

**SECTION 22 6005**  
**LABORATORY AIR, GAS, AND VACUUM SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Laboratory compressed air system.
- B. Laboratory vacuum system.

**1.02 RELATED REQUIREMENTS**

- A. Section 22 0510 - General Plumbing Requirements
- B. Section 22 0553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT.
- C. Section 22 1005 - Plumbing Piping

**1.03 REFERENCE STANDARDS**

- A. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2012.
- B. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2013.
- C. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).
- D. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2014.
- E. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2011-AMD 1.
- F. CGA V-5 - Diameter Index Safety System (Noninterchangeable Low Pressure Connections for Medical Gas Applications); 2008.
- G. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2009.

**1.04 SUBMITTALS**

- A. Refer to Section 22 0510 - General Mechanical Requirements for submittal procedures.
- B. Product Data: Provide manufacturers literature and illustrations for all components indicating size, dimensions and configuration.
- C. Operation Data: Include installation instructions, assembly views, lubrication instructions, and assembly views.
- D. Maintenance Data: Include maintenance and inspection data, replacement part numbers and availability, and service depot location and telephone.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Accept material on site in factory containers and packing. Inspect for damage.
- B. Protect from damage and contamination by maintaining factory packaging and caps in place until installation.

**PART 2 PRODUCTS**

**2.01 PIPE AND FITTINGS**

- A. Laboratory Compressed Air; Aboveground:
  - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper.
  - 2. Joints: AWS A5.8M/A5.8 Classification BCuP-3 or BCuP-4 silver braze.
- B. Laboratory Vacuum Systems; Aboveground:
  - 1. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), drawn.

2. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper.
3. Joints: AWS A5.8 Classification BCuP-3 or BCuP-4 silver braze or ASTM B32, solder, Grade Sn95.

## 2.02 VALVES

1. Up To and Including 2 Inches:
  - a. Manufacturers:
    - 1) Apollo; Model 82-200 Series
    - 2) Crane; Model 9312
    - 3) Hammond; Model 8614
    - 4) Kitz; Model 63
    - 5) Milwaukee; Model BA350
    - 6) Nibco; Model S-595-Y
    - 7) Watts; Model B6801
  - b. MSS SP-110, Class 150, 600 psi CWP, Bronze three piece body, full port, chrome plated brass ball, reinforced teflon seats and stuffing box ring, blow-out proof stem design, adjustable packing gland, zinc coated steel lever handle with vinyl hand grip with memory stops on balance valves , Solder ends .
2. Up To and Including 2 Inches:
  - a. Manufacturers:
    - 1) Apollo; Model 82-100
    - 2) Crane; Model 9311
    - 3) Hammond; Model 8604
    - 4) Kitz; Model 62
    - 5) Milwaukee; Model BA300
    - 6) Nibco; Model T-595-Y
    - 7) Watts; Model B6800
  3. MSS SP-110, Class 150, 600 psi CWP, Bronze three piece body, full port, chrome plated brass ball, reinforced teflon seats and stuffing box ring, blow-out proof stem design, adjustable packing gland, zinc coated steel lever handle with vinyl hand grip with memory stops on balance valves , threaded ends .

## 2.03 PIPING ACCESSORIES

- A. Hangers and Supports: MSS SP-58 with types as required by MSS SP-69. Refer to 22 1005 for hanger requirements.
- B. Piping Identification: Pressure sensitive adhesive tape and decals, color and labeling to conform with Section 22 0553.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Braze joints in pipe and tubing. Avoid leaving excess flux inside of pipe and fittings. During brazing of pipe connections, purge interior of pipe continuously with nitrogen.
- B. Effect changes in size with reducing fittings. Make changes in direction of required turns or offsets with fittings or tubing shaped by bending tools. Make bends free of flattening, buckling or thinning of tube wall.
- C. Cut pipe and tubing accurately and install without springing or forcing.
- D. Provide pipe sleeves where pipes and tubing pass through walls, floors, roofs, and partitions. Finish flush at both ends. Extend 2 inches above finished floors. Pack space between pipe or tubing and sleeve, and calk.
- E. Identify piping with tape and decals. Provide piping identification code and schematic for installation under provisions of Section 22 0553. Install labeling on pipe at intervals of not more than 20 feet and at least once in each room and each story traversed by pipeline.
- F. Except where indicated or in flush wall mounted cabinets, install manual shut off valves with stem vertical and accessible for operation and maintenance.

### **3.02 PIPING SYSTEMS CLEANING AND PRESSURE TESTING**

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

END OF SECTION