

1 **GENERAL**

1.1 **REFERENCES**

- .1 American National Standards Institute (ANSI)/American Welding Society (AWS)
 - .1 ANSI/AWS A5.8/A5.8M-11-AMD1, Specification Filler Metals for Brazing and Bronze Welding.
 - .2 American Society of Mechanical Engineers (ASME)
 - .1 ANSI/ASME B16.15-1985(2011), Cast Bronze Threaded Fittings.
 - .2 ANSI B16.18-2012, Cast Copper Alloy, Solder Joint Pressure Fittings.
 - .3 ANSI/ASME B16.22-2012, Wrought Copper and Copper-Alloy Solder Joint Pressure Fittings.
 - .3 American Society for Testing and Materials International (ASTM)
 - .1 ASTM B 32-08, Standard Specification for Solder Metal.
 - .2 ASTM B 61-08, Standard Specification for Steam or Valve Bronze Castings.
 - .3 ASTM B 62-09, Standard Specification for Composition Bronze or Ounce Metal Castings.
 - .4 ASTM B 88M-11, Standard Specification for Seamless Copper Water Tube Metric.
 - .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
 - .5 Manufacturers Standardization Society (MSS)
 - .1 MSS SP 80-2008, Bronze Gate, Globe, Angle and Check Valves.

1.2 **SUBMITTALS**

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 00 10 – General Instructions. Include product characteristics, performance criteria, and limitations.
 - .1 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 00 10 – General Instructions.
 - .2 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 00 10 – General Instructions.
 - .2 Indicate on manufacturers catalogue literature the following:
 - .1 VALVES.
 - .3 Quality assurance submittals: submit following in accordance with Section 01 00 10 – General Instructions.
 - .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .2 Instructions: submit manufacturer's installation instructions.

- .4 Closeout Submittals:
 - .1 Provide maintenance data for incorporation into manual specified in Section 01 00 10 – General Instructions.

1.3 QUALITY ASSURANCE

- .1 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 – Health and Safety Requirements.

2 PRODUCTS

2.1 TUBING

- .1 Type K hard drawn copper tubing: to ASTM B 88M.

2.2 FITTINGS

- .1 Cast bronze threaded fittings: to ANSI/ASME B16.15.
- .2 Wrought copper and copper alloy solder joint pressure fittings: to ANSI/ASME B16.22.
- .3 Cast copper alloy solder joint pressure fittings: to ANSI B16.18.

2.3 JOINTS

- .1 Brazing

2.4 VALVES

- .1 Connections:
 - .1 NPS 2 and smaller: ends for brazing.
- .2 Balancing, for TAB:
 - .1 Sizes: NPS 2 and under
 - .1 Provide, as shown on the job plans. Balancing Valves with provisions for connecting portable differential pressure meter. Each meter shall have pressure/temperature probes.

The balancing valves shall be y-pattern globe style design and all metal parts of nonferrous, pressure die cast, nonporous metal. Each valve shall provide four (4) functions:

- .1 Precise flow measurement,
- .2 Precision flow balancing,
- .3 Positive shut-off with no drip seat,
- .4 Drain connection using 3/4" NPT hose end thread.

These valves shall have four (4) 360° adjustment turns of the handwheel for precise setting with hidden memory to provide a tamper-proof balancing setting. Handwheel shall have digital readout.

- .3 Swing check valves:
 - .1 NPS 2 and under:

- .1 Class 125, swing, with composition disc, as specified Section 23 05 23.01 – Valves – Bronze.

- .4 Ball valves:
 - .1 NPS 2 and under: as specified Section 23 05 23.01 – Valves – Bronze.

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 datasheet.

3.2 PIPING INSTALLATION

- .1 Connect to equipment in accordance with manufacturer's instruction unless otherwise indicated.
- .2 Install concealed pipes close to building structure to keep furring space to minimum. Install to conserve headroom and space. Run exposed piping parallel to walls. Group piping where ever practical.
- .3 Slope piping in direction of drainage and for positive venting.
- .4 Use eccentric reducers at pipe size change installed to provide positive drainage or positive venting.
- .5 Provide clearance for installation of insulation and access for maintenance of equipment, valves and fittings.
- .6 Assemble piping using fittings manufactured to ANSI standards.

3.3 CIRCUIT BALANCING VALVES

- .1 Install flow balancing valves as indicated.
- .2 Remove handwheel after installation and TAB is complete.
- .3 Tape joints in prefabricated insulation on valves installed in chilled water mains.

3.4 VALVE INSTALLATION

- .1 Install ball valves at branch take-offs and to isolate each piece of equipment, and indicted.
- .2 Install swing check valves in horizontal lines or discharge of pumps and as indicated.

3.5 FLUSHING AND CLEANING

- .1 Flush and clean in presence of Departmental Representative.
- .2 Flush after pressure test for a minimum of 4h.
- .3 Fill with solution of water and non-foaming, phosphate-free detergent 3% solution by weight. Circulate for minimum of 8h.

- .4 Refill system with clean water. Circulate for at least 4h. Clean out strainer screens/baskets regularly. Then drain.
 - .5 Refill system with clean water. Circulate for at least 2h. Clean out strainer screens/baskets regularly. Then drain.
 - .6 Drainage to include drain valves, dirt pockets, strainers, low points in system.
 - .7 Re-install strainer screens/baskets only after obtaining Departmental Representative's approval.
- 3.6 **FILLING OF SYSTEM**
- .1 Refill system with chilled water.
- 3.7 **FIELD QUALITY CONTROL**
- .1 Testing:
 - .1 Test system in accordance with Section 21 05 01 – Common Work Results for Mechanical.
 - .2 Balancing:
 - .1 Balance water systems to within plus or minus 5% of design output.
- 3.8 **CLEANING**
- .1 Proceed in accordance with Section 01 00 10 – General Instructions.