

## PLUMBING LAB PIPING

### DESIGN GUIDELINES

#### 1. General

##### a. Piping

- Shall be sized to meet the design.
- All piping to be labeled per WUSM standards, see Identification.
- Piping to be routed tight to structure or as high as possible but still accessible for valves, drains, etc.
- Lab gas piping valves shall be brass.
- All gas pipe shall be brazed fittings.
- High purity gas systems shall have stainless steel piping with orbital welded fittings.
- Stainless steel, high purity systems shall have stainless steel valves.
- DI piping exposed to light (this includes light fixtures) becomes brittle. All DI piping shall be painted with water based latex paint.
- Piping routed in return air plenums shall be rated for plenum use or fire wrapped to be approved for plenum installation.

##### b. Lab Gas Piping (Lab Compressed Air (LA), Lab Vacuum (LV), Oxygen (O<sub>2</sub>), Nitrogen (N), Carbon Dioxide (CO<sub>2</sub>), Hydrogen (H), Lab Natural Gas (LG))

- Minimum lab vacuum pipe size is  $\frac{3}{4}$ ".
- Hydrogen Gas Piping shall be installed below drop ceiling in a tray, routed tight to structure, or as high as possible.

##### c. Lab Waste and Vent

- Standard DWV fittings, short turn elbows and sanitary tees prohibited.
- Glass lab waste piping is prohibited. Provide alternate to remove existing glass lab waste for tie-in and abandoned piping.
- Non-lab sanitary waste is prohibited from being combined with lab waste.
- If sinks are within Lab suite, the waste shall be piped to acid waste system.
- Point-of-use acid neutralization tanks are discouraged.
- Solids separators may required in Tissue labs or other Labs. Coordinate locations with project manager during design.

##### d. Valves

- For each service (water, gas, etc.), valves shall be located at each piping branch take off for each lab suite and at each group of fixtures, equipment and individual bench drops.
- The valves shall be located in the aisles and not above the benches.

- Locate isolation valves to facilitate future renovations.
  - Lab natural gas shutoff valves shall be located on wall, exterior to Lab for ease of shutoff.
  - Valves are not allowed above any ceiling (lay-in or gyp.) or other concealed locations.
- e. Demolition
- It is preferred to replace glass piping within project limits. Confirm with project manager if this work is to be indicated as an alternate.
  - Note that P-traps of existing lab sinks (including fume hood cup sinks) to be demolished are to be tested by WUSM EH&S prior to demolition.
  - Demo all piping not in use back to nearest active main. Do not abandon piping.
2. Clearances
- a. Include requirements for all plumbing valves or other items required maintenance clearances on drawings.
3. Related Sections
- a. RODI Equipment
  - b. Identification.

#### EQUIPMENT and PRODUCT REQUIREMENTS

1. Lab Waste and Vent Piping
- a. Lab waste and vent to be Fuseal acid waste piping only with fusion joints.
    - Manufactured by George Fischer.
  - b. Exception: Fusion joints not required on < 2" for p-trap connections at sinks. Mechanical joint fittings allowable for ease of removal and maintenance.
2. Lab Gas Piping (Lab Compressed Air (LA), Lab Vacuum (LV), Oxygen (O2), Nitrogen (N), Carbon Dioxide (CO2), Lab natural gas (LG))
- a. Lab gas piping shall be type L copper with lead free brazed joints and wrought copper fittings.
3. Deionized Water Piping (see also RODI Equipment section)
- a. DE pipe and fittings to be Schedule 80 polypropylene ASTM D 2447 with electro-fusion joints only.
    - Do not expose pipe to UV light
    - Paint all polypropylene pipe with two coats of latex paint if exposed to UV light.
    - Poly Pro-Seal by George Fischer.
  - b. Diaphragm valves are discouraged. Ball valves are preferred in DI systems where allowable to meet purity of system requirements.
  - c. Glass DE piping is prohibited.
  - d. Provide alternate to remove/replace existing glass DE piping for tie-in and abandoned piping.

- e. At point of use of Millipore's Milli-Q, provide polypropylene stub-out with wall escutcheon and full-port George Fischer MSS SP-122, 50 psig, polypropylene ball valve with PTFE seats (Do not provide wall box).
  - f. DI piping shall be hung with continuous sheet metal "V" trough for entire length of piping runs
    - Empire industries Figure 12 or equal.
4. Natural Gas Piping for Labs
    - a. Type L copper with hard soldered joints for all natural gas piping for Lab use.
    - b. Do not use black-iron pipe.
  5. Lab Gas Piping (High Purity Nitrogen and Carbon Dioxide)
    - a. 316L Stainless steel with orbital weld joints. Butt weld fittings by Cajon or Swagelok are allowable at equipment and manifold connections.
    - b. High purity quarter-turn, full line size, full flow, 316 stainless steel body/trim valve with PTFE seat.
    - c. Install in "tray" with "continuous" support.
  6. Hydrogen Gas Piping
    - a. Stainless steel with orbital weld joints.
    - b. Must be installed below ceiling in a tray.
  7. Zone valve box
    - a. Approved Manufacturers: (in order of preference)
      - Beacon Medaes
      - Allied
    - b. Provide quarter-turn ball valve with stainless steel trim, sliding opaque door, pull ring, and clear window.
    - c. Provide signage at each valve box. Label as "Emergency Shutoff". See section on Mechanical Identification.
  8. Tank/Lab Gas Manifolds
    - a. Approved Manufacturers: (in order of preference)
      - Concoa
    - b. Local alarm only as required by Lab users.
    - c. Confirm manifold style to be manual switchover or automatic with Lab group.
  9. Oxygen depletion alarm
    - a. Local alarm only as required by code, EH&S or Lab users.
  10. Ice machines
    - a. Air cooled is preferred. Verify with Project manager for unit manufacturer and installation requirements.

- b. Water cooled machines shall not be cooled with domestic water.
- c. Provide a floor drain for equipment drainage.
- d. No condensate pumps allowed.

END OF SECTION