

SECTION 22 15 19 - COMPRESSED AIR SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Compressed Air Piping (Non-Medical)
- B. Shutoff Valves
- C. Valve Connections

1.2 QUALITY ASSURANCE

- A. Valves: Manufacturer's name and pressure rating marked on valve body. Remanufactured valves are not acceptable.
- B. Welding Materials and Procedures: Conform to ASME Code and applicable state labor regulations.
- C. Welders Certification: In accordance with ANSI/ASME Sec 9 or ANSI/AWS D1.1.
- D. Pipe hangers and supports shall be spaced per 2016 CPC, Table 313.3, as applied to each pipe system listed. Refer to Section 22 05 29 for hanger and support components. Seismic supports shall be submitted as a deferred approval using OPM guidelines. Shop drawings shall be submitted for review to the AHJ: State, local or agency reviewing the project, DSA, OSHPD. Upon approval, these shop drawings shall be included in the record set.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store valves in shipping containers with labeling in place.

1.4 COORDINATION DRAWINGS

- A. Reference Coordination Drawings article in Section 22 05 00 for required plumbing systems electronic CAD drawings to be provided to Coordinating Contractor for inclusion into composite coordination drawings.

PART 2 - PRODUCTS

2.1 COMPRESSED AIR PIPING (NON-MEDICAL)

- A. Design Pressure: 125 psi; Maximum Design Temperature: 150°F
- B. Piping - 2" and Under:
 - 1. Pipe: Standard weight carbon steel, threaded and coupled, ASTM A53.
 - 2. Joints: Screwed.
 - 3. Fittings: 150# steam 300# CWP, black malleable iron, banded, ASTM A47, ASTM A197, ANSI B16.3.
 - 4. Unions: 250# steam - 500# CWP, black malleable iron, ANSI B16.39, ground joint with brass seat.

2.2 SHUTOFF VALVES

A. Ball Valves:

1. BA-1: 3" and under, 150 psi saturated steam, 600 psi CWP, full port, vented, screwed or solder ends (acceptable only if rated for soldering in line with 470°F melting point of lead-free solder), bronze body of a copper alloy containing less than 15% zinc, stainless steel ball and trim, Teflon seats and seals.

a. Manufacturers:

- 1) Apollo #77C-140
- 2) Stockham #S-255-FB-P-UL
- 3) Milwaukee #BA-400
- 4) Watts
- 5) Nibco #585-70-66
- 6) National Utilities Co.
- 7) RUB

b. NOTES: Provide lockout trim for all valves.

2.3 VALVE CONNECTIONS

- ### **A.**
- Provide all connections to match pipe joints. Valves shall be same size as pipe unless noted otherwise.

PART 3 - EXECUTION

3.1 PREPARATION

- #### **A.**
- Install all products per manufacturer's recommendations.
- #### **B.**
- Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- #### **C.**
- Remove scale and dirt on inside and outside before assembly.
- #### **D.**
- Connect to equipment with flanges or unions.

3.2 TESTING PIPING

A. Compressed Air Piping, Condensate Piping:

1. Test piping using compressed air per ASME 31.9 requirements.
2. Test piping at 125% of normal operating pressure in accordance with ASME 31.9.
3. Piping shall hold this pressure for one hour with no drop in pressure.

3.3 CLEANING PIPING

A. Assembly:

1. Before assembling pipe systems, remove all loose dirt, scale, oil and other foreign matter on internal or external surfaces by means consistent with good piping practice subject to approval of the Architect/Engineer's representative. Blow chips and burrs from machinery or thread cutting operation out of pipe before assembly. Wipe cutting oil from internal and external surfaces.
2. Notify the Architect/Engineer's representative before starting any post erection cleaning in sufficient time to allow witnessing the operation. Consult with and obtain approval from the Architect/Engineer's representative regarding specific procedures and scheduling. Dispose of cleaning and flushing fluids properly.
3. Prior to blowing or flushing erected piping systems, disconnect all instrumentation and equipment, open wide all valves, and be certain all strainer screens are in place.

B. Air Blow:

1. Blow out pipe and components with clean compressed air. Instrument air lines shall be blown out with dry, oil free air or nitrogen gas. "Oil Free" is defined as air compressed in a centrifugal, Teflon ring, carbon ring or water pumped air compressor. Where air supply is judged to be inadequate to continually attain cleaning velocity, alternate pressurization and sudden relief procedure may be used until discharge at all blowout points is clean. Use 80-90 psig pressure unless otherwise indicated.

