

SECTION 15410 – PLUMBING VALVES

PART 1 – GENERAL

1.1 WORK INCLUDED

- A. The work shall include labor, materials, tools, equipment, transportation, insurance, temporary protection, supervision and incidental items essential for proper installation and operation, even though not specifically mentioned or indicated on the drawings but which are usually provided or are essential for proper installation of systems related to this Section, as indicated on the drawings and specified herein.
- B. The specification and drawings described the minimum requirements that must be met for the installation of work as shown on the drawings and as specified hereinunder.
- C. Shop Drawings

1.2 RELATED SECTIONS

- A. Examine drawings and criteria sheets and all other Sections of the Specifications for requirements which affect work under this Section whether or not such work is specifically mentioned in this Section.
 - 1. Section 15050 – Basic Mechanical Materials and Methods
 - 2. Section 15055 – Through-Penetration Firestop Systems
 - 3. Section 15060 – Hangers and Supports
 - 4. Section 15075 – Mechanical Identification
 - 5. Section 15420 – Plumbing Distribution Piping
 - 6. Section 15430 – Drainage and Vent Piping
 - 7. Section 15440 – Plumbing Specialties
 - 8. Section 15450 – Plumbing Fixtures
 - 9. Section 15460 – Plumbing Equipment
 - 10. Section 15470 – Laboratory Plumbing Systems
 - 11. Section 15480 – Medical Plumbing Systems

1.3 REFERENCES

- A. Applicable provisions of the following Codes and Trade Standard Publications shall apply to the work of this Section, and are hereby incorporated into, and made a part of the Contract Documents.

B. Material standards shall be as specified or detailed hereinafter and as follows:

1. ANSI American National Standards Institute
2. ASME American Society of Mechanical Engineers
3. ASTM American Society of Testing Materials
4. AWS American Welding Society
5. CS Commercial Standards, U.S. Dept. of Commerce
6. FM Factory Mutual
7. FS Federal Specification, U.S. Government
8. MSS Manufacturers Standardization Society of the Valve and Fittings Industry
9. UL Underwriters Laboratories, Inc.
10. OSHA Occupational Safety and Health Act
11. NFPA National Fire Protection Assn.

1.4 SYSTEM DESCRIPTION

- A. Provide shut-off, gate, ball, butterfly, check, strainers, balancing and other types of valves as shown on the drawings and required for proper maintenance, isolation and safety of piping systems.
- B. Provide isolation valves at system drains and piping mains and branches for fixtures and piping systems, etc., at all fixtures and equipment and before and after backflow preventers, meters, pumps, and pressure reducing valves.

1.5 SUBMITTALS

- A. Refer to Section 01330 – SUBMITTAL PROCEDURES.
- B. Prepare and submit shop drawings and samples in accordance with the requirements of the General Conditions and Supplementary Conditions and in the manner described therein, modified as noted hereinafter.
- C. Valves and strainers of the same type shall be of the same manufacturer. Before purchasing any valve, the Contractor shall submit for approval the name of the manufacturer, the figure number which he proposes to furnish, and engineering data on each figure number. For manufacturers, see schedules herein.

1.6 QUALITY ASSURANCE

- A. Refer to Section 01400 – QUALITY REQUIREMENTS

B. Qualifications

1. Manufacturer: Company specializing in manufacturing valve and strainer products specified in this section, with documented 10 years experience. All valves shall be of United States manufacture.

C. Quality Standards

1. Valves and strainers shall be marked at the factory and shall contain manufacturer name, catalog or figure number, size and pressure class marked on the valve body, arrows to indicate direction of flow on check, globe and angle valves and UL label.

1.7 REGULATORY REQUIREMENTS

A. Perform Work in accordance with State and Local Plumbing Code.

B. Conform to State and Local Plumbing Code for installation of water heater safety valves and backflow prevention devices.

