

2.2 THERMOMETERS
A. Manufacturers: Marshalltown, Ashcroft, Marsh, Palmer, Tel_Tru or approved equal. Marshalltown used as basis for selection.

B. Type: Model V_3 adjustable model with 3 1/2 inch dial, 50 to 250 F. range for hot water.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install all gauges and thermometers where shown on the drawings and in accordance with manufacturer's recommendations.
B. Pressure gauge and thermometers shall be installed or located to be easily read from the floor.

SECTION 22 05 23
GENERAL DUTY VALVES FOR PLUMBING

PART 1 GENERAL

1.1 SUMMARY

A. Work included: Providing of all required valves, cocks and faucets.

1.2 SUBMITTALS

A. Provide submittals in accordance with Section 22-00-00.
B. Submittals shall include manufacturer's catalog or technical data showing performance, dimensions, materials of construction and recommended methods of installation.

1.3 OPERATION AND MAINTENANCE DATA

A. Provide O&M data in accordance with Section 22-00-00.
B. O&M data will include manufacturer's literature and Maintenance instructions.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Gate Valves, Ball Valves and Drain Valves: Hammond, Stockham, Nibco, Milwaukee or approved equal. Hammond used as basis of selection.

2.2 DESCRIPTION

A. Bronze Gate Valve (Domestic Water Service): Figure IB 647, Class 125, 200 PSI non-shock cold water rated solder type bronze body gate valve with solid wedge disc, integral seat, threaded bonnet, non-rising stem, iron handwheel.
B. Ball Valves (Domestic Water Service): Ball valves for domestic water service shall be Figure 8511, 150 WSP / 600 WOG, 400 PSI non-shock cold water rated solder type 2-piece bronze body ball valve with full port / large port, solder ends, blow out proof stem, RTFE seats and PTFE packing, free floating chrome plated brass ball.
C. Drain Valves: Figure 710 or 712 brass hose end valve, 150 WWP, brass body, adjustable packing nut and stuffing box, Buna-N seats, iron handwheel. Provide cap & chain.

PART 3 EXECUTION

3.1 INSTALLATION

A. Provide valves at connections to equipment, where shown on the drawings or as required.
B. Install all valves with stem horizontal or above, accessible and same size as connected piping.
C. Provide separate support for valves where necessary.

SECTION 22 05 29
HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

A. Work included: Providing of all required hangers and supports for piping, and equipment.

1.2 SUBMITTALS

A. Provide submittals in accordance with Section 22-00-00.
B. Submittals shall include:
1. Manufacturer's technical literature for all products used indicating service for each type of hanger.
2. Include proposed pre-manufactured piping and duct vibration isolation products.
3. Submit literature or describe duct-supporting method.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. M-CO, Grinnell, Super Strut. M-CO used for selection.
B. Vibration Isolators:

1. Type of isolator, base, and minimum static deflection shall be as required for each specific equipment application as recommended by isolator or equipment manufacturer but subject to minimum requirements indicated herein.
2. Uniform Loading: Select and locate isolators to produce uniform loading and deflection even when equipment weight is not evenly distributed.
3. Mason Industries products used as basis of selection.

2.2 DESCRIPTION

A. Pipe Attachments:
1. Non_insulated ferrous pipe (1/2 to 1-1/2 inch): Figure 100.
2. Non_insulated ferrous pipe (2 inch and larger): Figure 400.
3. Non_insulated copper pipe: Figure 101.
4. Insulated pipe: Figures 1031 and 4031.
5. Riser clamp, ferrous pipe: Figure 510.
6. Riser clamp, plastic DWV: Figure 515.
B. Upper Attachments: Attachment to wood structures where weights permit shall be Figure 325 or 328.
C. Structural Attachments: Provide all necessary structural attachments such as concrete anchors, beam clamps, hanger flanges and brackets. Hangers shall not be suspended from other piping, equipment, etc.
D. Miscellaneous items such as hanger rod, rod couplings, turnbuckles, etc. shall be standard figure numbers of the same manufacturer as the attachments.

PART 3 EXECUTION

3.1 INSTALLATION

A. Provide hangers and supports in accordance with the instructions furnished by the manufacturers of these devices.
B. For horizontal pipe lines install pipe hangers with maximum hanger spacing and maximum hanger rods as recommended in Table 6 of the 2000 edition of the ASHRAE Guide and Data Book, Systems and Equipment Chapter 41: Where concentrated loads of valves, fittings, etc. occur, closer spacing will be necessary and shall be based on the weight to be supported and the maximum recommended loads for the hanger components. Cast iron soil pipe shall be supported at every joint.
C. Horizontal banks of piping for plumbing piping only, i.e. domestic hot and cold water, may be supported on a common steel channel strut member spaced not more than the shortest allowable span required on the individual pipe. Piping to be maintained at these relative lateral positions using clamps, slips or free to roll axially or slide using a Figure 125 insulated protector at all points of support for insulated lines.

