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**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 23 07 13 - Dust insulation.
- .2 Section 23 07 15 – Thermal insulation for piping
- .3 Section 23 05 48 – Vibration and Seismic Controls for HVAC Piping and Equipment.

**1.2 WORK – PLUMBING**

- .1 Work included:
  - .1 Generally, the works include labor, delivery, and installation of all materials and equipment needed for the plumbing works indicated in the drawings and the specification.
  - .2 These works include, but are not limited to:
    - .1 The removal of all fixtures, piping and other existing accessories that are not essential or that disrupt the new installation and / or need to be removed in accordance with the municipal and provincial plumbing regulations.
    - .2 Supply of a new kitchen sink, including its connection to the existing drainage, venting, potable hot and cold water.
    - .3 Connection of the water machine to the potable cold water network
    - .4 The drainage of the evaporator located in room 652, including the connection to the existing drainage pipe.
    - .5 Fixtures:
      - .1 All plumbing fixtures, floor drains, roof drains, etc.
    - .6 Specialties:
      - .1 The structural steel supports and components.
      - .2 The testing.
      - .3 Payment of all expenses, permits, inspection fees, and other fees for this installation.
      - .4 All required sleeves.
      - .5 The acoustic and vibration works described in the Division 23 related to this section.
      - .6 The thermal insulation works described in sections 23 07 13 and 23 07 15 related to this section
    - .7 Seismic measures:
      - .1 All seismic measures for plumbing work, in accordance with Section 23 05 48 – Vibration and Seismic Controls for HVAC Piping and Equipment.
  - .2 Works excluded:
    - .1 In general, the following activities are excluded:
      - .1 Control works; except those specifically requested in the tender.



- .2 Electrical connections, except those specifically requested in the tender.

### 1.3 SPECIAL CONNECTIONS

- .1 In general, special connections include all connections to fixtures, all pipes, adapters, stop valves, by-passes, unions, flanges, filters, air vents, test valves, drain valves, control valves, shock dampers, buffer tanks, traps, ventilation ducts, flexible joints and other accessories necessary to operate the fixtures.
- .2 When special connections are made by others to their fixtures, each relevant section should be monitoring these connections and is solely responsible for the proper functioning of their own equipment.
- .3 Each section is responsible for any damage it may cause to the fixtures to which it makes connections.
- .4 Part of the plumbing contract:
  - .1 All plumbing connections and all points of connections to the various fixtures shown in the drawings and / or described in the specification.
  - .2 Installation of all necessary controls valves to the fixtures' plumbing connections. These controls valves are provided by the company responsible for carrying out the plumbing work or another section according to the requirements in the drawings and the specification. When the control valves are provided by other sections, install them following the directives and under the supervision of those other sections.
  - .3 When the control valves are provided by the company responsible for carrying out the plumbing work but are installed by others, the installation must be done according to the directives and under the supervision of the company in charge of the plumbing work, which remains directly responsible as to the proper functioning of the equipment.
  - .4 The fixtures provided by the landlord.
  - .5 Specialties:
    - .1 All domestic cold water and hot water connections of the specialties' contracts.
    - .2 All drainage, vent, and funnel drain connections, of the specialties' contracts.
  - .6 Refrigeration (air conditioning).
    - .1 All drains and funnel drains installed near these contracts' appliances. However, drainage and piping connection from these appliances to the funnel drains are the responsibility of the relevant sections.
- .5 Not part of the plumbing contract:
  - .1 The drainage and fixture connections included in the specialty contracts: fire suppression, heating, cooling, and controls, extending to the funnel drains installed nearby by Division 22.



**1.4 DOCUMENTS TO SUBMIT**

- .1 Submit the following documents:
  - .1 A list of the identification legends for the piping, valves, and fittings, in compliance with Division 20.
  - .2 Copies of the instruction manuals for the operation and maintenance of the equipment, in compliance with Division 20.
  - .3 Drawings kept up to date, in compliance with the Division 20.
  - .4 Certificates of compliance from an approved body for all plumbing appliances and equipment.

**1.5 GLOBAL PRICE – SEPARATE PRICE**

- .1 Provide with the tender an all-inclusive price covering all the work done by the Division 22 "PLUMBING".

**Part 2 Product**

**2.1 NOT APPLICABLE**

- .1 Not applicable.

**Part 3 Execution**

**3.1 SYSTEM CLEANING**

- .1 Clean the inside and outside all components, devices, and systems, including strainers and filters.

**3.2 PROTECTION**

- .1 By the means of suitable elements, prevent dust, dirt and other foreign matter from entering the openings of the devices, equipment, and systems.



**CERTIFICATE OF COMPLIANCE**

Project : \_\_\_\_\_  
Project address : \_\_\_\_\_  
Discipline : \_\_\_\_\_  
Specification section : \_\_\_\_\_

We certify that all materials and equipment used, as well as all apparent or concealed work that we have completed or that we have ordered completed, are in all aspects, compliant with the plans, specification, addenda, and changes prepared by the Engineers of Bouthillette Parizeau inc., and with all applicable codes in effect.

Sociale reason : \_\_\_\_\_  
Address : \_\_\_\_\_  
Telephone number : \_\_\_\_\_  
Signatory name : \_\_\_\_\_  
Signature : \_\_\_\_\_  
Signatory title : \_\_\_\_\_

**COMPANY SEAL**

**END OF SECTION**



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## **Part 1 General**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 20 00 10 – Mechanical and electrical general instructions.
- .2 Section 23 05 05 – Piping Installation.
- .3 Section 23 05 29 – Piping and HVAC Devices Support and Suspension Systems.