C. Provide certificate of compliance from the authorized representative indicating approval of installation of water heaters, piping, vents and backflow prevention devices.

PART 2 - PRODUCTS

2.1 VALVES, FLANGES AND UNIONS

A. General

1. All systems under this Section shall be provided with valves to permit complete and/or sectional control of the system. They shall be located to permit easy operation, replacement and repair. They shall be installed where shown on the drawings, or as herein specified. They shall be the product of the specified manufacturer.
2. All equipment shall be installed with isolation valves for service shut off. Equipment shut off valves shall be screwed ends or flanged. If screwed ends are provided, a union between equipment and valve shall be provided.

B. Water Valves

1. Isolation/shut-off valves 3" and smaller shall be all bronze ball valves Watts Series B-6000, Apollo 77-200, Nibco 585-70, Hammond 8501 or Milwaukee BA100, full port Teflon seated ball and 2-piece valve body designed for 600 psi water.
2. Isolation/shut-off valves 4" and larger shall be Nibco F-619 or Hammond IR1140 bronze fitted gate valves, flanged ends, iron body, 200 psi WOG, OS&Y valves or butterfly type, flanged ends, iron body, aluminum bronze discs, stainless steel stems and replaceable EPDM seats, 200 psi WOG, Nibco LD 2000 or Hammond 6211.

3. Drain valves shall consist of hose end drain or ball valve with cap and chain. Provide at all low points in water piping system and at the base of all risers so that entire system may be drained, Apollo 78-103, Nibco 585-70 HC or Hammond 8501.
4. Check valves 3" and smaller shall be Nibco S-413 -W, solder end, bronze body swing check, bronze disk, 200 psi WOG.
5. Check valves larger than 4" shall be Watts Series 411, Nibco F-918B or Hammond IR1124, flanged end, iron body with epoxy coated trim, swing check, 200 psi WOG.
6. Balancing valves for hot water circulation shall be Circuit Setter type, Armstrong, B&G, Nibco or approved equal with memory stop and calibrated nameplate.

C. Emergency Showers/Eyewash Stations

1. Valves 3" and smaller shall be all bronze ball valves Watts Service B-6000, Apollo 77-200, Nibco 585-70, Hammond 8501 or Milwaukee BA 100, full port teflon seated ball and 2-piece valve body designed for 600 psi WOG.
2. All isolation/shut-off valves on supplies to emergency stations (deluge showers, eye/face washers and drench hoses) shall be either locked open or have the handles removed and be labeled as "Emergency Shower Valve".
3. Provide six (6) master keys for valves locked open.
4. Each valve shall be labeled "For Emergency Shower Valve".

D. Sanitary/Drainage Valves

1. Gate valves on sewage and drainage ejector discharge piping shall be Nibco F-617-0 or Hammond IR1140, iron body, bronze mounted, solid wedge, outside screw and yoke, rising spindle, flanged ends, 150 psi.
2. Check valves on sewage and drainage ejector discharge piping shall be Kennedy 106LW, Nibco F-918L+W or Hammond IR1124LW, iron body, flanged ends, bronze disc with lever and weight.
3. Gate valves for special waste ejector discharge shall be ASAHI/America, polypropylene, flanged ends with EPDM seals, bubble tight, quick opening valve, non rising stem, 100 psi.
4. Check valves for special waste ejector discharge shall be ASAHI/America, polypropylene, flanged ends, with EPDM seals and seats, top entry, vertical or horizontal orientation.
5. Backwater valves J.R. Smith #7012 cast iron, bronze mounted, hub end, exterior shall be waterproofed, bolted and extended cover to suit finish floor or grade.

E. Natural Gas Valves

1. Valves 3" and smaller shall be Apollo Series 70-100-07, Nibco F.P. 600 or Hammond 8501-03, threaded bronze ball valve, 600 psi WOG.
2. Valves 4" and larger shall be Rockwell Figure 143, semi-steel, lubricated plug valve, flanged ends, wrench operated, 200 psi WOG.
3. All natural gas valves shall be approved by the state and local codes.

