Section 226000
Gas and Vacuum Systems for Laboratory
DESIGN GUIDE

1 General

1.1 General

A. At the end of design development, review major pipe routing and branch pipe isolation with the Mechanical Plumbing Manager (MPM).

B. Show isolation valves for each room and branch piping in the construction documents on the floor plans.

1.2 Maintenance Materials

A. For piping systems that require special tools for installation of joints and fittings, review tooling requirements with CWU Mechanical Plumbing Manager to determine if CWU has tools for repairs in their stock. If not, specialty tools will be required to be provided with the contract and incorporated in the project documents.

2 Materials

2.1 Lab Vacuum Piping

A. Tubing: Type L, hard drawn

B. Fittings: wrought copper and bronze

C. Joints:

1. Silver braze

2.2 Natural Gas Piping

A. Refer to Section 231000

2.3 Ball Valves-Vacuum:

A. Bronze body, three piece, double-seal, full-port, ball valves with replaceable neoprene or Teflon seat and stem seals, for minimum 400 psi or 29 inches HG cold working pressure, flange or union mounting, labeled for intended service

2.4 Gas Shutoff Valves

A. Provide wall box with manual shutoff ball valve and non-locking access door. Provide with vision panel and label. Valves to be installed horizontal to extend out of valve box when open. Provide engraved plastic label that reads: “Gas Control Valve-Close Only in Emergency.”

B. Valves shall be UL listed for gas service.

3 Execution

A. Provide service shut off valve in main branches for isolation.

B. Provide gas shut off valve in each lab, class or research space and locate near room egress in a prominent location. Mount at ADA height.

C. Vacuum Pump and Receiver

1. Provide redundancy for lab applications with multiple pumps manifolded to receiver. This also helps with pump cycling associated with larger pumps.

2. Water cooled vacuum pump that utilize potable water cooling shall be avoided.

3. Size receiver to minimize cycling of pumps.

4. Vent outlet to the roof and terminate a minimum of 6 feet above the roof.

D. Cleaning and Testing

1. After erection of pipe and tubing but prior to installation of service outlet valves, blow systems clear of free moisture and foreign matter with nitrogen gas.

2. Install service outlet valves, subject system to test pressure of 150 psi with nitrogen or dry compressed air. Check with soapy water. Provide twenty-four (24) hour standing pressure test.

3.2 Flanges and Unions

A. For pipe 2” and smaller, provide unions downstream of each valve, on each port of control valves, and at each equipment or piping specialty requiring service. Valves with threaded connections that cannot be rotated shall have unions on both sides of the valve. If equipment or valve has a flanged connection that is acceptable and preferred.

B. For pipe 2 ½” and greater, provide flanged connections on each side of valve, on each port of control valves, and at each equipment or piping specialty requiring service.

C. Unions and flanges for serviceable equipment shall be installed in non-parallel lines to eliminate spreading of pipe assembly during servicing.

3.3 Start Up-Vacuum Pumps

A. Contractor shall include factory authorized/warranted start-up.

B. Submit start-up certificate with the O&M manuals.

4 Appendix

4.1 Reserved for future.