### **1.2 REFERENCES**

- .1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME):
  - .1 ANSI/ASME B16.15-06 – Cast Bronze Threaded Fittings, Classes 125 and 250.
  - .2 ANSI/ASME B16.18-01 – Cast Copper Alloy Solder Joint Pressure Fittings.
  - .3 ANSI/ASME B16.22-01 – Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
  - .4 ANSI/ASME B16.24-01 – Cast Copper Alloy Pipe Flanges and Flanged Fittings, Class 150, 300, 400, 600, 900, 1500 and 2500.
- .2 ASTM International Inc.:
  - .1 ASTM A307-07b – Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - .2 ASTM A536-84(2004) e1 – Standard Specification for Ductile Iron Castings.
  - .3 ASTM B88M-05 – Standard Specification for Seamless Copper Water Tube (Metric).
- .3 American National Standards Institute/American Water Works Association (ANSI)/(AWWA):
  - .1 ANSI/AWWA C111/A21.11-07 – Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- .4 Association canadienne de normalisation (CSA)/CSA International (now known as CSA group):
  - .1 CSA B242-05 – Groove and Shoulder Type Mechanical Pipe Couplings.
- .5 Department of Justice Canada (DJC):
  - .1 Canadian Environmental Protection Act, 1999, ch.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-67-02a – Butterfly Valves.
  - .2 MSS-SP-70-06 – Gray Iron Gate Valves, Flanged and Threaded Ends.
  - .3 MSS-SP-71-05 – Gray Iron Swing Check Valves, Flanged and Threaded Ends.
  - .4 MSS-SP-80-03 – Bronze Gate, Globe, Angle and Check Valves.



- .8 The National Research Council (NRC)/ NRC Construction:
  - .1 NRCC 38728F – National Plumbing Code – Canada (NPC) - 2010.
- .9 Transport Canada (TC):
  - .1 Transportation of Dangerous Goods Act, 1992, Ch. 34 (TGDA).

### **1.3 DOCUMENTS/SAMPLES TO SUBMIT FOR APPROVAL/INFORMATION**

- .1 Submit all required documents and samples in accordance with section 20 00 10 – Mechanical and Electrical General Instructions.
- .2 Technical datasheet:
  - .1 Submit required technical datasheet, and manufacturer instructions and documentation. Technical datasheets must indicate product characteristics, performance criteria, physical size, finish and
- .3 Shop drawings:
  - .1 Submitted shop drawings stamped and signed by professional engineer registered or licensed in Canada in the province of Québec.
- .4 Certificates:
  - .1 Submit certificates signed by manufacturer certifying that the products, materials and equipment meet the requirements as to the physical characteristics and performance criteria.

### **1.4 DOCUMENTS/ITEMS TO GIVE AT WORK COMPLETION**

- .1 Submit all required documents and items in accordance with section 20 00 10 – Mechanical and Electrical General Instructions.
- .2 O M Sheets: Provide instruction for OM which will be included in the OM Manuals.

### **1.5 TRANSPORTATION, STORAGE AND HANDLING**

- .1 Transport, store and handle materials and equipment according to Section 20 00 10 – Mechanical and Electrical General Instructions.
- .2 Delivery and acceptance: deliver materials and equipment to site in original factory packaging, labeled with the name and address of the manufacturer.
- .3 Waste management and disposal:
  - .1 Separate waste materials for reuse / re-use and recycling in accordance with Section 01 74 21 – Construction/demolition waste management and disposal.
  - .2 Remove from site all packaging materials and transport them to the appropriate recycling facilities.
  - .3 Collect and sort paper packaging, plastic, polystyrene, corrugated cardboard for recycling in accordance with Waste Management Plan.
  - .4 Sort steel scrap, metal, plastic for recycling and place in designated containers in accordance with Waste Management Plan.
  - .5 Divert unused metal materials from metal recycling facility.





## **1.6 ACCEPTABLE MATERIALS OR PRODUCTS**

- .1 When materials or products are prescribed by their trademarks, consult the instructions to tenderers in order to know the procedure concerning the request for approval of substitutes materials or products.

## **Part 2 Produit**

### **2.1 VALVES – GENERALITIES**

- .1 Drain valve:
  - .1 DN 20 ball valve, bronze body, Teflon seat, with connection for hose, chain and cap.
  - .2 Milwaukee no. BA-100H or Red-White no. 5046, or a substitute product approved in an addendum in accordance with the Instructions to tenderers.

### **2.2 LOW PRESSURE ABOVE GROUND PIPING (UP TO 1035 KPA)**

- .1 Piping:
  - .1 Material:
    - .1 DN 80 or smaller:
      - .1 Copper, ASTM-B88, hard L type.
  - .2 Fittings:
    - .1 DN 80 or smaller:
      - .1 Elbows, reducers, adapters, and couplings of the same brand as the tees made of wrought bronze (wrot). Cast brass unions, 860 kPa of steam, ASA B16.17, Grinnell no. 1949, or a substitute product approved in an addendum in accordance with the Instructions to tenderers.
  - .3 Junctions:
    - .1 DN 80 or smaller:
      - .1 Wrot forged tees. They can be cast for NPS 3 and above.
  - .4 Joints:
    - .1 DN 80 or smaller:
      - .1 95/5 welded joints. For valves with threaded joints, use threaded-welded fittings (welded on the side of the pipe and threaded on the side of the tap).
- .2 Valves:
  - .1 Generalities:
    - .1 All valves must be manufactured according to the following standards, depending on the application and unless otherwise specified:
      - .1 Class 125.
      - .2 MSS SP-70, SP-78, SP-80, SP-85 or ANSI applicable.
      - .3 Bronze: ASTM-B62, ASTM-B584.



