

## PLUMBING EQUIPMENT

### DESIGN GUIDELINES

#### 1. General

- a. Water heaters shall be steam to hot water heat exchanger type with steam from main Boiler Plant where feasible.
  - If preferred option above is not feasible, high efficiency gas fired boilers with storage tanks or a high efficiency gas fired hot water heater may be used.
  - Electric storage tank type heaters are acceptable for stand-alone projects if the above two options have been determined to be cost prohibitive.
  - Local, instantaneous or point of use electric heater are not acceptable.
- b. Sump Pumps – Note: Engineer should design out of the project WUSM prefers not to have any sumps.
  - Duplex with motors above the flood level of the pit.
  - Pumps shall be floor mounted outside of the pit with level controls in the pit.
  - Submersible pumps with a rail system are allowable if pumps are fully maintainable from outside of the pit. WUSM will review the possibility of accepting submersible types along with other requirements on a case by case basis.
  - Pumps shall be duplex type and rated for 100% capacity each for full redundancy.
  - BAS interface or alarm relay output to be specified for remote monitoring of sump pump alarm.
  - Alarms to include high water and loss of power alarm
- c. Hot Water Re-Circulating Pumps
  - Provide base mounted pumps for the main building recirculating hot water.
  - Provide in-line pumps for a separate floor or smaller recirculating system.
  - Include bronze impeller on pumps.
  - Main building recirculating pumps to be setup for 24/7 operation
- d. Domestic Water Booster Pump
  - Office Building pump redundancy shall be duplex pumping system with 100% capacity each.
  - Animal Facilities and Healthcare Facilities shall be triplex pumping system with 50/50/50 split capacity for each pump.
  - Shutoff valves shall be provided for each pump at manifold.
  - Include Variable Frequency Drives for all pumps, see VFD section.

- Include buffer tank on booster systems for minimizing pump cycling at low flow conditions.
  - e. Mixing valves
    - Mixing valves to include redundant cold water (CW) and hot water (HW) check valves upstream of mixing valve's stop check valves. Note: The factory stop check valves have been failing and eventually mixing HW and CW in high rise buildings.
      1. Check valves for mixing valves at showers shall be installed above the ceiling at an accessible location for the ability to replace in the future.
    - Include integral cold water emergency bypass on all emergency mixing valves for eyewashes and showers.
    - Thermostatic style shall be used for emergency equipment mixing valves.
    - Coordinate with Architect for 6" deep wall for emergency shower mixing valve box.
    - Coordinate location and elevation of mixing valves and detail on drawings.
    - Dial thermometer at mixing valve outlet.
  - f. Building compressed air prohibited from serving lab equipment.
  - g. Backflow preventers
    - Serving whole buildings – Reduced Pressure.
    - Serving partial areas or individual equipment - Reduced Pressure.
    - Refer to Fire Protection guidelines for backflow preventers only serving sprinkler systems.
    - Drains shall be sized for a "dump" if RPBP's are installed.
  - h. Pressure reducing valves
    - PRVs to be mounted maximum 6 feet above floor in an accessible location.
  - i. Provide water supply wall boxes at each coffee/ice maker with appropriate backflow and water arrestor device.
2. Redundancy/Capacity
- a. Provide water heaters at 100% capacity of load.
    - Critical buildings with Animals and Healthcare services shall have multiple water heaters sized so that if any heater is down, the remaining heaters are sized for 100% of the load.
    - Office building shall have water heaters sized for the project.
  - b. Provide pumps with redundancy similar to heater requirements above.
3. Clearances
- a. Sump pump pits shall be designed such that there is adequate clearance to remove pumps, control panels and floats so pumps can be serviced.

- b. Drawings shall indicate the location of service clearance and illustrate that clearances can be maintained.
4. Related Sections
  - a. Plumbing Sanitary, Vent and Storm Piping
  - b. Plumbing Water piping
  - c. Plumbing Lab Piping
  - d. VFD's
  - e. Fire Protection

#### EQUIPMENT and PRODUCT REQUIREMENTS

1. Water heaters: High efficiency gas fired boiler type with storage tank.
  - a. Approved Manufacturers: (in order of preference)
    - Aerco
    - Rheem
    - State
    - A.O. Smith
  - b. Construction to comply with ASME Code, NSF Standard, ASHRAE energy requirement.
  - c. Storage Tank Materials:
    - Shell - Steel.
    - Tank – Steel and glass lined.
2. Sump Pumps
  - a. Approved Manufacturers: (in order of preference)
    - Zoeller
3. Mixing Valves
  - a. Approved Manufacturers: (in order of preference)
    - Powers
    - Lawler
4. Domestic Water Booster Pumps
  - a. B&G pump
5. Hot Water Re-circulation Pumps
  - a. B&G pumps
6. Pressure reducing valves
  - a. Watts, model #LF-909
7. Backflow preventers

- a. FM Approved.
- b. Watts 909.
- 8. Acid Neutralization Tanks
  - a. Schier – PVC
  - b. Knight ware - Ceramic
- 9. Solids Separators
  - a. Schier
  - b. JR Smith
- 10. Wall Boxes
  - a. Oatey
  - b. Guy Gray
- 11. Air Compressors
  - a. Beacon Medaes
  - b. Ohio Medical, all equipment types.
  - c. High efficiency, variable speed Claw type is preferred.
- 12. Lab Vacuum Pump
  - a. Shall be High Efficiency type.
  - b. Claw is preferred.

END OF SECTION