - .6 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 Departmental Representative 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:
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- .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 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.
 - .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 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. 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 Departmental Representative for approval and make corrections as directed.
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- .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.

1.3 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.
- .2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.

1.4 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.
- .3 Furnish one commercial quality grease gun, grease and adapters to suit different types of grease and grease fittings.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction Waste Management and Disposal.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 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.

3.2 CLEANING

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

3.3 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 - 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 - 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 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.4 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:
 - .1 Domestic water heaters.
- .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.

3.5 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 RELATED REQUIREMENTS

- .1 Section 22 05 00 – Common Work Results for Plumbing.
- .2 Section 23 05 05 – Installation of Pipework.
- .3 Section 23 05 93 – Testing, Adjusting and Balancing for HVAC.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME)
 - .1 ANSI/ASME B16.15-2013, Cast Copper Alloy Threaded Fittings, Classes 125 and 250.
 - .2 ANSI/ASME B16.18-2012, Cast Copper Alloy Solder Joint Pressure Fittings.
 - .3 ANSI/ASME B16.22-2013, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
 - .4 ANSI/ASME B16.24-2011, Cast Copper Alloy Pipe Flanges and Flanged Fittings, Class 150, 300, 600, 900, 1500 and 2500.
 - .2 ASTM International Inc.
 - .1 ASTM A307-12, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.
 - .2 ASTM B88M-13, Standard Specification for Seamless Copper Water Tube (Metric).
 - .3 American National Standards Institute/American Water Works Association (ANSI)/(AWWA)
 - .1 ANSI/AWWA C111/A21.11-2012, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
 - .4 Canadian Standards Association (CSA International)
 - .1 CSA B242-2011, 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-67-2011, Butterfly Valves.
 - .2 MSS SP-70-2011, Gray Iron Gate Valves, Flanged and Threaded Ends.
 - .3 MSS SP-71-2011, Gray Iron Swing Check Valves, Flanged and Threaded Ends.
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- .4 MSS SP-80-2013, 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) - 2010.
- .9 Transport Canada (TC)
- .1 Transportation of Dangerous Goods Act, 1992, c. 34 (TDGA).

1.3 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.

2.2 FITTINGS

- .1 Copper alloy pipe flanges and flanged fittings, Class 150: to ANSI/ASME B16.24.
- .2 Cast copper alloy 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 ½ and smaller: wrought copper to ANSI/ASME B16.22; with 301 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: 95/5.
- .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 BALL VALVES

- .1 NPS 2 and under, screwed:
 - .1 Class 150.
 - .2 Copper alloy body, stainless steel ball, PTFE adjustable packing, brass gland and PTFE seat, steel lever handle.
- .2 NPS 2 and under, soldered:
 - .1 To ANSI/ASME B16.18, Class 150.
 - .2 Copper alloy body, stainless steel ball, PTFE adjustable packing, brass gland and PTFE seat, steel lever handle, with NPT to copper adaptors.

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 NPC 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.
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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 Conform to requirements of Section 22 05 00 - Common Work Results for Plumbing.
- .2 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 copper to Provincial potable water guidelines. 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 and approval of Departmental Representative.
- .2 Upon completion, provide laboratory test reports on water quality for Departmental Representative approval.

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 one 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.

3.11 CLEANING

- .1 Clean in accordance with Section 01 00 10 - General Instructions, Part 1.7 - Cleaning.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction Waste Management and Disposal.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 22 05 00 – Common Work Results for Plumbing.
- .2 Section 23 05 01 – Use of HVAC Systems During Construction.
- .3 Section 23 05 05 – Installation of Pipework.
- .4 Section 23 05 93 – Testing, Adjusting and Balancing for HVAC.