- .4 Brass: ASTM- B16.
- .5 Cast iron: ASTM-A126, classes B and C.
- .2 Gate valves:
  - .1 50 mm or smaller:
    - .1 Bronze body, bronze disc, non-rising brass stem, solder fittings, cold working pressure of 2070 kPa, Jenkins fig. no. 313J, or a substitute product approved in an addendum in accordance with the Instructions to tenderers.
  - .2 65 mm or larger:
    - .1 Cast iron body, bronze seat and valve, brass rising stem, flanged fittings, cold working pressure of 1380 kPa, Jenkins fig. no. 454J, or a substitute product approved in an addendum in accordance with the Instructions to tenderers.
- .3 Globe valves:
  - .1 50 mm or smaller:
    - .1 Bronze body, bronze seat and replaceable disc, bronze non-rising stem, solder fittings, cold working pressure of 2070 kPa, Jenkins fig. no. 106BPJ, or a substitute product approved in an addendum in accordance with the Instructions to tenderers.
  - .2 65 mm or larger:
    - .1 Cast iron body, bronze seat and replaceable disc, brass rising stem, flanged fittings, cold working pressure of 1380 kPa, Jenkins fig. no. 2342J, or a substitute product approved in an addendum in accordance with the Instructions to tenderers.
- .4 Other valves:
  - .1 Ball valve – 50 mm or smaller:
    - .1 Two part bronze body, stainless steel ball, Teflon gasket (PTFE), locking lever, threaded fittings, cold working pressure of 4145 kPa, Jenkins fig. no. 201J, or a substitute product approved in an addendum in accordance with the Instructions to tenderers.
- .5 Check valves:
  - .1 50 mm or smaller:
    - .1 Bronze body, bronze seat and replaceable disc, Y configuration with swing check valve, solder fittings, cold working pressure of 2070 kPa, Jenkins fig. no. 4093J, or a substitute product approved in an addendum in accordance with the Instructions to tenderers.
  - .2 65 mm or larger:
    - .1 Cast iron body, bronze seat and replaceable disc, horizontal type, tilting valve, flanged fittings, cold working pressure of 1380 kPa, Jenkins fig. no. 587J, or a substitute product approved in an addendum in accordance with the Instructions to tenderers.



## **2.3 EXPANSION JOINTS**

- .1 Take all necessary precautions to allow for the expansion and contraction of the pipes using expansion joints.
- .2 The expansion of the piping must be based on a temperature of -28.9°C and a hot temperature corresponding to the maximum possible temperature of the liquid.
- .3 Use expansion joints of the same diameter as the piping and pre extend them where required.
- .4 By submitting the piping to the required test pressure, take precautions to prevent the deterioration of expansion joints that cannot withstand that pressure or the expansion created by this pressure.
- .5 Joints manufactured with the piping:
  - .1 Manufacture swing joints with the same material as the piping and design them so as not to exceed the yield strength of the material used.
  - .2 In general, use wrought type fittings instead of cast fittings in loops.

## **Part 3 Execution**

### **3.1 GENERALITIES**

- .1 Comply with requirements of Sections 23 05 05 – Piping Installation and 23 05 29 – Piping and HVAC devices support and suspension systems.
- .2 General layout of the works:
  - .1 The layout of the pipe network, the position of sanitary fixtures, special equipment, etc., mentioned in the specification or shown on the drawings give the general layout of the equipment. This section must execute this installation while complying with provincial and municipal health regulations and keep itself constantly informed on the architectural and structural arrangement of the building.
  - .2 Pay special attention in order to avoid any interference of plumbing pipes with other disciplines.
- .3 Levels:
  - .1 Establish the levels with surveying instruments, following to the usual surveying methods.
- .4 Lead piping and accessories:
  - .1 Seal the space between the toilet lead joints and the concrete with a monolastomeric seal.
- .5 Carefully and securely install the pipes left.



### 3.2 VALVES

- .1 Domestic water control valves:
  - .1 Each group of devices must use straight valves with the same dimensions as the supply pipes and a valve with a hose connection for drainage. In addition, in large washrooms, each group of devices must have straight valves for hot water and recirculation, of the same size as the cold water supply pipes.
- .2 Drain valve:
  - .1 In all low points of the hot water, cold water, and recirculation systems as well as on each network and system, supply and install an NPS 1 drain valve.
- .3 Isolation valve:
  - .1 At the foot of each cold water, hot water, and recirculation column, as well as the locations shown in the drawings, supply and install a valve to isolate the column, with a valve fitting for the connection to the drain. Each device must also be isolated.

### 3.3 SLOPES

- .1 Domestic hot, cold, and recirculated water piping:
  - .1 Main pipes: Leveled.
  - .2 Branching Slope of 25 mm to 15 mm towards the drainage points.

### 3.4 TESTS, ADJUSTMENTS, AND CLEANING

- .1 Generalities:
  - .1 Perform all the tests specified below.
  - .2 All tests must have been performed satisfactorily prior to being performed in the presence of the Engineer.
  - .3 Any piping or part thereof must be proven before being covered with insulation or be concealed in partitions, ceilings or walls. Prior to pressure testing systems, remove or protect devices such as control devices, air valves, or any equipment that is not designed to be subjected to pressures corresponding to those used in the tests.
  - .4 During the hydrostatic tests, ensure that the piping is completely filled with liquid and purged of all the air.
  - .5 In cold weather, use an antifreeze for hydrostatic tests, and at the end of the tests, drain the piping completely to prevent any risk of freezing.
  - .6 Three copies of the final report of all tests and adjustments executed indicating the final readings obtained should be sent for analysis, comments, and approval. Enter the results on 8½ "x 11" format sheet by entering the name of the system, the device, the requested specifications and those obtained.
- .2 Domestic water piping:
  - .1 A pressure of 345 kPa above the maximum operating pressure and a minimum of 1035 kPa must be maintained without leaks for a period of at least two hours throughout the domestic water piping and / or drainage, and the non-potable water piping. Perform this test with cold water.



- .2 Subject all joints to mechanical shocks with a suitable tool.
- .3 If it is impossible to test the entire installation at once, it can be divided into several sections, each tested as described above.
- .4 In booster pump systems, the maximum pressure must correspond to the maximum pump pressure at zero flow.
- .3 Specific tests and balancing of systems:
  - .1 When all the mechanical installation is completed and before final approval, make the following specific tests and adjustments.
    - .1 When all cold, hot, recirculating, and other water distribution systems are completed and connected, this section must carry out the adjustment of all manual valves, pressure reducing valves, booster pumps, circulation pumps, and other related equipment to ensure that the operation of the equipment and the behavior comply with the specification requirements.
    - .2 Adjust the valves to obtain a constant and uniform temperature in the domestic hot water line.
    - .3 All these tests and adjustments must be made by a qualified Engineer or technician and in cooperation with the representative of the manufacturer of the concerned equipment and other trades involved. All tests must be done according to the current recommendations and requirements of ASME, AIEE, and ASHRAE. All systems must be kept in constant operation for a period of two weeks before possession.
    - .4 Transmit five copies of the complete folder of all tests and adjustments performed, indicating the final readings obtained for analysis, for comments and approval. Enter these results indicating the name of the system, the device, the requested specifications and those obtained.
    - .5 All equipment, accessories, pressure gauges, thermometers, Pitot tubes, and other similar items as well as any labor required for the testing and adjustments are the responsibility of this section.
- .4 System Cleaning:
  - .1 Wash all piping of the diverse water systems with cold water at high speed to remove all foreign matter. Make the temporary connections required. After washing, providing an analysis report of the water system by an independent laboratory.
- .5 Screen cleaning:
  - .1 Periodically clean the screen.