F. Pressure Reducing Valves

1. The PRV shall be Watts ACV-115 Series. The valve shall maintain a constant downstream pressure regardless of demand fluctuations. The control shall be an adjustable, spring loaded, direct acting, normally open, diaphragm valve designed to permit flow when controlled pressure is less than the spring setting. The control system shall consist of an adjustable opening speed needle valve and adjustable closing speed flow control valve. The specification shall note when valves 6" and larger are to be installed with the stem in a horizontal position.
2. Provide pressure gauges and shut-off valves on inlet and outlet of all pressure reducing valves.

G. Mixing Valves

1. Provide at each hot water heating system a master thermostatic mixing valve. The units shall be thermostatic controllers with check stops, strainers, outlet thermometer, volume control and chrome finish as detailed on the drawings. Lawler Series #800 high/low mixing valve, (#805-86108-05 for flow rates of 100 GPM at 10 PSID, #802-86008-05 for flow rates of 40 GPM at 10 PSID, #801-86208-05 for flow rates of 25 GPM at 10 PSID). Contact manufacturer for flow rates over 100 GPM. Leonard, Symmons or approved equal.
2. Emergency station (shower and eye/facewash) mixing valve shall be Lawler 911 E-85808-01 or approved equal. The valve shall be capable of high and low flows, positive hot water shut-off, integral cold water by-pass, integral check stops, strainer, volume control, thermometer and control mechanism to fail open to full capacity flow of cold water in the event of either the hot water supply is shut down or thermostatic control failure.
3. Lavatories shall be provided with point of use mixing valves, Watts Model USG-B, Powers #480 or approved equal where required by code. Device shall comply with ASSE 1016 and shall have lock feature.

H. Temperature and Pressure Relief Valves

1. Units in compliance with ANSI Z21.22, requirements and AGA certified, ASME rated, automatic reseating to suit installation, 150 psi pressure setting, 210°F setting.

I. Vacuum Relief Valve

1. Units in compliance with ANSI Z21.22, requirements, automatic cold water closed system, vent sized in accordance with 1/2 cross-sectional area of inlet piping to tank, Conbraco #37-201-01 1/2" NPT, Watts #36 or approved equal.

J. Thermal Check Valve

1. Refer to "Check Valves" herein. Provide a 1/8" diameter hole drilled in the clapper on cold water inlet piping to tank.

K. Flanges

1. Flanges shall be companion type, faced and drilled for not less than 125# steam working pressure complete with necessary adapter, and shall be of size and material of adjacent piping.

L. Unions

1. Provide union connections to fixtures and equipment. Union connections include compression fittings, grooved couplings, and flared fittings.
 - a. Unions on copper piping shall be bronze minimum working pressure of 200 psi.
 - b. Unions on steel and iron shall be ferrous ground joint brass to iron, rated for the working pressure of the system.

M. Dielectric Fittings

1. Provide separation between copper and ferrous piping systems such as nipples, unions or flanges. Components shall be equal to Watts or Clearflow.

N. Solder

1. Domestic water, waste and vent: 95-5 lead free, ASTM B32.

PART 3 – EXECUTION

3.1 SYSTEM SHUTDOWN

- A. The shutdown of any system shall be coordinated with the Owner's representative, at least (10) days in advance of the proposed shutdown.
- B. Provide temporary services to maintain active systems during extended shutdowns as required for demolition, service tie-ins and phasing. Operation of existing shut-off valves shall be by the Owner.

3.2 INTERIOR COPPER WATER PIPING INSTALLATION

- A. Test all water piping in accordance with this Specification.
- B. Pipe used in piping assembly must be clean of dirt and obstructions and shall have ends square and reamed before butting into the fittings.
- C. Cut the tube to the required length with tube cutter designed for copper work.