D. Provide additional structural members where required to support piping or ductwork.
E. Provide hangers and support devices in accordance with the equipment manufacturer's instructions for all equipment.
F. Provide seismic bracing and supports per SMACNA Seismic Restraint Manual Guidelines and as required by the governing jurisdiction for all Mechanical Systems. Provide seismic restraints on all mechanical equipment in accordance with Zone 3 seismic requirements. Provide seismic restraint details and calculations as required by the governing code jurisdiction. Cost for all seismic detail development and calculations are to be included in the base bid price.
G. Provide supplementary drawings and calculations as required by governing code jurisdictions noting seismic support data/calculations as required for permit purposes.
H. All piping and duct supports within 30-feet of air handling units is to be isolated from the building support structure by pre-manufactured spring and/or resilient vibration isolators.

SECTION 22 05 48

VIBRATION AND SEISMIC CONTROLS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: Providing of all seismic restraints and vibration isolation for plumbing equipment.

1.2 QUALITY ASSURANCE

A. Equipment: All plumbing equipment mounted on vibration isolators shall be provided with seismic restraints capable of resisting a horizontal force of 100 percent of the weight of the equipment furnished.
B. Piping: Refer to specification section 22 05 29, Hangers and Supports for Plumbing Piping and Equipment.

1.3 SUBMITTALS

A. Provide submittals in accordance with Section 22 00 00.
B. Submittals shall include:
1. Manufacturer's technical literature for all products used including weights, dimensions and standard connections.
2. Indicate service for each type of hanger.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Type of isolator, base, and minimum static deflection shall be as required for each specific equipment application as recommended by isolator or equipment manufacturer but subject to minimum requirements indicated herein.
B. Uniform Loading: Select and locate isolators to produce uniform loading and deflection even when equipment weight is not evenly distributed.
C. Mason Industries products used as basis of selection.

2.2 VIBRATION ISOLATORS

A. Piping Systems:
1. Provide isolation by either floor mount or hangers with 3/4-inch deflection.
2. Provide oversized wall penetrations, line with neoprene and seal with resilient caulk or firestop material as appropriate.
3. Isolate domestic water piping from structure with Holdrite. Attach to one side of double stud wall.

PART 3 EXECUTION

3.1 INSTALLATION

A. Provide vibration isolation above for the noted plumbing systems. Install all vibration isolation devices in accordance with manufacturer's installation instructions. Provide additional support members, Unistrut bracing, etc as required for proper installation of isolation devices.
B. Inspection and Adjustments: Check for vibration and noise transmission through connections and floor. Adjust, repair, or replace isolators as required to reduce vibration and noise transmissions to specified levels.
C. On all sides of suspended equipment, provide bracing for rigid supports and provide restraints for resiliently supported equipment. The slack cable restraint method, Mason Industries, or equal, is acceptable.

3.2 ADJUSTING

A. Adjust vibration isolators after equipment is at operating weight.
B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.
C. Adjust active height of spring isolators.
D. Adjust seismic restraints to permit free movement of equipment within normal mode of operation.
E. Torque anchor bolts according to equipment manufacturer's recommendations to resist seismic forces.

SECTION 22 05 53

IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

A. Work included: Providing of all required identification systems for equipment and piping.

2.2 SUBMITTALS

A. Provide submittals in accordance with Section 22 01 00.
B. Submittals shall include:
1. List of proposed equipment and valve tags.
2. Product information on piping markers.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. W. H. Brady Co. or Seton.

2.2 DESCRIPTION

A. Equipment Identification: Equipment identification tags shall be three_ply, white center, black face plastic plates with 1/2" high letters for major and 1/4" high letters for minor equipment.
B. Piping Markers:
1. All vinyl self_sticking labels.
2. Markers shall comply with ANSI A 13.1 for width, size of letters, background colors, etc.

PART 3 EXECUTION

3.1 INSTALLATION

A. Provide each piece of roof equipment with a manufacturer's standard nameplate indicating manufacturer's name, model number, capacities and characteristics.
B. In addition, provide each piece of equipment with a plastic tag indicating its designation on this project. Mount this tag with screws, where possible, in a clearly visible location.
C. Affix piping markers to pipe or insulation in locations that make them clearly visible. Secure markers with two wraps of "Scotch Reinforced Tape" at each end.
D. Locate markers at intervals of 15 to no more than 50 feet allowing visual identification of a line from any point along that line and as follows: At each valve, where a pipe passes through a wall, direction of flow on each leg of a "T" and on lower quarters of the line on horizontal runs where view is not obstructed.
E. Provide arrow markers to indicate direction of flow away from each pipe identification marker.

SECTION 22 05 93

TESTING OF PLUMBING

PART 1 GENERAL

1.1 SUMMARY

A. Work Included: Pressure testing of piping.

1.2 OPERATION AND MAINTENANCE DATA

A. Provide O&M data in accordance with Section 22 00 00.
B. O&M data shall include certificate of completion, inspection and test by authority having jurisdiction on required piping systems.