### **3.5 FLUSHING AND CLEANING**

- .1 Flush the network for a period of eight (8) hours. Flush water outlets for two (2) hours. Let the rinsing water sit for 24 hours and then sample one (1) water sample from the longest segment. Submit the sample to the designated laboratory which will make the analysis. The copper levels in the water must comply with the relevant guidelines for drinking water established by the provincial and federal authorities. Flush the system for two (2) additional hours, then take another sample for analysis.



### **3.6 COMMISSIONING**

- .1 Start-up the network once:
  - .1 The hydrostatic testing is completed.
  - .2 The disinfection is completed.
  - .3 The test certificate is delivered.
  - .4 The water treatment system is running and functional.
- .2 Ensure continuous monitoring throughout the duration of the commissioning.
- .3 Commissioning:
  - .1 Pressurize the network and purge the air.
  - .2 Ensure that the pressure is appropriate for smooth functioning of the network and prevent water hammers, gas expansion and/or cavitation.
  - .3 Slowly raise the temperature of the water in the domestic hot water heater to the design temperature.
  - .4 Anticipate the expansion displacements of the hot water pipeline (distribution / supply / recirculation).
  - .5 Ensure that the control, regulation, and security devices promote the normal and safe operation of the network.
- .4 Correct deficiencies identified during the commissioning.

**END OF SECTION**



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## **Part 1            General**

### **1.1            RELATED REQUIREMENTS**

- .1    Section 20 00 10 – Mechanical and Electrical General Instructions.
- .2    Section 23 05 05 – Installation of Pipework.
- .3    Section 23 05 29 – Hangers and Supports for HVAC Piping and Equipment.

### **1.2            REFERENCES**

- .1    ASTM International Inc.:
  - .1    ASTM A53/A53M 12, Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc-Coated, Welded and Seamless.
  - .2    ASTM A88-1931, Standard Specification for High Test Gray Iron Castings.
  - .3    ASTM B32-08(2014) – Standard Specification for Solder Metal.
  - .4    ASTM B88 14, Standard Specification for Seamless Copper Water Tube.
  - .5    ASTM A53/A53M-12, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
  - .6    ASTM A105/A105M 14, Standard Specification for Carbon Steel Forgings for Piping Applications.
  - .7    ASTM A234/A234M 15, Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
  - .8    ASTM B306-13 – Standard Specification for Copper Drainage Tube (DWV).
  - .9    ASTM C76 13a, Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe (Metric).
  - .10   ASTM C428/C428M-05(2011) e1, Standard Specification for Asbestos-Cement Non-pressure Sewer Pipe.
  - .11   ASTM C564-14 – Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
  - .12   ASTM D2235-04(2011), Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
  - .13   ASTM D2564-12 – Standard Specification for Solvent Cements for Poly (Vinyl-Chloride) (PVC) Plastic Piping Systems.
- .2    Canadian Standards Association (CSA International):
  - .1    CSA B67-1972(R1996) – Lead Service Pipe, Waste Pipe, Traps, Bends and Accessories.
  - .2    CSA-B70-12 – Cast Iron Soil Pipe, Fittings and Means of Joining.
  - .3    CSA-B125.3-12 – Plumbing Fittings.
  - .4    CSA B602-16, Mechanical couplings for drain, waste, and vent pipe and sewer pipe.
  - .5    CSA B1800-15, Thermoplastic Non-Pressure Pipe Compendium.
- .3    Green Seal Environmental Standards (GSES):
  - .1    Standard GS-36 - Adhesives for Commercial Use, Edition 2.1, July 12, 2013.





- .4 South Coast Air Quality Management District (SCAQMD), California State:

- .1 SCAQMD Rule 1168-A2005 – Adhesive and Sealant Applications.

### **1.3 DOCUMENTS/SAMPLES TO SUBMIT FOR APPROVAL/INFORMATION**

- .1 Submit all required documents and samples in accordance with section 20 00 10 – Mechanical and Electrical General Instructions.
- .2 Technical datasheet:
  - .1 Submit required technical datasheet, and manufacturer instructions and documentation. Technical datasheets must indicate product characteristics, performance criteria, physical size, finish and
- .3 Shop drawings:
  - .1 Submitted shop drawings stamped and signed by professional engineer registered or licensed in Canada in the province of Québec.
- .4 Certificates:
  - .1 Submit certificates signed by manufacturer certifying that the products, materials and equipment meet the requirements as to the physical characteristics and performance criteria.

### **1.4 DOCUMENTS/ITEMS TO GIVE AT WORK COMPLETION**

- .1 Submit all required documents and items in accordance with section 20 00 10 – Mechanical and Electrical General Instructions.
- .2 O M Sheets: Provide instruction for OM which will be included in the OM Manuals.

### **1.5 TRANSPORTATION, STORAGE AND HANDLING**

- .1 Transport, store and handle materials and equipment according to Section 20 00 10 – Mechanical and Electrical General Instructions.
- .2 Delivery and acceptance: deliver materials and equipment to site in original factory packaging, labeled with the name and address of the manufacturer.
- .3 Waste management and disposal:
  - .1 Separate waste materials for reuse / re-use and recycling in accordance with Section 01 74 21 – Construction/demolition waste management and disposal.
  - .2 Remove from site all packaging materials and transport them to the appropriate recycling facilities.
  - .3 Collect and sort paper packaging, plastic, polystyrene, corrugated cardboard for recycling in accordance with Waste Management Plan.
  - .4 Sort steel scrap, metal, plastic for recycling and place in designated containers in accordance with Waste Management Plan.
  - .5 Divert unused metal materials from metal recycling facility Product.



