

Approved: 2017-10-27

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section

**1.2                REFERENCE STANDARDS**

- .1        American Society of Mechanical Engineers International (ASME)
  - .1        ANSI/ASME B16.15-13, Cast Copper Alloy Threaded Fittings, Classes 125 and 250.
  - .2        ANSI/ASME B16.18-12, Cast Copper Alloy Solder Joint Pressure Fittings.
  - .3        ANSI/ASME B16.22-13, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
  - .4        ANSI/ASME B16.24-11, Cast Copper Alloy Pipe Flanges and Flanged Fittings: Class 150, 300, 400, 600, 900, 1500 and 2500.
  - .5        ASME B31.9-14, Building Services Piping.
- .2        ASTM International (ASTM)
  - .1        ASTM A307-14, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - .2        ASTM A351/A351M-16, Castings, Austenitic, for Pressure Containing Parts.
  - .3        ASTM A536-84 (2014), Standard Specification for Ductile Iron Castings.
  - .4        ASTM B32-08 (2014), Standard Specification for Solder Metal.
  - .5        ASTM B42-15a, Seamless Copper Tube, Standard Sizes.
  - .6        ASTM B88M-14, Standard Specification for Seamless Copper Water Tube (Metric).
- .3        American National Standards Institute/American Water Works Association (ANSI)/(AWWA)
  - .1        ANSI/AWWA C111/A21.11-12, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
  - .2        ANSI/AWWA C151/A21.51-09, Ductile Iron Pipe, Centrifugally Cast, for Water.
- .4        CSA Group (CSA)
  - .1        CSA B242-05, Groove and Shoulder Type Mechanical Pipe Couplings.
- .5        Underwriters Laboratories of Canada (ULC)
  - .1        CAN/ULC S101-07, Fire Endurance Tests of Buildings Construction and Materials.
  - .2        CAN/ULC S102.2-10, Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings and Miscellaneous Materials and Assemblies.
  - .3        CAN/ULC S115-11, Standard Method of Fire Tests of Firestop.

- .6 Department of Justice Canada (Jus)
  - .1 Canadian Environmental Protection Act, 1999, c. 33 (CEPA).
- .7 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Safety Data Sheets (SDS).
- .8 Manufacturer s Standardization Society of the Valve and Fittings Industry (MSS).
  - .1 MSS-SP-71-05, Grey Iron Swing Check Valves, Flanged and Threaded Ends.
  - .2 MSS-SP-80-03, Bronze Gate, Globe, Angle and Check Valves.
- .9 National Research Council (NRC)
  - .1 National Plumbing Code of Canada (NPC) 2015.
- .10 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 division 1.
- .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 division 1.

### **1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Store and manage hazardous materials in accordance with division 1: Construction.
- .2 Place materials defined as hazardous or toxic in designated containers.

## **Part 2 Products**

### **2.1 PIPING**

- .1 Domestic hot, and cold systems, within building.
  - .1 Above ground:
    - .1 Copper tube, hard drawn, type K: to ASTM B88M.

### **2.2 FITTINGS**

- .1 Cast copper, solder type: to ANSI/ASME B16.18.
- .2 Wrought copper and copper alloy, solder type: to ANSI/ASME B16.22.
- .3 NPS 2 and larger:
  - .1 ANSI/ASME B16.18 or ANSI/ASME B16.22 roll grooved to CSA B242.

- .4 NPS 1 ½ and smaller:
  - .1 cast copper to ANSI/ASME B16.18, 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 Teflon tape: for threaded joints.

## **2.4 BALL VALVES**

- .1 NPS 2 and under, screwed:
  - .1 Class 150.
  - .2 Forged Brass or Bronze body, stainless steel chrome plated brass ball, PTFE adjustable packing, brass gland and PTFE, TFE, or Bunan seat, steel lever handle as specified Section 23 05 23.01 - Valves - Bronze
- .2 NPS 2 and under, soldered:
  - .1 To ANSI/ASME B16.18, Class 150.
  - .2 Bronze body, stainless steel ball, PTFE adjustable packing, brass gland and PTFE, or Bunan seat, steel lever handle, with NPT to copper adaptors as specified Section 23 05 23.01 - Valves - Bronze

## **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.
- .2 Assemble piping using fittings manufactured to ANSI and Standard Council of Canada (SCC) standards.
- .3 Install CWS piping below and away from HWS and HWC and other hot piping to maintain temperature of cold water as low as possible.
- .4 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.
- .5 Valves
  - .1 Isolate equipment, fixtures and branches with ball valves.

### **3.3 PRESSURE TESTS**

- .1 Conform to requirements of Section
- .2 Test pressure: greater of 1.5 times maximum system operating pressure or 860 kPa.

### **3.4 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 to Federal. Let system flush for additional 2 hours, then draw off another sample for testing.

### **3.5 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.

### **3.6 DISINFECTION**

- .1 Flush out, disinfect and rinse system to approval of Departmental Representative.
- .2 Upon completion, provide laboratory test reports on water quality for Departmental Representative approval.

### **3.7 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.

### **3.8 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 off 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.

### **3.9 OPERATION REQUIREMENTS**

- .1 Co-ordinate operation and maintenance requirements including, cleaning and maintenance of specified materials and products .
- .2 Operational requirements in accordance with division 1. Operation, include:
  - .1 Cleaning materials and schedules.
  - .2 Repair and maintenance materials and instructions.

### **3.10 CLEANING**

- .1 Clean in accordance with division 1.

**END OF SECTION**