- D. Remove burrs from the inside and outside of the cut edge and clean the end of the tube with steel wool or sand cloth until all discoloration is removed and metal is smooth and bright.
- E. Oxides will be removed by sand cloth, brush, etc.
- F. Removal of oxides or discoloration of pipe and fittings by acids or self-cleaning flux is forbidden.
- G. Apply a thin, uniform and complete coating of reliable brand of soldering flux meeting the ASME AWS/A5.8, lead free to the cleaned surfaces of the tube and fittings.
- H. When joints are soldered, remove excess solder with a cloth or brush leaving a fillet of solder in the chamber at the end of the fitting.
- I. All piping must be true and plumb and with proper pitch for draining after soldering.
- J. All lines of water piping shall be protected from water hammer by shock absorbers. Where shock absorbers are used, they shall be as manufactured by Josam Mfg. Co., JR Smith, or Zurn Mfg. Co., shall conform to the Plumbing and Drainage Institute published requirements and shall be made accessible through access panels.
- K. All connections to tanks and equipment shall be made with unions.

3.3 DISINFECTION OF DOMESTIC WATER SYSTEMS

A. General

1. All water piping systems shall be thoroughly disinfected with a solution containing not less than 50 ppm of available chlorine by this Plumbing Contractor. The chlorinating material shall be either liquid chlorine or sodium hypochlorite solution.
2. This work is to be supervised by the Owner's representative and performed by an Owner approved chemical testing laboratory and results sent to the Architect/Engineer or his representative for verification. All costs shall be borne by this Plumbing Contractor.
3. The testing laboratory shall submit a summary of the test procedure to the Owner for approval prior to any work being performed. All work to be in accordance with the Owner's requirements. This Plumbing Contractor shall provide any and all valves, pipe and connections required to disinfect the water supply system totally or in part as required. Provide isolating valves and draw-off valves for proper containment, phasing and flushing.

B. Procedure

1. The water systems shall be tested and thoroughly flushed prior to chlorination.
2. The chlorine shall be introduced at a point of the system so as not to create a hazard to the existing systems. The disinfection solution shall be allowed to remain in the system for a period of 24 hours, during which period all valves and faucets shall be opened and closed several times with the chlorine drawn to all points in the system. After

disinfection, the solution shall be flushed from the system with potable water until the residual chlorine content is not greater than 0.2 ppm for the domestic potable system. Prior to any further testing procedures, the Engineer and the Owner shall review all draw-off valve locations and chlorine introduction locations.

3. The Contractor is to allow ample time for the chlorination of the water systems and is to plan the chlorination just prior to occupancy if possible. If the system is to sit dormant for any extended period of time prior to occupancy, the Contractor is to flow water to all points in the building to completely flush the systems prior to occupancy. A full (3) days notice will be given the Owner and Engineer prior to the start of disinfection.

C. Tests

1. The Owner's representative shall select a location on the floor for a chlorine concentration test and a chlorine residual, a coliform bacteria and total plate count bacteria tests. The laboratory report shall include sample locations, chlorine concentration, chlorine residual, coliform bacteria count and, after flushing, total plate count bacteria tests.
2. Acceptable limits for total plate count shall be 300 per 100 ml sample. Acceptable levels of chlorine residual shall be 0.2 ppm, for the domestic potable water system.
3. If these parameters are not met, continued flushing of the water systems shall be required until they are met.
4. Full Owner acceptance of the water systems shall not be given until these parameters are met, documented and submitted by the Testing Laboratory selected.
5. Incoming exterior water mains shall be disinfected similarly except chlorine introduction shall be from the point of new water service connection to the existing main. System shall be disinfected when water pressure testing is completed and accepted.