## **1.6 ACCEPTABLE MATERIALS OR PRODUCTS**

- .1 When materials or products are prescribed by their trademarks, consult the instructions to tenderers in order to know the procedure concerning the request for approval of substitutes materials or products.

## **Part 2 Product**

### **2.1 MATERIAL**

- .1 Ductile cast iron:
  - .1 Class no. 3.
- .2 Cast iron:
  - .1 The labelling of the trademark, the diameter, and the seal of the CSA and ASTM will be stamped on the entire length of the pipe.
  - .2 ASTM A88, class no. 4000.
  - .3 ACNOR no. B70.
- .3 Galvanized steel:
  - .1 ASTM A53, series no. 40.
- .4 DWV copper:
  - .1 ASTM B306.
- .5 Hard L type copper:
  - .1 ASTM B88.

### **2.2 LOCATIONS**

- .1 Storm drains, drop pipes, and soil stacks:
  - .1 Unless otherwise indicated, class no. 4000 cast iron or DWV copper for the entire riser pipe to the drain, with the horizontal portion at the bottom up to the drain in cast iron.
- .2 Horizontal branched connections, soil pipes, and waste pipes.
  - .1 DN 50 or smaller: DWV copper.
  - .2 DN 80 or larger: Cast iron.
  - .3 Note: If the vent is made of copper, the drainage pipe is made of cast iron or copper.
- .3 Equipment and ventilation device drainage:
  - .1 DN 25 or smaller: Hard type L copper.
  - .2 DN 32 or larger: DWV copper.
- .4 Vents:
  - .1 DN 65 or smaller: DWV copper.
  - .2 DN 80 or larger: Cast iron or DWV copper.



.3 Notes:

- .1 Roof vent outlets: Cast iron, class no. 4000.
- .2 Laboratory device vents made of the same material as the laboratory equipment drain piping.

## 2.3 FITTINGS AND ACCESSORIES

- .1 Cast iron pipes: The labelling of the trademark, the diameter, and the insignia of the CSA and ASTM will be cast in the metal, class no. 4000.
- .2 Cast iron pipes with mechanical joints: The labelling of the trademark, the diameter, and the insignia of the CSA and ASTM will be cast in the metal, ACNOR no. B70, provided with a locking lever for the positioning of the seals.
- .3 Copper pipes: Emco or Mueller welding fittings.
- .4 In the ground, appliance plumbing fittings: cast iron, ASTM A74, class no. 4000.
- .5 Galvanized steel and aluminum pipes: drainage type, black cast iron fittings.
- .6 Ventilation equipment and devices drains:
  - .1 DN 25 or smaller: Emco fittings.
  - .2 DN 32 or larger: Emco or Mueller drainage type fittings.
- .7 For piping made of another material, use fittings of the same material and the same class as the pipe on which they are used.

## 2.4 JOINTS

- .1 Ductile cast iron:
  - .1 Mechanical joints with corrosion resistant bolts and nuts.
- .2 Cast iron pipes with caulked joints (for piping DN 250 or larger in diameter):
  - .1 Joints sealed with molten lead on dry tow or hemp.
  - .2 Caulk all joints properly.
  - .3 For each joint, use 450 grams of soft pig lead for each DN 25 diameter pipe. Increase the lead quality when using cut pipes. PC-4 can be used, according the instructions of manufacturer and the Plumbing Code requirements.
  - .4 No trace of tar or grease will be tolerated.
  - .5 For silica cast iron piping DN 150 and larger, seal the joints with rope resistant to acids and bases, treated with a special material by Duricon. Use Durco caulking.
- .3 Cast iron pipes with mechanical joints (for piping DN 200 or smaller in diameter):
  - .1 Of the mechanical type, approved by the authorities, such as St. Croix STC.
  - .2 Corrugated stainless steel collars approved by CSA, CSA B602.
  - .3 Joint components compliant with the CSA B70.
  - .4 Stainless steel no. T-304 seal clamp.
  - .5 For silica cast iron piping with DN 100 or smaller diameter: stainless steel rings, Teflon gasket, neoprene outer gasket, all manufactured by Duricon.



- .4 Copper:
  - .1 Unless otherwise specified, joints are welded with 50% tin and 50% lead solder.
  - .2 For pumped sewers, the solder is 95% tin and 5% antimony.
- .5 Fittings between copper pipes and cast iron pipes:
  - .1 It is permitted to connect copper to black iron, but no connection is allowed between copper and galvanized steel.

## **Part 3 Execution**

### **3.1 GENERAL**

- .1 Comply with requirements of Section 23 05 05 - Installation of Pipework and Section 23 05 29 – Hangers and Supports for HVAC Piping and Equipment.
- .2 General layout of the works:
  - .1 The layout of the pipe network, the position of sanitary fixtures, special equipment, etc., mentioned in the specification or shown on the drawings give the general layout of the equipment. This section must execute this installation while complying with provincial and municipal health regulations and keep itself constantly informed on the architectural and structural arrangement of the building.
  - .2 Pay special attention in order to avoid any interference of plumbing pipes with

### **3.2 SLOPES**

- .1 Drainage and vent piping:
  - .1 The drainage and horizontal vent piping must slope in the direction of flow. Unless otherwise indicated, an incline of 2% for DN 80 pipes and under and 1% for DN 100 or larger pipes.

### **3.3 TESTS, ADJUSTMENTS AND CLEANING**

- .1 Generalities:
  - .1 Perform all the tests specified below.
  - .2 All tests must have been performed satisfactorily prior to being performed in the presence of the Engineer.
  - .3 Any piping or part thereof must be proven before being covered with insulation or be concealed in partitions, ceilings or walls. Prior to pressure testing systems, remove or protect devices such as control devices, air valves, or any equipment that is not designed to be subjected to pressures corresponding to those used in the tests.
  - .4 During the hydrostatic tests, ensure that the piping is completely filled with liquid and purged of all the air.
  - .5 In cold weather, use an antifreeze for hydrostatic tests, and at the end of the tests, drain the piping completely to prevent any risk of freezing.