1.2 REFERENCES

- .1 ASTM International Inc.
 - .1 ASTM B32-08, Standard Specification for Solder Metal.
 - .2 ASTM B306-13, Standard Specification for Copper Drainage Tube (DWV).
 - .3 ASTM C564-12, Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
- .2 Canadian Standards Association (CSA International).
 - .1 CSA B67-1972(R1996), Lead Service Pipe, Waste Pipe, Traps, Bends and Accessories.
 - .2 CAN/CSA-B70-12, Cast Iron Soil Pipe, Fittings and Means of Joining, Includes Update No. 1 (2012).
 - .3 CAN/CSA-B125.3-12, Plumbing Fittings.
- .3 Green Seal Environmental Standards (GSES)
 - .1 Standard GS-36-13, Adhesives for Commercial Use.

1.3 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 adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.

Part 2 Products

2.1 COPPER TUBE AND FITTINGS

- .1 Above ground sanitary, storm and vent Type DWV to: ASTM B306.
 - .1 Fittings.
 - .1 Cast brass: to CAN/CSA-B125.3.
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.2 Wrought copper: to CAN/CSA-B125.3.

.2 Solder: lead free, tin-95:5 to ASTM B32.

2.2 CAST IRON PIPING AND FITTINGS

.1 Buried sanitary, storm and vent minimum NPS 3, to: CAN/CSA-B70, with one layer of protective coating.

.1 Joints:

.1 Mechanical joints:

.1 Neoprene or butyl rubber compression gaskets: to CAN/CSA-B70 or ASTM C564.

.2 Stainless steel clamps.

.2 Hub and spigot:

.1 Caulking lead: to CSA B67.

.2 Cold caulking compounds.

.2 Above ground sanitary, storm and vent: to CAN/CSA-B70.

.1 Joints:

.1 Hub and spigot:

.1 Caulking lead: to CSA B67.

.2 Mechanical joints:

.1 Neoprene or butyl rubber compression gaskets with stainless steel clamps.

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 01 - Use of HVAC Systems During Construction.

.2 Install in accordance with National 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 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 every floor or 4.5 m (whichever is less).

3.5 CLEANING

- .1 Clean in accordance with Section 01 00 10 - General Instructions, Part 1.7 - Cleaning.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 22 05 00 – Common Work Results for Plumbing.
- .2 Section 23 05 93 – Testing, Adjusting and Balancing for HVAC.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA B51-09, Boiler, Pressure Vessel, and Pressure Piping Code. Includes Update No. 1 (2009).
 - .2 CAN/CSA-C22.2 No.110-94(R2014), Construction and Test of Electric Storage Tank Water Heaters, Includes General Instruction No. 1, Update No. 2 (2004), Update No. 3 (2009).
 - .3 CAN/CSA-C191-13, Performance of Electric Storage Tank Water Heaters for Domestic Hot Water Service.
 - .4 CAN/CSA-C309-M90(R2009), Performance Requirements for Glass-Lined Storage Tanks for Household Hot Water Service.

1.3 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 Provide drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Indicate:
 - .1 Equipment, including connections, fittings, control assemblies and ancillaries, identifying factory and field assembled.

1.4 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 ELECTRIC WATER HEATER

- .1 To CAN/CSA-C22.2 No.110, CAN/CSA-C191 and CAN/CSA-C309 for glass-lined storage tanks, with 2 immersion type elements, 3000 W each, and surface mounted or
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immersion type adjustable thermostats.

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 recommendations and Authority Having Jurisdiction.

3.3 FIELD QUALITY CONTROL

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

3.4 CLEANING

- .1 Clean in accordance with Section 01 00 10 - General Instructions, Part 1.7 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