3.4 CONNECTIONS TO EQUIPMENT

- A. Furnish and install waste and vents, traps, cold water, hot water, non-domestic cold and hot water, medical gases, piping, shutoffs, backflow preventers, pressure reducing valves, vacuum breakers, shock absorbers, regulators and flexible tubing for all final connections to kitchen, medical and laboratory equipment, headwalls, casework and sinks provided under other Sections. Roughing for this equipment shall be as indicated on the drawings.
- B. Obtain exact roughing in dimensions from manufacturers of all service locations before connecting to or roughing for equipment. Provide shutoff valves at each piece of equipment.
- C. Owner provided equipment shall be furnished and set under other Sections. Roughing for and final connections to including piping shall be provided by this Contractor. Equipment included shall be:
 1. Kitchen equipment (dishwasher, ice maker)
 2. Prefabricated medical gas headwalls
 3. Preformed sink tops
 4. Scrub stations
 5. Sterilizers, glasswashers

3.5 IDENTIFICATION OF SYSTEMS

- A. Provide clip-on color coded piping identification markers on piping systems installed under this Section. Provide matching flow arrows to indicate direction of flow. Markers shall be Seton Nameplate Co., W.H. Brady, Westline Products or approved equal.
- B. Color coding shall comply with the American Hospital Association or ANSI A13.1 Standards as directed by the Owner.
- C. Install markers on each side of wall penetrations, at each valve, at tee fittings and base of risers. Spacing of markers shall not exceed 20'-0" and shall include at least one marker in each room. Letters shall not be less than 1 1/2" in height. Arrows shall not be less than 9' long.
- D. Install markers on cleaned or painted piping only after piping is complete and has been accepted by the Architect. Install marker adjacent to access panels where piping is concealed.
- E. Stencil equipment, such as pumps, compressors, water heaters, and tanks with the name of the equipment and equipment number. Stencils shall be at least 6" high and of a color to provide a contrast with the equipment finish.

3.6 VALVE TAGS, NAMEPLATES AND CHARTS

- A. All valves on pipes of every description shall be provided with neat circular plastic valve tags of at least 1 1/2" in diameter, attached with brass hook to each valve stem or handle. Tags shall have stamped on, in letters as large as practical, the number of the valve and the service, such as "CW", "HW", and "HWC", etc., for cold water, hot water, and hot water circulation, respectively, etc. The numbers of each service shall be consecutive. Obtain approval of tag material size and numbering system from the Architect prior to installation.
- B. All valves on equipment shall be numbered by 3" red plastic discs with 2" high white numbers secured to stem of valves by means of brass hooks or small link brass chain.
- C. All numbers utilized shall correspond to numbers indicated for valves on the Record Drawings and on (2) printed detailed lists. These printed lists shall state the numbers and locations of each valve and the equipment or system which it controls and other necessary information such as requiring the opening or closing of another valve or valves when any one valve is to be opened and closed.
- D. These printed lists shall be prepared in form to meet approval of the Architect and shall be framed under glass and mounted in place as directed by the Architect.
- E. Nameplates, catalog numbers and rating identification shall be securely attached to mechanical equipment with screws or rivets. Adhesives or cements will not be permitted.

- F. The Contractor shall provide for his work all valve charts including the Contractor's name and telephone number; date of chart; name and telephone number of Architectural Firm and Consulting Mechanical Engineering Firm.

3.7 FINAL ADJUSTMENTS AND BALANCING

- A. Upon completion of installation and equipment start-up, adjust systems to within operation parameters, temperatures, pressures and flows. Include adjustments to pressure relief valves, pressure regulating valves, temperature control valves for water systems, and verify normally closed/open valve positions.
- B. Balance water systems over a period of several days to ensure proper pressure, flows and circulating. Adjust temperature limit stops on shower valves to a maximum of 112°F. Verify proper settings for hot water circulation loops and aquastat controls. Master mixing valves shall be set at 120°F and 145°F according to their specific usage.
- C. Adjust all metering and infrared control faucets to operate for a minimum of 10 seconds at a flow rate of 0.5 gpm.

END OF SECTION