

## **1. General Information**

### **3.1 Related requirements**

- .1 20 00 01 – Scope of work.
- .2 21 05 01 - General requirements for work results.

### **3.2 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 A 307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - .2 ASTM A 536-84 e1, Standard Specification for Ductile Iron Castings.
  - .3 ASTM B 88M-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 Canadian Standards Association (CSA)/CSA International
- .1 CSA B242-05, Groove and Shoulder Type Mechanical Pipe Couplings.
- .5 Department of Justice
- .1 Canadian Environmental Protection Act, ch.33 (CEPA)
- .6 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
- .1 Material Safety Data Sheets (MSDS)
- .7 Manufacturers Standardization Society (MSS) of the Valve and Fittings Industry.
- .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 National Research Council Canada (NRCC)/Construction Research Centre
- .1 NRCC 38728, National Plumbing Code of Canada (NPC).
- .9 Transport Canada (TC)
- .1 Transportation of Dangerous Goods Program, ch. 34 (TDG).

## **2. Products**

### **2.1 Piping/tubes**

- .1 Cold water and hot water pipes (distribution, supply and recirculation), located inside the building
- .1 Aboveground installation: Type L, hardened copper tube, in accordance with the ASTM B 88M standard.
- .2 Buried or embedded: K-type annealed copper tubes, in accordance with the ASTM B 88M standard, in long lengths with no joints in the part to be buried.

## **2.2 Fittings**

- .1 Bronze flanges and fittings, of class 150: in accordance with the ANSI/ASME B16.24 standard.
- .2 Molded bronze threaded fittings, class 150: in accordance with the ANSI/ASME B16.15 standard.
- .3 Molded bronze solder fittings: in accordance with the ANSI/ASME B16.18 standard.
- .4 Wrought copper and copper alloy solder-joint fittings: in accordance with the ANSI/ASME B16.22 standard.

## **2.3 Joints**

- .1 Rubber-gasket joints, without latex 1.6 mm thick: in accordance with the AWWA C111 standard.
- .2 Hexagon bolts, studs and washers: heavy series, in accordance with the ASTM A 307 standard.
- .3 Soft solder: alloy tin/copper 95/5.
- .4 Teflon tape: for screwed joints.
- .5 Dielectric connections between elements made of different metals: with thermoplastic lining.

## **2.4 Ball valves**

- .1 Ball valves drinking water approved, nominal size DN 2 or less, to be screwed
- .1 Class 150 valves.
- .2 Certifications: NSF / ANSI 61 and NSF / ANSI 372. Products approved for drinking water.
- .3 Bronze body, spherical stainless steel shutter, adjustable seal in PTFE, brass stuffing box, PTFE seat, steel lever.

### **3. Execution**

#### **3.1 Application**

- .1 Manufacturer's instructions: Comply with manufacturer's written requirements, including any available technical bulletins, instructions for handling, storing, and commissioning products, and data sheet instructions.

#### **3.2 Piping installation**

- .1 To install piping in accordance with the requirements of the NPC of the proper local authority.
  - .2 Install piping in accordance with Section 23 05 05 - Piping Installation and the requirements of this section.
  - .3 Assemble the pipe fittings manufactured according to the relevant ANSI standards.
  - .4 Install the cold water distribution piping below the hot water distribution, the hot water recirculation piping and other hot water piping, in order to keep the cold water at the lowest possible temperature.
  - .5 Unless otherwise specified, connect the piping to washroom facilities and other fixtures in accordance with the manufacturer's written instructions.
  - .6 Piping to be buried
- .1 Install piping on a washed, well-compacted sand bed that meets the requirements of AWWA (Class B bedding).
  - .2 Bend the tubes without wrinkling or reducing their useful section (inside diameter). Use as few fittings as possible.

#### **3.3 Valves and fittings**

- .1 Isolate the bypass lines and supply lines of equipment and fixtures with ball valves.
- .2 Balance the recirculation system with globe shut-off valves. Once the balancing operations are completed, mark the position of the valves and record it on the post-production drawings.

#### **3.4 Tests under pressure**

- .1 Section 21 05 01 - Mechanical - General requirements for work results.
- .2 Perform the tests at a pressure corresponding to the highest of the following values, either 860 kPa or the maximum operating pressure.

### **3.5 Flushing and cleaning**

- .1 Flush the network for a period of eight (8) hours. Flush water outlets for two (2) hours. Then allow the rinse water to stand for 24 hours and then take one (1) water sample from the longest section. Submit to the designated laboratory for analysis. The amount of copper in the water must be in accordance with the applicable drinking water guidelines established by the provincial and federal authorities. Flush the system for two (2) additional hours and then take another sample for analysis.

### **3.6 Inspections prior to start-up**

- .1 Ensure that all network elements are in place before flushing, testing and commissioning.
- .2 Ensure that the system can be drained completely.
- .3 Ensure that the booster pumps are functioning properly.
- .4 Ensure that the pneumatic anti-hammers and the expansion compensators are correctly installed.

### **3.7 Disinfection**

- .1 Empty, disinfect and flush the system in accordance with the requirements of the competent authority to the satisfaction of the ministerial representative.
- .2 After disinfection has been completed, submit the reports of the water quality testing laboratory for approval by the ministerial representative.

### **3.8 Performance control**

- .1 Timeline
  - .1 Monitor the network performance control once the hydrostatic and leak tests have been completed and the certificate of completion has been issued by the competent authority.
  - .2 Procedure
    - .1 Ensure that the flow and the operating pressure are in accordance with the calculated flow rate and pressure.
    - .2 Test, adjust and balance the hot water recirculation system in accordance with Section 23 05 93 - HVAC network testing, adjustment and balancing.

- .3 Adjust the pressure regulators when the draw-off flow is at maximum and the inlet pressure is at a minimum.
  - .4 Perform sterilization of hot water piping (distribution / feed / recirculation) to prevent Legionella.
  - .5 Verify the performance of the temperature regulators.
  - .6 Ensure that the network meets health and safety requirements.
  - .7 Verify the operation of the anti-hammers. Open one (1) tap, let the water run for ten (10) seconds and then quickly turn off the tap. If water hammers are felt, replace the anti-hammer devices or recharge the pneumatic anti-hammers. Do the same for all faucets and flush valves.
  - .8 Ensure that the water quality meets the standards and that the water contains no cleaning or flushing residue.
- .3 Reports
- .1 Submit certificates of pressure and flow tests performed on the general connections, attesting that these parameters meet the requirements.

**END OF SECTION**