

Part 1 General

1.1 SUMMARY

- .1 Section Includes:
 - .1 Materials and installation for hard drawn copper domestic hot and cold water service inside a building.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME):
 - .1 ANSI/ASME B16.15, Cast Bronze Threaded Fittings, Classes 125 and 250.
 - .2 ANSI/ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
 - .3 ANSI/ASME B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
- .2 American Society for Testing and Materials International (ASTM):
 - .1 ASTM A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .2 ASTM B88M, Standard Specification for Seamless Copper Water Tube (Metric).
- .3 Canadian Standards Association (CSA International):
 - .1 CSA-B64 Series, Backflow Preventers and Vacuum Breakers.
- .4 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS):
 - .1 MSS-SP-80, Bronze Gate, Globe, Angle and Check Valves.
- .5 National Research Council (NRC)/Institute for Research in Construction:
 - .1 NRCC 38728, National Plumbing Code of Canada (NPC) complete with Manitoba Amendments.

1.3 SUBMITTALS

- .1 Submittals in accordance with E3 – Shop Drawings.
- .2 Submit product data for following: valves.
- .3 Provide maintenance data for incorporation into manual specified in E5 – Additional Submittals.

Part 2 Products

2.1 CUL (DOMESTIC WATER COPPER TUBING)

- .1 Tubing:
 - .1 Domestic hot and cold water system, within building.
 - .2 Above ground: copper tube, hard drawn, Type L: to ASTM B88M.
- .2 Fittings:
 - .1 Cast bronze threaded fittings, Class 125: to ANSI/ASME B16.15.
 - .2 Cast copper, solder type: to ANSI/ASME B16.18.
- .3 Joints:
 - .1 Bolts, nuts, hex head and washers: to ASTM A307, heavy series.
 - .2 Solder: 95/5 tin copper alloy.
 - .3 Teflon tape: for threaded joints.
 - .4 Dielectric connections between dissimilar metals: dielectric fitting to ASTM F492, complete with thermoplastic liner.
- .4 Valves:
 - .1 Ball – Isolation: NPS 2 and under:
 - .1 Class 150/600WOG.
 - .2 Brass and or bronze body, full port, TFE seats, double O-ring design or PTFE packing, chrome plated solid bronze ball, lever handle, soldered ends or threaded ends.
 - .3 Acceptable material:
 - .1 Soldered: Kitz 59; Toyo 5049A.
 - .2 Threaded: Kitz 58, Toyo 5044A.
- .5 Backflow Preventers:
 - .1 BackFlow Preventers: to CSA-B64 Series, application reduced pressure principle type.
 - .2 Materials: Bronze body and covers, stainless steel springs, silicone seat discs, nitrile and nylon diaphragm, EPDM O-rings.
 - .3 Acceptable: Watts, Febco, Apollo, Ames
- .6 Strainers:
 - .1 NPS 2 and under, bronze body, Y-Pattern, stainless steel screen with 0.8mm perforations.
 - .2 Acceptable material:
 - .1 Soldered: Mueller, Kitz.
 - .2 Threaded: Mueller, Kitz, Toyo, Spirax Sarco.

Part 3 Execution

3.1 INSTALLATION

- .1 Install in accordance with Manitoba Amendments of the NPC and local authority having jurisdiction.
- .2 Install in accordance with manufacturer's recommendations and as specified.
- .3 Install pipe work in accordance with Section 23 05 05 - Installation of Pipework, supplemented as specified herein.
- .4 Assemble piping using fittings manufactured to ANSI standards.
- .5 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.

3.2 VALVES

- .1 Isolate equipment, fixtures and branches with ball valves.
- .2 Remove internal parts before soldering.

3.3 BACK FLOW PREVENTORS

- .1 Install in accordance with CSA-B64 Series.
- .2 Pipe discharge to terminate over nearest drain.

3.4 STRAINERS

- .1 Install with sufficient room to remove basket.

3.5 PRESSURE TESTS

- .1 Conform to requirements of Section 21 05 01 - Common Work Results - Mechanical.
- .2 Test pressure: greater of 1.5 times maximum system operating pressure or 860 kPa.