- .6 Three copies of the final report of all tests and adjustments executed indicating the final readings obtained should be sent for analysis, comments, and approval. Enter the results on 8½ "x 11" format sheet by entering the name of the system, the device, the requested specifications and those obtained.
- .2 Drainage, sewer, and vent piping (tests):
  - .1 Submit the drainage and vent piping to a hydrostatic test by sections of a maximum height of 15 m. completely fill each section of water to a height of 2.1 m above the highest lateral branch of each section. The water level should remain stable for a period of two hours.

**END OF SECTION**



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## **Part 1 General**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 20 00 10 – Mechanical and Electrical General Instructions

### **1.2 REFERENCES**

- .1 Canadian Standards Association (CSA)/CSA International:
  - .1 CAN/CSA-B45 Series-02(C2008) – Plumbing Fixtures.
  - .2 CAN/CSA-B125.3-05 – Plumbing Fittings.
  - .3 CAN/CSA-B651-04 – Accessible Design for the Built Environment.
- .2 Green Seal Environmental Standards (GSES):
  - .1 Standard GS-36-00 – Commercial Adhesives.
- .3 South Coast Air Quality Management District (SCAQMD), California State:
  - .1 SCAQMD Rule 1168-A2005 – Adhesive and Sealant Applications.

### **1.3 DOCUMENTS/SAMPLES TO SUBMIT FOR APPROVAL/INFORMATION**

- .1 Submit all required documents and samples in accordance with section 20 00 10 – Mechanical and Electrical General Instructions.
- .2 Technical datasheet:
  - .1 Submit required technical datasheet, and manufacturer instructions and documentation. Technical datasheets must indicate product characteristics, performance criteria, physical size, finish and
- .3 Shop drawings:
  - .1 Submitted shop drawings stamped and signed by professional engineer registered or licensed in Canada in the province of Québec.
- .4 Certificates:
  - .1 Submit certificates signed by manufacturer certifying that the products, materials and equipment meet the requirements as to the physical characteristics and performance criteria.

### **1.4 DOCUMENTS/ITEMS TO GIVE AT WORK COMPLETION**

- .1 Submit all required documents and items in accordance with section 20 00 10 – Mechanical and Electrical General Instructions.
- .2 O M Sheets: Provide instruction for OM which will be included in the OM Manuals.

### **1.5 TRANSPORTATION, STORAGE AND HANDLING**

- .1 Transport, store and handle materials and equipment according to Section 20 00 10 – Mechanical and Electrical General Instructions.
- .2 Delivery and acceptance: deliver materials and equipment to site in original factory packaging, labeled with the name and address of the manufacturer.



- .3 Waste management and disposal:
  - .1 Separate waste materials for reuse / re-use and recycling in accordance with Section 01 74 21 – Construction/demolition waste management and disposal.
  - .2 Remove from site all packaging materials and transport them to the appropriate recycling facilities.
  - .3 Collect and sort paper packaging, plastic, polystyrene, corrugated cardboard for recycling in accordance with Waste Management Plan.
  - .4 Sort steel scrap, metal, plastic for recycling and place in designated containers in accordance with Waste Management Plan.
  - .5 Divert unused metal materials from metal recycling facility.

## 1.6 ACCEPTABLE MATERIALS OR PRODUCTS

- .1 When materials or products are prescribed by their trademarks, consult the instructions to tenderers in order to know the procedure concerning the request for approval of substitutes materials or products.

## Part 2 Product

### 2.1 GENERALITIES

- .1 All vitreous china plumbing fixtures must comply with CSA requirements (originally
- .2 Chrome plating:
  - .1 All visible fixture pipes and accessories must be polished and have a chrome finish. All visible water supply pipes must be made of drawn tube, without any welds, of the same dimensions as the iron pipes, and installed within walls, wherever possible.
- .3 Traps:
  - .1 Each fixture in the entire building must be equipped with a P-trap, barring special requirements, placed as close as possible to the fixture drain opening.
- .4 Note:
  - .1 Unless indicated otherwise, all porcelain fixtures are to be white colored by Crane.

### 2.2 KITCHEN SINKS

- .1 Type E-1: (single bowl sink)
  - .1 Kitchen counter sink, stainless steel no. 18-8, 20 gauge, single hole, DN 90 screen, basket strainer, backledge basin, self-framed, noise-dampening undercoating, Franke no ALBS6805-1, or a substitute product approved in an addendum in accordance with the Instructions to tenderers.
  - .2 Dimensions (overall):
    - .1 Width: 510 mm
    - .2 Front - rear: 520 mm
    - .3 Depth: 125 mm





- .3 Faucets:
  - .1 Sink faucet, single lever, aerator, single piece construction, elevated spout, Crane: Solitaire no. S-5900. Seal using an adhesive at the base of the faucet, or a substitute product approved in an addendum in accordance with the Instructions to tenderers.
- .4 Water supply:
  - .1 Shut-off valve, DN 10 compression fitting, chrome plated stem and handwheel, chrome plated flexible piping, Speedway by Creed: Eastman Speed Flex no. R-19, or a substitute product approved in an addendum in accordance with the Instructions to tenderers.
- .5 Trap:
  - .1 Powers-Crane no. P4006, DN 40, or a substitute product approved in an addendum in accordance with the Instructions to tenderers.

## 2.3 MANUFACTURER LIST

- .1 Comply with the manufacturer list.
- .2 Manufacturer list, this section 22 42 00 – Plumbing Fixtures:
  - .1 Sinks:
    - Aristaline
    - Franke
    - Kindred Industries Ltd (K.I.L.)
    - or a substitute product approved in an addendum in accordance with the Instructions to tenderers
  - Faucets:
    - American Standard
    - Cambridge Brass (Teck)
    - Crane
    - TES Brass & Bronze Works Inc. (Johns Brooks & Co. Ltd)
    - or a substitute product approved in an addendum in accordance with the Instructions to tenderers

## Part 3 Execution

### 3.1 GENERAL

- .1 General:
  - .1 Supply and install all fixtures described in this section and indicated in mechanical and architectural drawings. These fixtures must be of high quality and in perfect condition upon acceptance of the work.
- .2 Drawings:
  - .1 Submit shop drawings of each plumbing fixture for approval.



