
221116 DOMESTIC WATER PIPING

Part 1 – GENERAL

1.1 Description

A. This section details the guidelines and expectations for the design and installation of domestic water piping distribution systems on Johns Hopkins University Homewood Campus. Project conditions and requirements vary, thus precluding the absolute adherence to the items identified herein in all cases. However, unless there is adequate written justification and approval from the JHFRE Engineering and Energy Department, it is expected that these guidelines will govern the design and specifications.

B. All design and components shall comply with local MD and Baltimore governing codes and regulations.

1.2 Submittals

A. Piping layouts shall be designed to provide organized distribution systems which permit isolation of distinct sections without disruption of the entire building. Provide isolation valves at every major branch and at all unit connections. Provide manual air vents at all high points in the system and drain valves at all low points of the piping system.

1.3 Quality Assurance

A. The industry standard definition of clean is a surface free of mill scale, slag, grease, oil, dirt, and corrosion products. All new piping systems shall be specified to be chemically pre-treated using an agent in compliance with the JHU's water treatment contractor (Guardian CSC) standards. A water treatment contractor shall test the water to ensure that the contaminant levels coming out of the system in the effluent are identical to that of the makeup water source, in accordance with AWWA-C651. Results must be presented to JHFRE.

B. Any new/old system shall be specified to be flushed with clean fresh makeup water until the water coming out of the system is identical in content to the water going into the system. This ensures that any chemical agents used are completely rinsed out of the system and any corrosion products, oils, greases, etc. are removed from the system.

C. All new piping shall be specified to be cleaned, flushed, treated and hydrostatically tested to ensure clean, flushed, treated and leak-free construction prior to JHFRE acceptance.

1.4 Delivery and storage

A. Material deliveries and storage areas to be approved by Owner.

B. Material storage to comply with manufacturer's recommendations.

Part 2 – PRODUCTS

2.1 Above Ground Domestic Water Piping

A. Aboveground domestic water piping shall be copper water tube, Type-L, drawn temper, in accordance with ASTM B88, 125psig minimum working pressure rating. Fittings shall be wrought copper, solder-joint pressure fitting in accordance with ASME B16.22. Joining material shall be lead free solder and flux, 95% Tin, 4-5% Copper, 0.04-0.20 % Selenium, in accordance with ASTM B32.

2.2 Under Ground Domestic Water Piping

A. Underground domestic water piping 2-1/2" and smaller shall be copper tube, ASTM, B88, Type K, water tube, annealed temper for underground piping. Fittings shall be wrought copper, solder-joint pressure fitting in accordance with ASME B16.22. Joining material shall be lead free solder and flux, 95% Tin, 4-5% Copper, 0.04-0.20% Selenium in accordance with ASTM B32.

B. Underground domestic water piping 3" and larger shall be HDPE pipe lengths of 50' installed via direct burial in a trench on top of 4-6" of tamped bedding material. If directional boring is deemed necessary, it must be approved by JHFRE in writing. Connections shall be made using welding/fusing, not mechanical fasteners.

1. HDPE piping must adhere to all applicable AWWA and ASTM standards.
2. For applications less than 200psi, HDPE pipe and fittings shall be DR11 (IPS).
3. For applications greater than 200psi and less than 250psi, use DR9 (IPS).

C. Flanged piping of any kind is prohibited for underground applications.

2.3 Reverse osmosis and distilled/de-ionized water piping shall be Schedule 80 PVC (ex. Harvel LXP) or polypropylene (ex. Poly Pro 150) plastic pipe and fittings. Connections shall be made based on the manufacturer's recommendations.

2.4 Water hammer arrestors shall be provided at each elevation change of every horizontal branch to fixture batteries and at all quick-closing valves (mechanical make-up, drinking fountains, flush valves, single lever control faucets, temperature valves, dishwashers, etc.) for both hot and cold water.

2.5 Hose bibs shall be bronze body, wheel handle, with renewable composition disc, threaded or solder joint inlet, ASME B1.20.7 garden hose threads on the outlet and integral or field-installed.

2.6 Wall hydrants shall be ASME A112.21.3M, non-freeze type, key operated, threaded or solder joints, integral or field installed, non-removable, drainable, hose connection vacuum breaker with ASME B1.20.7 garden hose threads on outlet. Spacing for exterior wall hydrants shall be every 200'. Provide at least one wall hydrant on every exterior wall.

2.7 Trap seal primer valves shall be factory fabricated, enclosed electronic trap primer system with bronze body, ball valve, atmospheric vacuum breaker (ASSE 1001), electrical brass body solenoid valve, Type-L copper manifold with distribution units (the number of outlets shall be suitable for the application) with compression connection for water distribution. Electrical components shall include single point power connection with manual override switch, 24-hour timer with relay and adjustable

delay. All components shall be factory assembled in a 16-gauge steel box recessed or surface mounted. The entire assembly shall be tested and certified to ASSE 1044 and the electrical component are tested and certified to U.L. Standard #73.

2.8 Thermostatic water mixing valves shall be manually adjustable with bronze body. Provide check stops and unions on hot- and cold-water supply inlets, adjustable temperature setting in accordance with ASSE 1017.

Part 3 – EXECUTION

3.1 Threaded dielectric nipples shall be used to join all pipes of dissimilar metal construction. Standard dielectric unions with gaskets shall not be used.

3.2 Solder joints shall be made with no-lead solder.

3.3 In new installations or major renovations, pro-press and shark byte style fittings are prohibited behind enclosed walls or above ceilings. In easily accessible areas, these style fittings can be used, but must be pre-approved by JHFRE Engineering Dept.

3.4 If available, utilize campus steam to provide domestic hot water. Steam powered instantaneous water heaters are preferred.

3.5 Mechanical systems consuming domestic water, such as boiler systems (for blowdown) and open cooling tower systems (evaporation and blowdown) shall have a water sub-meter for tracking consumption (with bypass).

3.6 Dead legs or capped spurs in excess of 4' within the domestic hot water plumbing system without return circulation are prohibited.

3.7 Natural rubber fittings shall not be permitted within the potable domestic hot water or return systems, as they have been associated with persistent colonization of Legionella bacteria.