3.6 FLUSHING AND CLEANING

- .1 Flush the addition to the system for 8 hours. Let stand for 24 hours, and then draw one sample off longest run. Submit to testing laboratory to verify that system is clean to Provincial potable water guidelines. Let system flush for additional 2 h, then draw off another sample for testing.

3.7 PRE-START-UP INSPECTIONS

- .1 Systems to be complete, prior to flushing, testing and start-up.
- .2 Verify that system can be completely drained.

3.8 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 Contract Administrator review.

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 Backflow preventers:
 - .1 Test tightness, accessibility for O&M of cover and of valve.
 - .2 Simulate reverse flow and back-pressure conditions to test operation of backflow preventers.
 - .3 Verify visibility of discharge from open ports.
 - .4 Test in accordance with CSA-B64.
- .3 Strainers:
 - .1 Clean out repeatedly until clear.
 - .2 Verify accessibility of cleanout plug and basket.
 - .3 Verify that cleanout plug does not leak.

3.10 PERFORMANCE VERIFICATION

- .1 Timing:
 - .1 After pressure and leakage tests and disinfection completed, and certificate of completion has been issued by authority having jurisdiction.
- .2 Procedures:
 - .1 Verify that pressure meet Design Criteria.
 - .2 Adjust pressure regulating valves while withdrawal is maximum and inlet pressure is minimum.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

- .1 The installation of drainage waste and vent piping – cast iron and copper.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM):

- .1 ASTM B32, Specification for Solder Metal.
.2 ASTM B306, Specification for Copper Drainage Tube (DWV).
.3 ASTM C564, Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.

.2 Canadian Standards Association (CSA International):

- .1 CSA B67, Lead Service Pipe, Waste Pipe, Traps, Bends and Accessories.
.2 CAN/CSA-B70, Cast Iron Soil Pipe, Fittings and Means of Joining.
.3 CAN/CSA-B125, Plumbing Fittings.

.3 National Research Council (NRC)/Institute for Research in Construction:

- .1 NRCC 38728, National Plumbing Code of Canada (NPC) complete with the Manitoba Amendments.

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.
.2 Wrought copper: to CAN/CSA-B125.
.2 Solder: lead free, tin-95:5, Type TA, to ASTM B32.

2.2 CAST IRON PIPING AND FITTINGS

.1 Buried sanitary, storm and vent minimum NPS 3, to: CAN/CSA-B70:

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

- .1 In accordance with Section 23 05 05 - Installation of Pipework.
- .2 Install in accordance with the National Plumbing Code and local authority having jurisdiction.
- .3 Install in accordance with manufacturer's recommendations and as specified.

3.2 TESTING

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

3.3 PERFORMANCE VERIFICATION

- .1 Cleanouts:
 - .1 Ensure accessibility 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 Ensure that fixtures are properly anchored, connected to system and effectively vented.

3.4 START-UP

- .1 Provide continuous supervision during start-up.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM):
 - .1 ASTM D2235, Specification for Solvent Cement for Acrylonitrille-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
 - .2 ASTM D2564, Specification for Solvent Cements for Poly (Vinyl-Chloride) (PVC) Plastic Piping Systems.
- .2 Canadian Standards Association (CSA International):
 - .1 CSA-Series B1800, Plastic Non-pressure Pipe Compendium.
 - .2 CSAB181.1, ABS Drain, Waste, and Vent Pipe and Pipe Fittings
 - .3 CSA-B181.2, PVC Drain, Waste and Vent Pipe and Pipe Fittings.
 - .4 CSA-B182.1, Plastic Drain and Sewer Pipe and Pipe Fittings.
- .3 National Research Council (NRC)/Institute for Research in Construction:
 - .1 NRCC 38728, National Plumbing Code of Canada (NPC) complete with the Manitoba Amendments.

Part 2 Products

2.1 PIPING AND FITTINGS

- .1 For buried and/or above ground DWV piping to:
 - .1 CSA-B181.1.
 - .2 CSA-B181.2.
 - .3 CSA-B182.1.

2.2 JOINTS

- .1 Solvent weld for PVC: to ASTM D2564.
- .2 Solvent weld for ABS: to ASTM D2235.