3.4 INSTALLATION

A. General Installation Requirements:

1. Provide dielectric connections between dissimilar metals.
2. Route piping in orderly manner and maintain gradient. Install to conserve building space.
3. Group piping whenever practical at common elevations.
4. Install piping to allow for expansion and contraction without stressing pipe, joints, or equipment.
5. Where pipe supports are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welds.
6. Seal pipes passing through exterior walls with a wall seal per Section 22 05 29. Provide Schedule 40 galvanized sleeve at least 2 pipe sizes larger than the pipe.

B. Installation Requirements In Electrical Rooms:

1. Do not install piping or other equipment above electrical switchboards or panelboards. This includes a dedicated space extending 25 feet from the floor to the structural ceiling with width and depth equal to the equipment.

C. Valves/Fittings and Accessories:

1. Install shutoff valves that permit the isolation of each equipment connection without isolating any equipment or portion of the system, unless noted otherwise.
2. Provide clearance for installation and access to valves and fittings.
3. Provide access doors for concealed valves and fittings.
4. Install valve stems upright or horizontal, not inverted.

3.5 PIPE ERECTION AND LAYING

- A. Carefully inspect all pipe, fittings, valves, equipment and accessories before installation. Any items that are unsuitable, cracked or otherwise defective shall be removed from the job immediately.
- B. All pipe, fittings, valves, equipment and accessories shall have factory applied markings, stampings, or nameplates with sufficient data to determine their conformance with specified requirements.
- C. Exercise care at every stage of storage, handling, laying and erecting to prevent entry of foreign matter into piping, fittings, valves, equipment and accessories. Do not install any item that is not clean.
- D. Until system is fully operational, all openings in piping and equipment shall be kept closed except when actual work is being performed on that item or system. Closures shall be plugs, caps, blind flanges or other items specifically designed and intended for this purpose.
- E. Run pipes straight and true, parallel to building lines with minimum use of offsets and couplings. Provide only offsets required to provide needed headroom or clearance and to provide needed flexibility in pipe lines.
- F. Make changes in direction of pipes only with fittings. Changes in size only with fittings. Do not use miter fittings, face or flush bushings, or street elbows. All fittings shall be of the long radius type, unless otherwise shown on the drawings or specified.
- G. Provide flanges or unions at all final connections to equipment, traps and valves.
- H. Arrange piping and connections so equipment served may be totally removed without disturbing piping beyond final connections and associated shutoff valves.
- I. Use full and double lengths of pipe wherever possible.
- J. Unless otherwise indicated, install all piping, including shutoff valves, filters, and regulators, to equipment at line size with reduction in size being made only at control valve or equipment.
- K. Cut all pipe to exact measurement and install without springing or forcing except in the case of expansion loops where cold springing is indicated on the drawings.
- L. Unless otherwise indicated, branch take-offs shall be from top of mains or headers at either a 45° or 90° angle from the horizontal plane to prevent carryover of condensate and foreign matter.

3.6 DRAINING AND VENTING

- A. Unless otherwise indicated on the drawings, compressed air lines, including branches, shall pitch 1" in 40 feet in the direction of airflow to low points for complete drainage, removal of condensate.
- B. Maintain accurate grade where pipes pitch or slope for venting and drainage. No pipes shall have pockets due to changes in elevation.

- C. Provide drip legs at low points and at the base of all risers in compressed air pipes. Drip legs shall be full line size on pipes through 4" and at least 4", but not less than half line size over 4". Drip legs shall be 12" minimum length, capped with a reducer to a drain valve.
- D. Use eccentric reducing fittings on horizontal runs when changing size of pipes for proper drainage and venting. Install compressed air and gravity drain pipes with bottom of pipe and eccentric reducers in a continuous line; all other liquid lines with top of pipe and eccentric reducers in a continuous line.
- E. Provide air vents at high points and wherever else required to eliminate air in all condensate piping systems.

3.7 BRANCH CONNECTIONS

- A. Reducers are generally not shown. Where pipe sizes change at tee, the tee shall be the size of the largest pipe shown connecting to it.
- B. Do not use double wye or double combination wye and eighth bend DWV fittings in horizontal piping.

3.8 JOINING OF PIPE

- A. Threaded Joints:
 - 1. Threads shall conform to ANSI B2.1 "Pipe Threads".
 - 2. Ream pipe ends and remove all burrs and chips formed in cutting and threading.
 - 3. Protect plated pipe and valve bodies from wrench marks when making up joints.
 - 4. Apply PTFE thread lubricant to male threads

END OF SECTION 22 15 19