1.3 QUALITY ASSURANCE

A. Code Compliance: Perform required tests in the presence of the authority having jurisdiction.

PART 2 PRODUCTS

2.1 DESCRIPTION

A. The Contractor shall furnish instruments, gauges, meters and necessary connection points for performance of the tests.

PART 3 EXECUTION

3.1 GENERAL

A. Piping: Test prior to concealment, insulation being applied, and connection to equipment, fixtures, or specialties. Conduct tests with all valves but those used to isolate the test section 10% closed.
B. Leaks: Repair all leaks or replace defective pipe or fittings and retest until stipulated results are achieved.
C. Notification: Advise the Architect 48 hours in advance of each test. Failure to so notify will require test to be rescheduled.
D. Testing Equipment: Provide all necessary pumps, gauges, connections similar items required to perform the tests.

3.2 TESTING REQUIREMENTS

A. Sanitary Systems: Test entire system or sections of system by closing all openings in piping except the highest opening and filling system with water to the point of overflow. If the system is tested in sections, plug each opening except the highest opening of the section under test and fill each section with water, but none with less than 6 feet head of water above the maximum estimated ground water level. Keep the water in system, or in portions under test, for 24 hours before testing begins. Test for six (6) hours with a maximum of 0.3 gallon per hour per inch diameter per 100 feet run of loss allowed. Locate and repair leaks. The maximum pressure on the lowest system invert is not to exceed 16 feet of head.

B. Piping_General: Test all piping as noted below, with no leaks or loss in pressure for the time indicated. Repair or replace defective piping until tests are completed successfully.

System	Pressure	Medium	Duration
Domestic Water Systems	150 psig	water	4 hours
Natural Gas	60 psig	air	4 hours
Misc. Piping	1.5x normal oper. pressure	nitrogen or water as appropriate	4 hours

SECTION 22 07 19
PLUMBING INSULATION

PART 1 GENERAL

1.1 SUMMARY

A. Work included: Providing of all required insulation for equipment.

1.2 SUBMITTALS

A. Provide submittals in accordance with Section 22 00 00.
B. Submittals shall include:
1. Data to show compliance with flame and smoke rating.
2. Manufacturer's catalog or technical data showing performance, dimensions, materials of construction and recommended methods of installation.

1.3 QUALITY ASSURANCE

A. Insulation materials and accessories such as adhesives, cement, etc. shall have composite fire and smoke hazard ratings, as tested by procedures indicated in NFPA 255 and U.L. 723, not to exceed a flame spread index of 25 and a smoke developed index of 50. Products or their shipping cartons shall have identification of the flame spread and smoke developed index.

PART 2 PRODUCTS

1.1 MANUFACTURERS

A. Schuller, Knauf, Owens-Corning, Certain-teed, or approved equal. Schuller used as basis of selection.

2.2 DESCRIPTION

A. Domestic Water Insulation
1. Schuller Micro-Lok AP-T molded fiberglass.
2. Pipe fittings: Zeston one-piece preformed PVC covers with fiberglass blanket insulation.

PART 3 EXECUTION

3.1 INSTALLATION

A. Piping:
1. Domestic Cold Water: Provide 1/2-inch minimum pipe insulation on domestic cold water piping.
2. Domestic Hot Water and Hot Water Return:
a. Provide 1-inch pipe insulation on domestic hot water and domestic hot water return less than or equal to 2 inches diameter.
b. Provide 1-1/2 inch pipe insulation on domestic hot water and domestic hot water return greater than 2 inches.
3. Insulate fittings on piping utilizing preformed pipe covering.
4. Insulate all valve bodies, fittings, unions, flanges and equipment with insulation equal to the attached service piping.
5. Seal all insulation to maintain a vapor barrier.
6. Provide 1-inch pipe insulation on storm/overflow storm drain piping and roof/overflow roof drain bodies. Seal all insulation to maintain a vapor barrier.

SECTION 22 11 00

FACILITY WATER DISTRIBUTION

PART 1 GENERAL

1.1 SUMMARY

A. Work included: Providing of all required pipes and pipe fittings.

1.2 OPERATION AND MAINTENANCE DATA

A. Submit certificates of inspections and tests to owner.

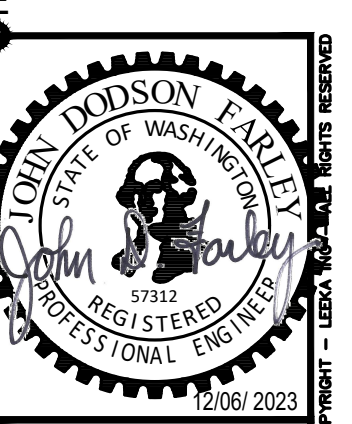
1.3 QUALITY ASSURANCE

A. Piping material and installation to meet requirements of the local plumbing, fire and building codes and serving utility requirements.
B. Pipe Cleaning: Should any pipe be plugged, the piping shall be disconnected, cleaned and reconnected without additional cost to Owner.
C. Damage to the building or systems resulting from failure to properly clean the system shall be corrected without additional expense to the Owner.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Pipe and fittings: Standard product of manufacturer.



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Specifications

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