Part 3 Execution

3.1 INSTALLATION

- .1 In accordance with Section 23 05 05 - Installation of Pipework.
- .2 Install in accordance with National Plumbing Code and local authority having jurisdiction.
- .3 Install in accordance with manufacturer's recommendations and as specified.

3.2 TESTING

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

3.3 PERFORMANCE VERIFICATION

- .1 Cleanouts:
 - .1 Ensure accessibility and that access doors are correctly located.
 - .2 Open, cover with linseed oil and re-seal.
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- .2 Test to ensure traps are fully and permanently primed.
- .3 Ensure fixtures are properly anchored, connected to system and effectively vented.

3.4 START-UP

- .1 Provide continuous supervision during start-up.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Section Includes:
 - .1 The supply and installation of domestic water heaters.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International):
 - .1 CSA B51, Boiler, Pressure Vessel, and Pressure Piping Code.
 - .2 CAN/CSA C22.2No.110, Construction and Test of Electric Storage Tank Water Heaters.
- .2 National Research Council (NRC)/Institute for Research in Construction:
 - .1 NRCC 38728, National Plumbing Code of Canada (NPC) complete with the Manitoba Amendments.

1.3 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with E3 – Shop Drawings.
- .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 E5 – Additional Submittals.

1.5 WARRANTY

- .1 For the Work of this Section, the warranty period prescribed in D31 - Warranty is extended to number of years specified for each product.

Part 2 Products

2.1 ELECTRIC

- .1 To CAN/CSA C22.2 No.110, CAN/CSA-C191 and CAN/CSA-C309 for glass-lined storage tanks, with single immersion type element, and surface mounted adjustable thermostats.
- .2 Tank: glass-lined steel with anode protection, enamelled steel jacket, three-year warranty certificate.

- .3 Acceptable Manufacturers: A.O. Smith, Bradford White, Rheem.

2.2 TRIM AND INSTRUMENTATION

- .1 Drain valve: NPS 3/4 with hose end.
- .2 Thermometer: 100 mm dial type with red pointer and thermowell filled with conductive paste.
- .3 Pressure gauge: 75 mm dial type with red pointer, and shut-off cock.
- .4 Thermowell filled with conductive paste for control valve temperature sensor.
- .5 ASME rated temperature and pressure relief valve sized for full capacity of heater, having discharge terminating over floor drain and visible to operators.
- .6 Magnesium anodes adequate for 20 years of operation and located for easy replacement.

2.3 ANCHOR BOLTS AND TEMPLATES

- .1 Supply for installation by other Divisions.

Part 3 Execution

3.1 INSTALLATION

- .1 Install in accordance with National Plumbing Code of Canada and authority having jurisdiction.
- .2 Install in accordance with manufacturer's recommendations and as specified.

3.2 START-UP

- .1 Provide continuous supervision during start-up.

END OF SECTION

Part 1 General

1.1 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 B62, Specification for Composition Bronze or Ounce Metal Castings.
- .2 American Water Works Association (AWWA):
 - .1 AWWA C700, Cold Water Meters-Displacement Type, Bronze Main Case.
 - .2 AWWA C701, Cold Water Meters-Turbine Type for Customer Service.
 - .3 AWWA C702-1, Cold Water Meters-Compound Type.
- .3 Canadian Standards Association (CSA International):
 - .1 CSA-B64 Series, Backflow Preventers and Vacuum Breakers.
 - .2 CSA-B79, Floor, Area and Shower Drains, and Cleanouts for Residential Construction.
 - .3 CSA-B356, Water Pressure Reducing Valves for Domestic Water Supply Systems.
- .4 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 Arresters Standard.
- .5 National Research Council (NRC)/Institute for Research in Construction:
 - .1 NRCC 38728, National Plumbing Code of Canada (NPC) complete with Manitoba Amendments.
- .6 NSF International:
 - .1 NSF/ANSI Standard 61 – Drinking Water System Components – Health Effects.

1.2 SUBMITTALS

- .1 Submittals in accordance with E3 – Shop Drawings.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet for fixtures and equipment.
 - .2 Indicate dimensions, construction details and materials for specified items.
 - .3 Submit product data sheets to indicate materials, finishes, method of anchorage, number of anchors, dimensions, construction and assembly details and accessories.