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

1.2 REFERENCES

- .1 American National Standard Institute (ANSI):
 - .1 ANSI/ASSE (Plumbing) 1017-2009 - Performance Requirements for Temperature Actuated Mixing Valves for Hot Water Distribution Systems.
 - .2 ANSI Z21.22-99 (R2008)/CSA 4.4-M99(R2008) - Relief Valves for Hot Water Supply Systems.
 - .3 ANSI Z358.1-2009 - Emergency Eyewash and Shower Equipment.
 - .2 American Society for Testing and Materials International (ASTM).
 - .1 ASTM A126-04 (2014), 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.
 - .3 American Water Works Association (AWWA).
 - .1 AWWA C700-09, Cold Water Meters-Displacement Type, Bronze Main Case.
 - .2 AWWA C701-12, Cold Water Meters-Turbine Type for Customer Service.
 - .3 AWWA C702-1-10, Cold Water Meters-Compound Type.
 - .4 Canadian Standards Association (CSA International).
 - .1 CSA-B64 Series-11, Backflow Preventers and Vacuum Breakers.
 - .2 CSA-B79-08 (R2013), Commercial and Residential Drains and Cleanouts.
 - .3 CSA-B125.3-12, Plumbing Fittings.
 - .4 CAN/CSA-B356-10, Water Pressure Reducing Valves for Domestic Water Supply Systems.
 - .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
 - .6 Plumbing and Drainage Institute (PDI).
 - .1 PDI-G101-2012, Testing and Rating Procedure for Hydro Mechanical Grease Interceptors with Appendix of Installation and Maintenance.
 - .2 PDI-WH201-2010, Water Hammer Arresters Standard.
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1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

Part 2 Products

2.1 FLOOR DRAINS

- .1 Floor Drains and Trench Drains: to CSA B79.
- .2 Type 1: general duty; cast iron body as indicated, adjustable head, nickel bronze strainer, integral seepage pan, and clamping collar.

2.2 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 or round 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, round or square, gasket, vandal-proof screws.
 - .3 Cover for Tile and Linoleum Floors: polished nickel bronze with recessed cover for linoleum or tile infill, complete with vandal-proof locking screws.
 - .4 Cover for Carpeted Floors: polished nickel bronze with deep flange cover for carpet infill, complete with carpet retainer vandal-proof locking screws.

2.3 NON-FREEZE WALL HYDRANTS

- .1 Surface mount with integral vacuum breaker, NPS 3/4 hose outlet, removable operating key. Polished bronze finish.

2.4 BACK FLOW PREVENTERS

- .1 Preventers: to CSA-B64 Series, application as indicated.

2.5 HOSE BIBBS AND SEDIMENT FAUCETS

- .1 Bronze construction complete with integral back flow preventer, hose thread spout, replaceable composition disc, and chrome plated in finished areas.

2.6 TRAP SEAL PRIMERS

- .1 Brass, with integral vacuum breaker, NPS1/2 solder ends, NPS1/2 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 National 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 NPS4.

3.4 NON-FREEZE WALL HYDRANTS

- .1 Install 600 mm above finished grade unless otherwise indicated.

3.5 BACK FLOW PREVENTORS

- .1 Install in accordance with CSA-B64 Series, where indicated and elsewhere as required by code.
- .2 Pipe discharge to terminate over nearest drain or service sink.

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

3.8 START-UP

- .1 Start-up only after:
 - .1 Pressure tests have been completed.
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- .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.

3.9 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: +/- 20%.
- .3 Adjustments:
 - .1 Verify that flow rate and pressure meet design criteria.
 - .2 Make adjustments while flow rate or withdrawal is (1) maximum and (2) 25% of maximum and while pressure is (1) maximum and (2) minimum.
- .4 Floor drains:
 - .1 Verify operation of trap seal primer.
 - .2 Prime, using trap primer. Adjust flow rate to suit site conditions.
 - .3 Check operations of flushing features.
 - .4 Check security, accessibility, removeability of strainer.
 - .5 Clean out baskets.
- .5 Access doors:
 - .1 Verify size and location relative to items to be accessed.
- .6 Cleanouts:
 - .1 Verify covers are gas-tight, secure, yet readily removable.
- .7 Wall, Ground hydrants:
 - .1 Verify complete drainage, freeze protection.
 - .2 Verify operation of vacuum breakers.
- .8 Training:
 - .1 Demonstrate full compliance with Design Criteria.

END OF SECTION
