

SECTION 22 63 00 – GAS SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES

PART 1 GENERAL

1.01 DESCRIPTION

- A. Remove existing medical gas systems and recertify existing systems to remain as required.

1.02 RELATED WORK

- A. Section 22 05 11 – Common Work Results for Plumbing: General requirements and items common to more than one section of Division 22.

1.03 QUALITY ASSURANCE

- A. Materials and Installation: In accordance with NFPA 99, (2005) and as specified.
- B. Equipment Installer: Show technical qualifications and previous experience in installing laboratory and healthcare equipment on three similar projects. Submit names and addresses of referenced projects. Installers shall meet the qualifications of ANSI/ASSE Standard 6010.
- C. Equipment Supplier: Show evidence of equivalent product installed at three installations similar to this project that has been in satisfactory and efficient operation for three years. Submit names and addresses where the product is installed.
- D. Laboratory and healthcare System Testing Organization: The testing shall be conducted by a party technically competent and experienced in the field of laboratory and healthcare pipeline testing. Testing and systems verification shall be performed by personnel meeting the qualifications of ANSI/ASSE Standard 6030. Such testing shall be performed by a party other than the installing contractor.
- E. Provide names of three projects where testing of medical or laboratory gases systems has been performed by the testing agency. Include the name of the project, names of such persons at that project who supervised the work for the project owner, or who accepted the report for the project owner, and a written statement that the projects listed required work of similar scope to that set forth in this specification.
- F. Submit the testing agency's detailed procedure which will be followed in the testing of this project. Include details of the testing sequence, procedures for cross connection tests, outlet function tests, alarm tests, purity tests, etc., as required by this specification. For purity test procedures, include data on test methods, types of equipment to be used, calibration sources and method references.

- G. Certification: Provide documentation prior to submitting request for final inspection to include all test results, the names of individuals performing work for the testing agency on this project, detailed procedures followed for all tests, and a certification that all results of tests were within limits allowed by this specification.
- H. Installing contractor shall maintain As-Built Drawings of each completed phases for verification; and, shall provide the complete set at the time of final systems certification testing, for certification by the Third Party Testing Company. As-Built Drawings shall be provided on prints and in digital format. The digital format shall be in the native CAD system required for the project design. Should the installing contractor engage the testing company to provide as-built or any portion thereof, it shall not be deemed a conflict of interest or breach of the 'third party testing company' requirement.
- I. "Hot taps" are not permitted for operating medical oxygen systems. Methods for connection and extension of active and pressurized medical gas systems without subsequent medical gas testing and verification are not allowed.

1.04 SUBMITTALS

- A. None.

1.05 TRAINING

- A. None.

1.06 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the test by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
 - 1. B819 (R2006): Seamless Copper Tube for Medical Gas Systems
- C. American Society of Mechanical Engineers (ASME):
 - 1. A13.1-07: Scheme for Identification of Piping Systems
 - 2. B16.22-01 (R2005): Wrought Copper and Bronze Solder – Joint Pressure Fittings
 - 3. B40.100 (2005): Pressure Gauges and Gauge Attachments Boiler and Pressure Vessel Code
 - 4. Section VIII-07: Pressure Vessels, Division I
 - 5. Section IX-07: Welding and Brazing Qualifications

- D. American Welding Society (AWS):
 - 1. AWS A5.8-04: Brazing Filler Metal
 - 2. AWS B2.2-91: Standard for Brazing Procedure and Performance Qualification (Modified per NFPA 99)
- E. Compressed Gas Association (CGA):
 - 1. C-9-04: Standard Color Marking of Compressed Gas Cylinders
 - 2. G-4.1 (2009): Cleaning Equipment for Oxygen Service
 - 3. G-10.1 (2008): Nitrogen, Commodity
 - 4. P-9-01: Inert Gases Argon, Nitrogen and Helium
 - 5. V-1-05: Standard for Compressed Gas Cylinder Valve Outlet and Inlet Connections
- F. National Electrical Manufacturers Association (NEMA):
 - 1. ICS-6-93 (R2006): Industrial Controls and Systems Enclosures
- G. National Fire Protection Association (NFPA):
 - 1. 99-05: Health Care Facilities
- H. United States Pharmacopoeia XXI/National Formulary XVI (USP/NF)
- I. Manufacturing Standardization Society (MSS):
 - 1. MSS-SP-72-99: Ball Valves With Flanged or Butt Welding For General Purpose
 - 2. MSS-SP-110-96: Ball Valve Threaded, Socket Welding, Solder Joint, Grooved and Flared Ends
 - 3. MSS-SP-73-03: Brazing Joints for Copper and Copper Alloy Solder Pressure Fittings

PART 2 PRODUCTS

2.01 PIPING AND FITTINGS

- A. Copper Tubing: Type "K," ASTM B819, seamless copper tube, hard drawn temper, with wrought copper fittings conforming to ASME B16.22 or brazing fittings complying with MSS SP-73. Size designated reflecting nominal inside diameter. All tubing and fittings shall be labeled "ACR/OXY," "OXY," "OXY/MED," "ACR/MED" or "MED."
- B. Brazing Alloy: AWS A5.8, Classification BCuP, greater than 537 °C (1000 °F) melting temperature. Flux is strictly prohibited for copper-to-copper connections.
- C. Screw Joints: Polytetrafluoroethylene (Teflon) tape.
- D. Underground Protective Pipe: Polyvinyl Chloride (PVC), ASTM D1785, Schedule 80.
- E. Memory metal couplings: Temperature and pressure rating shall not be less than that of a brazed joint.
- F. Apply piping identification labels at the time of installation in accordance with current NFPA. Apply supplementary color identification in accordance with CGA Pamphlet C-9.
- G. Special Fittings: The following special fittings shall be permitted to be used in lieu of brazed joints:
 - 1. Memory-metal couplings having temperature and pressure ratings joints not less than that of a brazed joint.
 - 2. Listed or approved metallic gas tube fittings that, when made up, provide a permanent joint having the mechanical, thermal and sealing integrity of a brazed joint.
 - 3. Dielectric fittings where required by the manufacturer of special medical equipment to electrically isolate the equipment from the piping distribution system.
 - 4. Axially swaged, elastic strain preload fittings providing metal to metal seal having pressure and temperature ratings not less than that of a brazed joint and when complete are permanent and non-separable.

2.02 ALARMS

- A. Remove all alarms sent from 162 to other buildings.

PART 3 EXECUTION

3.01 INSTALLATION

- A. In accordance with current NFPA.

3.02 TESTS

- A. Tests: Perform any tests required by NFPA.

END OF SECTION