- .3 Identification:
  - .1 Identify all valves in French or with a color code.

### **3.2 SETTINGS**

- .1 Comply with the water conservation requirements specified in this section.
- .2 Settings:
  - .1 Set the normal flow so that it matches the calculated flow.
  - .2 Set the water supply pressure of the fixtures so that it does not cause splashing at the maximum pressure.
  - .3 In the case of flush valves, make the necessary adjustments based on the existing onsite conditions.
  - .4 Set the urinal flush timers.
  - .5 Set the toilet and urinal automatic flush valves so as to avoid unnecessary flushes during unoccupied hours.
- .3 Verification
  - .1 Check the toilet and urinal flush valves.
  - .2 Check the operating conditions of the aerators.
  - .3 Check the operation of vacuum breakers and backflow preventers for all operating conditions.
- .4 Verification of the thermostatic mixing valves
  - .1 Check the temperature setpoints, safety features and operation of the fixtures.

**END OF SECTION**



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**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 20 00 10 – Mechanical and Electrical General Instructions

**1.2 REFERENCES**

- .1 ASTM International:
  - .1 ASTM A126-04(2014) – Standard Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
  - .2 ASTM B62-15 – Standard Specification for Composition Bronze or Ounce Metal Castings.
  - .3 ASTM B306-13, Standard Specification for Copper Drainage Tube (DWV).
- .2 American Water Works Association (AWWA):
  - .1 ANSI/AWWA C700-15 – Cold Water Meters, Displacement Type, Metal Alloy Main Case.
  - .2 ANSI/AWWA C701-15 – Cold Water Meters, Turbine Type for Customer Service.
  - .3 ANSI/AWWA C702-15 – Cold Water Meters, Compound Type.
- .3 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-B356-10 – Water pressure reducing valves for domestic water supply systems.
- .4 Efficiency Valuation Organization (EVO):
  - .1 International Performance Measurement and Verification Protocol (IPMVP).
    - .1 IPMVP, version 2007.
- .5 Plumbing and Drainage Institute (PDI):
  - .1 PDI-G101-R2015– Testing and Rating Procedure for Grease Interceptors with Appendix of Installation and Maintenance.
  - .2 PDI-WH201-R2010 – Water Hammer Arresters Standard.

**1.3 DOCUMENTS/SAMPLES TO SUBMIT FOR APPROVAL/INFORMATION**

- .1 Submit all required documents and samples in accordance with section 20 00 10 – Mechanical and Electrical General Instructions.
- .2 Technical datasheet:
  - .1 Submit required technical datasheet, and manufacturer instructions and documentation. Technical datasheets must indicate product characteristics, performance criteria, physical size, finish and



- .3 Shop drawings:
  - .1 Submitted shop drawings stamped and signed by professional engineer registered or licensed in Canada in the province of Québec.
- .4 Certificates:
  - .1 Submit certificates signed by manufacturer certifying that the products, materials and equipment meet the requirements as to the physical characteristics and performance criteria.

#### **1.4 DOCUMENTS/ITEMS TO GIVE AT WORK COMPLETION**

- .1 Submit all required documents and items in accordance with section 20 00 10 – Mechanical and Electrical General Instructions.
- .2 O M Sheets: Provide instruction for OM which will be included in the OM Manuals.

#### **1.5 TRANSPORTATION, STORAGE AND HANDLING**

- .1 Transport, store and handle materials and equipment according to Section 20 00 10 – Mechanical and Electrical General Instructions.
- .2 Delivery and acceptance: deliver materials and equipment to site in original factory packaging, labeled with the name and address of the manufacturer.
- .3 Waste management and disposal:
  - .1 Separate waste materials for reuse / re-use and recycling in accordance with Section 01 74 21 – Construction/demolition waste management and disposal.
  - .2 Remove from site all packaging materials and transport them to the appropriate recycling facilities.
  - .3 Collect and sort paper packaging, plastic, polystyrene, corrugated cardboard for recycling in accordance with Waste Management Plan.
  - .4 Sort steel scrap, metal, plastic for recycling and place in designated containers in accordance with Waste Management Plan.
  - .5 Divert unused metal materials from metal recycling facility.

#### **1.6 ACCEPTABLE MATERIALS OR PRODUCTS**

- .1 When materials or products are prescribed by their trademarks, consult the instructions to tenderers in order to know the procedure concerning the request for approval of substitutes materials or products.

### **Part 2 Products**

#### **2.1 FLOOR DRAINS**

- .1 General:
  - .1 By Zurn with integrated or separate P-trap, or a substitute product approved in an addendum in accordance with the Instructions to tenderers.



- .2 Traps:
  - .1 Separate traps provided with a bronze cleanout plug at the bottom of the trap and a DN 15 connection for the trap primer.
  - .2 Deep trap seal, 100 mm minimum depth.
  - .3 Floor drains serving ventilation units with deep trap seals are supplied by this section. The height of the trap seal must be at least 80 mm higher than the height corresponding to the vacuum or the pressure generated in the ventilation unit. Zurn no. Z-1000P or H4051 by Bibby Ste-Croix if mechanical joints are used, or a substitute product approved in an addendum in accordance with the Instructions to tenderers.
- .3 Cast iron body, extendable fittings, threaded if necessary, Zurn no. Z-1040 (joints), or a substitute product approved in an addendum in accordance with the Instructions to tenderers.
- .4 Water seal guard for the trap seal, TrapGuard model byProSet Systems (distributed by Les Entreprises Roland Lajoie Inc.), TG model, complete with a ten year warranty, or a substitute product approved in an addendum in accordance with the Instructions to tenderers.
- .5 Floor drain description:
  - .1 Funnel floor drain:
    - .1 Cast iron, covered with a protective paint.
    - .2 Heavy grid, 172 mm in diameter, polished nickel bronze 206 mm diameter top.
    - .3 Cast iron sediment bucket.
    - .4 Membrane flashing clamp comprised of a mechanical joint and a secondary seepage pan.
    - .5 Polished drain funnel.
    - .6 Adjustable frame.
    - .7 Frame 213 mm in diameter, ensuring proper adhesion to the membrane.
    - .8 Complete grate with 85 mm x 232 mm oval funnel or round funnel of 102 mm or 152 mm in diameter.
    - .9 Acceptable Products: Zurn no. ZN-556-Y (FO: oval), (F4 or F6: round).

