Basis of Design

This section applies to the design and installation of potable and nonpotable water systems.

Design Criteria

- Most University of Washington buildings will include laboratories, vivaria or other areas that require a nonpotable laboratory water system. Each potable and nonpotable system will require a water header, separate semi-instantaneous hot water heaters, and a hot water circulation system.

- When incoming water pressure exceeds 80 psig, provide a pressure reducing station with two parallel PRVs (each sized at 2/3 of total flow, each valved to operate independently.)
  1) The system shall be designed to provide pressure at the highest point of the building not less than 1) as needed for connected systems or 2) 25 psig.
  2) The assembly shall include appropriate valves, strainers, gauges, drains, etc. and include a bypass.

- See Metering section for metering and monitoring requirements.

- Separate water systems into potable and non-potable by installing reduced pressure backflow preventers (RP devices). Separate the incoming water header from all lines supplying water to non-domestic uses, including laboratory, circulating heating and cooling, and industrial process water, e.g., to boilers, air conditioners and cooling towers.

- Provide the laboratory nonpotable water system with parallel RP devices each sized 2/3 of the laboratory supply pipe capacity to prevent need for shutdown to test and repair. Protect the laboratory water system by installing faucets with built-in and un-removable vacuum breakers.

- Locate irrigation system backflow preventers inside the building mechanical room rather than outside if feasible.

- Provide potable water to hallways, kitchenettes and conference rooms in laboratory areas to offer safe drinking water. Do not provide potable water to laboratories except to emergency showers and eye washes. Equip all drinking fountains in laboratory buildings with cup filler spouts to meet the safe drinking water requirement.

- Divide water system into smaller systems with isolation valves separating them. This will allow a section of the building to be worked on without affecting the remainder of the building. Provide isolation valves for each floor, for each laboratory, each restroom and each plumbing fixture.

- Design the restroom plumbing systems of buildings with large classroom areas using the Hunter stadium curve. This alternate pipe sizing criteria was developed for sports stadiums where restroom use is confined to a short time period. A similar problem exists during the class break period. The maximum flow velocity should not exceed 4 feet per second.

- Design the potable and laboratory hot water systems to heat water to 125°F and 145°F respectively. Provide a thermostatic mixing valve on semi-instantaneous or tank-type water heating systems. Initial operating set points should be set at 120°F and 125°F, respectively. Initial distribution set points should be set at 105°F and 125°F.

- Provide booster heaters for dishwashers and other equipment requiring higher hot water temperatures than previously listed. Do not raise the temperature of the building system.

- Do not install water piping below slabs on grade except for trap priming lines. Protect copper pipes from contact with concrete.
• Provide electronic sensor faucets for all lavatories. Do not use electronic sensor flushometers for toilets and urinals.
• For emergency safety shower and eyewash fountain requirements, refer to EH&S Laboratory Safety Guide.
• Avoid waterless urinals
• See UW Standard Drawings:
  1) Water Filter Header
  2) Typical Building Water Header

Design Evaluation

The following information is required to evaluate the design:
• Schematic Design Phase: Provide locations of water headers, pipe chases, plumbing equipment, and plumbing fixtures. Provide design calculations and a plumbing legend.
• Design Development Phase: Provide a preliminary system riser diagram showing all fixtures, valves, recirculation lines, pipe sizing, etc. Provide piping plans, design calculations, and a detail of each water header. Provide preliminary water service point of connection location and elevation.
• Construction Document Phase: Provide detailed potable and non potable plumbing system riser diagrams, design calculations, water heater piping details, a water header diagram, and pipe sizes. Provide final water service point of connection location and elevation.

Construction Submittals

• Submittal information shall include catalog cuts of all fixtures, valves, fittings, pipe, hangers, solder, etc.

Products, Material and Equipment

• For potable and laboratory piping materials see Piping, Valves & Accessories section.
• Fittings on copper piping shall be wrought copper or cast brass, solder pattern.
• Solder shall be 95-5 tin antimony or approved substitution. No lead-type solders shall be allowed on the job site.
• Use dielectric nipples between copper and other dissimilar materials.

Installation, Fabrication and Construction

• Slope all piping to allow the system to be drained. Provide a drain valve at low points of the system along with a drain to take the water away.

END OF DESIGN GUIDE SECTION
NOTES:

1. THE 100 MICRON FILTERS ARE USED TO EXTEND THE FILTER LIFE.

2. DUAL UNITS ARE PROVIDED TO ALLOW ONE TO BE CHANGED WITHOUT SHUTTING DOWN THE SYSTEM.

3. FOR USE WITH DELICATE EQUIPMENT ONLY, NOT FOR THE BUILDING WATER SUPPLY.
Typical Building Water Header

**LEGEND**

* RPBP REQUIRED ONLY ON BUILDING WITH HAZARDOUS PROCESSES.

DCVA REQUIRED FOR ANY BUILDING OVER 30' HIGH

RPBP REDUCED PRESSURE BACKFLOW PREVENTER

DCVA DOUBLE CHECK VALVE ASSEMBLY.

** REQUIRED ONLY FOR SYSTEMS WITH GLYCOL CONCENTRATION.