SECTION 221116 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes domestic water piping under and inside the building.

B. See Division 221113, Section “Facility Water Distribution Piping” for water-service piping and water meters outside the building from source to the point where water-service piping enters the building.

C. See Division 221119, Section "Domestic Water Piping Specialties" for water distribution piping specialties.

1.2 SUBMITTALS

A. Product Data: For each product indicated, include manufacturer’s name, materials of construction, and joining materials.

1.3 QUALITY ASSURANCE

A. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9," for potable domestic water piping and components.

B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Soft Copper Tube: ASTM B 88, Type K, water tube, annealed temper.


2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends. Furnish Class 300 flanges if required to match piping.

3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

B. Hard Copper Tube: ASTM B 88, Type L, water tube, drawn temper.

2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends. Furnish Class 300 flanges if required to match piping.

3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

2.2 VALVES

A. Bronze and cast-iron, general-duty valves are specified in Section 220523"General-Duty Valves for Plumbing Piping."

B. Balancing and drain valves are specified in Section 221119 "Domestic Water Piping Specialties."

2.3 PIPING JOINING MATERIALS, SLEEVES, AND SLEEVE SEALS

A. See Section 220515 Common Work Results for Plumbing

PART 3 - EXECUTION

3.1 EXCAVATION

A. Excavating, trenching, and backfilling are specified in Section 312000 Earthmoving.

3.2 PIPE AND FITTING APPLICATIONS

A. Flanges may be used on aboveground piping only.

B. Under-Building-Slab, Domestic Water NPS 4 and Smaller: Soft copper tube, Type K, no joints below slabs. All underground copper tube shall be protected with 20 mil plastic sleeve.

C. Aboveground Domestic Water Piping All Sizes: Hard copper tube, Type L; copper pressure fittings; soldered joints for NPS2 and smaller; brazed joints for NPS2-1/2 and larger.

D. Non-potable Water Piping All Sizes: Same as Domestic Water Piping.
3.3 VALVE APPLICATIONS

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

2. Throttling Duty: Use bronze full port ball valves for piping NPS 4 and smaller.

B. Install shutoff valve close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, on each water supply to plumbing fixtures with integral stops, and on each water supply to plumbing fixtures that do not have supply stops. Use ball valves.

C. Install drain valves for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping.

1. Install hose-end drain valves at low points in water mains, risers, and branches.

D. Install calibrated balancing valves in each hot-water circulation return branch and discharge side of each pump and circulator. Set calibrated balancing valves partly open to restrict but not stop flow. Calibrated balancing valves are specified in Section 221119 "Plumbing Specialties."

3.4 PIPING INSTALLATION

A. Basic piping installation requirements are specified in Section 220515 "Common Work Results for Plumbing."

B. Install copper tubing according to CDA's "Copper Tube Handbook."

C. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Sleeves and mechanical sleeve seals are specified in Section 220515 "Common Work Results for Plumbing."

D. Install shutoff valve and wall hydrant at each domestic water service entrance.

E. Install domestic water piping level without pitch and plumb.

3.5 JOINT CONSTRUCTION

A. Basic piping joint construction requirements are specified in Section 220515 "Common Work Results for Plumbing."
B. Soldered Joints 2" and Smaller: Use ASTM B 813, water-flushable, lead-free flux, Sterling, or approved equal; ASTM B 32, lead-free-alloy solder, Sterling premium grade or Silvabrite 100; and ASTM B 828 procedure, unless otherwise indicated.

C. Brazed Joints 2-1/2" and Larger: Use Silvaloy Silfos brazing rods which meet all ASTM, ASW, Federal and military specifications (BcuP-2) with melting temperature between 1350 degrees F and 1500 degrees F. Cored solder is not approved.

3.6 HANGER AND SUPPORT INSTALLATION

A. Pipe hanger and support devices are specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment." Install the following:

1. Vertical Piping: MSS Type 8 or Type 42, clamps.
2. Individual, Straight, Horizontal Piping Runs: According to the following:
   a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
   b. Longer than 100 Feet: MSS Type 43, adjustable roller hangers.
   c. Longer than 100 Feet: MSS Type 49, spring cushion rolls, if indicated.
3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
4. Base of Vertical Piping: MSS Type 52, spring hangers.

B. Install supports according to Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

C. Support vertical piping and tubing at base and at each floor.

D. Rod diameter may be reduced 1 size for double-rod hangers, to a minimum of 3/8 inch.

E. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
2. NPS 1 and NPS 1-1/2: 72 inches with 3/8-inch rod.
3. NPS 2: 96 inches with 3/8-inch rod.
4. NPS 2-1/2: 108 inches with 1/2-inch rod.
5. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
6. NPS 6: 10 feet with 5/8-inch rod.
7. NPS 8: 10 feet with 3/4-inch rod.

F. Install supports for vertical copper tubing every 10 feet.
3.7 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties. All offsets are not shown.

B. Install piping adjacent to equipment and machines to allow service and maintenance.

C. Connect domestic water piping to exterior water-service piping.

D. Connect domestic water piping to water-service piping with shutoff valve, and extend and connect to the following:
   1. Booster Pumps: Cold-water suction and discharge piping.
   2. Water Heaters: Cold-water supply and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
   3. Plumbing Fixtures: Cold- and hot-water supply piping in sizes indicated, but not smaller than required by plumbing code. Refer to Section 224100 "Plumbing Fixtures" and Drawings.
   4. Equipment: Cold- and hot-water supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.8 FIELD QUALITY CONTROL

A. Inspect domestic water piping as follows:
   1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
   2. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
      a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
      b. Final Inspection: Arrange final inspection for authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
   3. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
   4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

B. Test domestic water piping as follows:
   1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
   2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
3. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.

4. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.

5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.

6. Perform final system test in presence of Owner.

7. Prepare reports for tests and required corrective action.

3.9 CLEANING

A. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

B. Swab all pipe, fittings, and valves just prior to installation with a 1% chlorine solution for small sections of piping not practical for cleaning per below instructions.

C. Clean and disinfect potable domestic water piping using purging and disinfecting procedures prescribed by the Municipality providing the water or, if methods are not prescribed, procedures described in AWWAC 651 or as described below shall be used:

1. Flush piping system with clean, potable water until dirty water does not appear at outlets.
2. Fill and isolate system according to either of the following:
   a. Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
   b. Fill system or part thereof with water/chlorine solution with at least 200ppm of chlorine. Isolate with valves and allow to stand for 3 hours.
3. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.

D. Submit water samples in sterile bottles to SRP for testing. Repeat procedures if biological examination shows contamination.

E. Prepare and submit reports of purging and disinfecting activities.

END OF SECTION