- .3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .4 Instructions: submit manufacturer's installation instructions.
- .5 Manufacturers' Field Reports: manufacturers' field reports specified.
- .6 Closeout submittals: submit maintenance and engineering data for incorporation into manual specified in E5 – Additional Submittals, include:
 - .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 FLOOR DRAINS

- .1 Floor Drains: to CSA B79.

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.

2.1 WATER HAMMER ARRESTORS

- .1 Copper construction: to PDI-WH201.

2.2 BACK FLOW PREVENTERS

- .1 Preventers: to CSA-B64 Series, application as indicated, double check valve assembly (DCVA) back flow preventer.
 - .1 Acceptable Manufacturer: Watts

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 sheets.

3.2 INSTALLATION

- .1 Install in accordance with National Plumbing Code of Canada and 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 at locations required code, and as indicated.
- .2 Bring cleanouts to wall or finished floor unless serviceable from below floor.
- .3 Stack base cleanouts: line size to maximum NPS4.

3.4 NON-FREEZE WALL HYDRANTS

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

3.5 WATER HAMMER ARRESTORS

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

3.6 BACK FLOW PREVENTORS

- .1 Install in accordance with CSA-B64 Series, where indicated.

3.7 WATER METERS

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

3.8 START-UP

- .1 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.
- .2 Provide continuous supervision during start-up.

3.9 TESTING AND ADJUSTING

- .1 Floor drains:
 - .1 Verify operation of trap seal primer.
 - .2 Prime, adjust flow rate to suit site conditions.
 - .3 Check operations of flushing features.
 - .4 Check security, accessibility, removeability of strainer.
 - .5 Clean out baskets.

- .2 Backflow preventers:
 - .1 Test tightness, accessibility for O&M of cover and of valve.
 - .2 Simulate reverse flow and back-pressure conditions to test operation.
- .3 Cleanouts:
 - .1 Verify covers are gas-tight, secure, yet readily removable.
- .4 Wall hydrants:
 - .1 Verify complete drainage, freeze protection.
 - .2 Verify operation of vacuum breakers.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Standards Association (CSA International):
 - .1 CAN/CSA-B45 Series, Plumbing Fixtures.
 - .2 CAN/CSA-B125, Plumbing Fittings.
 - .3 CAN/CSA-B651, Barrier Free Design.
- .2 National Research Council (NRC)/Institute for Research in Construction:
 - .1 NRCC 38728, National Plumbing Code of Canada (NPC) complete with Manitoba Amendments.

1.2 SUBMITTALS

- .1 Submittals in accordance with E3 – Shop Drawings.
- .2 Closeout Submittals:
 - .1 Submit maintenance data in accordance with E5 – Additional 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 MANUFACTURED UNITS

- .1 Fixtures: manufacture in accordance with CAN/CSA-B45 series.
- .2 Trim, fittings: manufacture in accordance with CAN/CSA-B125.
- .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 Fixture piping:
 - .1 Hot and cold water supplies to each fixture:
 - .1 Flexible supply pipes each with handwheel stop, reducers, escutcheon.

- .2 Waste:
 - .1 Brass P trap with clean out on each fixture not having integral trap.
 - .2 Chrome plated in all exposed places.
- .8 Acceptable Manufacturers:
 - .1 Fixtures: Crane, American Standard, Kohler.
 - .2 Trim: American Standard, Delta Commercial.

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 sheets.

3.2 INSTALLATION

- .1 Install in accordance with National Plumbing Code of Canada and authority having jurisdiction.
- .2 Install in accordance with manufacturer's instruction and as specified.
- .3 Mounting heights:
 - .1 Standard: to comply with manufacturer's recommendations unless otherwise indicated or specified.
 - .2 Wall-hung fixtures: as indicated, measured from finished floor.

3.3 START-UP

- .1 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.
- .2 Provide continuous supervision during start-up.

3.4 TESTING AND ADJUSTING

- .1 Adjustments:
 - .1 Adjust water flow rate to design flow rates.
 - .2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.
- .2 Checks:
 - .1 Aerators: operation, cleanliness.
 - .2 Vacuum breakers, backflow preventers: operation under all conditions.

- .3 Thermostatic controls:
 - .1 Verify temperature settings, operation of control, limit and safety controls.

END OF SECTION