## 2.2 DRAINAGE – FUNNELS

- .1 Unless indicated otherwise, manufacture funnels out of 0.74 kg gauge copper with a reinforced edge using a copper wire with a rectangular section at the top, removable grate and cover, with a cut-out opening for the passage of piping.
- .2 Manufacture funnels serving the fire protection system to be manufactured with DN 100 cast iron piping, 1220 mm in height.
- .3 In visible areas with stainless steel furniture, manufacture stainless steel funnels the same way as copper funnels, with rounded and polished edges, stainless steel no. 316, finish no.4.
- .4 For floor drains combined with funnels, see the article "FLOOR DRAINS" in this section.



### **2.3 WATER – BUFFER TANKS (WATER HAMMER ARRESTOR)**

- .1 In required locations on the water distribution system, installation of prefabricated water hammer arrestors is envisioned.
- .2 Manufactured with stainless steel, 18-8 series, with "accordeon" chamber, and threaded fittings.
- .3 The water hammer arrestor must be accessible. Provide and install access door where required.
- .4 Zurn no. Z-1700, or a substitute product approved in an addendum in accordance with the Instructions to tenderers.

### **2.4 TRAP PRIMERS**

- .1 Mechanical trap primer, Zurn no. Z-1022, or a substitute product approved in an addendum in accordance with the Instructions to tenderers.
- .2 Electronic control trap primer with integral vacuum breaker:
  - .1 Aquaelectronik no. MGE-M101SP (one trap) or MGE-S01SP (multiple traps).
  - .2 No. PR-500 with PPP Inc. Industries distributor, or a substitute product approved in an addendum in accordance with the Instructions to tenderers.

### **2.5 MANUFACTURER LIST**

- .1 Comply with the manufacturer list.
- .2 Manufacturer list, section 22 42 01:
  - .1 Floor drains:
    - .1 Watts-Drainage
    - .2 Zurn
    - .3 Or a substitute product approved in an addendum in accordance with the Instructions to tenderers.
  - .2 Prefabricated buffer tanks:
    - .1 Amtrol
    - .2 Sioux Chief
    - .3 Watts Drainage
    - .4 Zurn
    - .5 Or a substitute product approved in an addendum in accordance with the Instructions to tenderers.
  - .3 Trap primers:
    - .1 Aquaelectronik (electronic)
    - .2 PPP Inc. (electronic)
    - .3 Watts-Drainage (mechanical)
    - .4 Zurn (mechanical)
    - .5 Or a substitute product approved in an addendum in accordance with the Instructions to tenderers.



## **Part 3            Execution**

### **3.1                INSPECTION**

- .1        Verification of conditions: prior to the installation of special fixtures and equipment, ensure that the surfaces/materials condition, previously implemented under other sections or contracts, is acceptable and that the work can be performed in accordance with manufacturer's written instructions.

### **3.2                MANUFACTURER'S INSTRUCTIONS**

- .1        Compliance: comply with the manufacturer's requirements, recommendations and written instructions, including product technical bulletins, instructions for handling, storage and installation of the products, and datasheet indications.

### **3.3                INSTALLATION**

- .1        Install the fixtures and equipment as required by the plumbing code of the province where the work is carried out.
- .2        Install special plumbing fixtures according to the manufacturer's instructions and issued requirements.

### **3.4                FLOOR DRAINS**

- .1        Floor drains installed within monolithic slabs and ceramic tiles, tiles or other finishing materials: during the floor pour, coat the adjustable part of the floor drain with polythene for subsequent adjustment of the grate to the level of the finished floor.

### **3.5                DRAINAGE – FUNNELS**

- .1        Supply and install all drains and funnels needed for the drainage, the overflow, and pressure relief valves of all fixtures or systems.
- .2        The air gap between the funnel and the drain pipe must not exceed the nominal pipe diameter.
- .3        Bevel at 45° the end of pipes discharging into a funnel. The higher flow rate drain pipe must be centered with the drain.

### **3.6                WATER – WATER HAMMER ARRESTORS**

- .1        Install prefabricated water hammer arrestors on hot and cold domestic water pipes:
  - .1        At the highest point of the cold and hot water risers.
  - .2        Where possible, the water hammer arrestor for each fixture can be replaced by a single arrestor sized for a group of fixtures. Submit for approval the manufacturer's technical recommendations on the number and location of water hammer arrestors.
  - .3        At all locations with possible pressure buildup, installation of prefabricated water hammer arrestors.





### **3.7 TRAP PRIMERS**

- .1 Where indicated on the drawings or where floor drains are not equipped with a trap seal guard, on the cold water supply lines serving washbasins or sinks, supply and install trap primers with DN 15 copper piping of the same material and solder as the domestic water piping. The location and the installation will be according to the manufacturer's recommendations.

### **3.8 TESTING AND BALANCING**

- .1 Perform the testing and balancing of special fixtures and equipment at this time.
  - .1 Defects found in the start-up have been rectified.
  - .2 The completion certificate was issued by the competent authorities
- .2 Tolerances:
  - .1 Pressure at fixtures: allowable deviation of more or less 70 kPa.
  - .2 Flowrate at fixtures: allowable deviation of more or less 20%.
- .3 Floor drains:
  - .1 Check the operation of the trap primer.
  - .2 Initiate the trap seal using the trap primer. Set the flow according to the existing conditions.
  - .3 Check the operation of the flushing device.
  - .4 Check that the grate is in place, accessible and easy to remove.
  - .5 Clean the sediment bucket.
- .4 Water hammer arrestors:
  - .1 Ensure that the water hammer arrestors installed are of the appropriate type and are adequately implemented.

**END OF SECTION**

