

SECTION 22 01 08
BASIC PIPING MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General Conditions, Special Provisions apply to work of this section.

1.2 SUMMARY

- A. This Section specifies piping materials and installation methods common to more than one section of Division 22 and includes joining materials, piping specialties, and basic piping installation instructions.
- B. Related Sections:
 - 1. Division 22 "Basic Mechanical Requirements" section applies to the work at this Section.
 - 2. Piping materials and installation methods peculiar to individual systems are specified within their respective system specification sections of Division 22.
 - 3. Valves are specified in a separate section and in individual piping system sections of Division 22.
 - 4. Supports and Anchors are specified in a separate section of Division 22.
 - 5. Mechanical Identification is specified in a separate section of Division 22.
 - 6. Fire Barrier Penetration Seals specified in Division 22 Section: "Basic Mechanical Materials and Methods".

1.3 SUBMITTALS

- A. Refer to General Conditions, Special Provisions, Division 1 Sections and Basic Mechanical Requirements for administrative and procedural requirements for submittals.
- B. Product Data: Submit product data on the following items:
 - 1. Escutcheons
 - 2. Dielectric Unions and Fittings
 - 3. Mechanical Sleeve Seals
 - 4. Strainers
- C. Quality Control Submittals:
 - 1. Submit welders' certificates specified in Quality Assurance below.

1.4 QUALITY ASSURANCE

- A. Welder's Qualifications: All welders shall be qualified in accordance with ASME

Boiler and Pressure Vessel Code, Section IX, Welding and Brazing Qualifications.

- B. Welding procedures and testing shall comply with ANSI Standard B31.1.0 - Standard Code for Pressure Piping, Power Piping, and The American Welding Society, Welding Handbook.
- C. Soldering and Brazing procedures shall conform to ANSI B9.1 Standard Safety Code for Mechanical Refrigeration.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Provide factory-applied plastic end-caps on each length of pipe and tube. Maintain end-caps through shipping, storage and handling to prevent pipe-end damage and prevent entrance of dirt, debris and moisture.
- B. Protect stored pipes and tubes. Elevate above grade and enclose with durable, waterproof wrapping. When stored inside, do not exceed structural capacity of the floor.
- C. Protect flanges, fittings, and specialties from moisture and dirt by inside storage and enclosure, or by packaging with durable waterproof wrapping.
- D. Contractor is responsible for obtaining a "hot work permit" from Fire and/or Building Department to perform welding indoors. Comply with latest requirements.

2.0 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer uniformity: conform to the requirements specified in Division 1.
- B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering piping materials and specialties which may be incorporated in the work include, but are not limited to, the following:
 - 1. Pipe Escutcheons:
 - a. Chicago Specialty Mfg. Co.
 - b. Sanitary-Dash Mfg. Co.
 - c. Grinnell
 - 2. Dielectric Waterway Fittings:
 - a. Epco Sales, Inc.
 - b. Victaulic Company of America
 - 3. Dielectric Unions:
 - a. Eclipse, Inc.
 - b. Perfection Corp.

- c. Watts Regulator Co.
- 4. Strainers:
 - a. Armstrong Machine Works.
 - b. Hoffman Specialty ITT; Fluid Handling Div.
 - c. Metraflex Co.
 - d. Spirax Sarco.
 - e. Trane Co.
 - f. Victaulic Co. of America. (low pressure applications only)
 - g. Watts Regulator Co.
- 5. Mechanical Sleeve Seals:
 - a. Thunderline Corp.

2.2 PIPE AND FITTINGS

- A. Refer to the individual piping system specification sections in Division 22 for specifications on piping and fittings relative to that particular system.

2.3 JOINING MATERIALS

- A. Welding Materials: Comply with Section II, Part C, ASME Boiler and Pressure Vessel Code and with ASME B31.1 Power Piping Code for welding materials appropriate for the wall thickness and chemical analysis of the pipe being welded.
- B. Brazing Materials: Comply with Section IX, ASME Boiler and Pressure Vessel Code and ASME Code for Power Piping Section B31.1 for brazing filler metal materials appropriate for the materials being joined.
- C. Soldering Materials: Refer to individual piping system specifications for solder appropriate for each respective system.
- D. Gaskets for Flanged Joints: Gasket material shall be full-faced for cast-iron flanges and raised-face for steel flanges. Select materials to suit the service of the piping system in which installed and which conform to their respective ANSI Standard (A21.11, B16.20, or B16.21). Provide materials that will not be detrimentally affected by the chemical and thermal conditions of the fluid being carried.

2.4 PIPING SPECIALTIES

- A. Escutcheons: Chrome-plated, stamped steel, hinged, split-ring escutcheon, with set screw. Inside diameter shall closely fit pipe outside diameter, or outside of pipe insulation where pipe is insulated. Outside diameter shall completely cover the opening in floors, walls, or ceilings.
- B. Unions: Malleable-iron, Class 150 for low pressure service and class 250 for high pressure service; hexagonal stock, with ball-and-socket joints, metal-to-metal bronze seating surfaces; female threaded ends.

- C. Dielectric Unions: Provide dielectric unions with appropriate end connections for the pipe materials in which installed (screwed, soldered, or flanged), which effectively isolate dissimilar metals, prevent galvanic action, and stop corrosion.
- D. Dielectric Waterway Fittings: electroplated steel or brass nipple, with an inert and non-corrosive, thermoplastic lining.
- E. Y-Type Strainers: Provide strainers full line size of connecting piping, with ends matching piping system materials. Screens shall be 20 mesh monel for pipes 2 inches and smaller. For pipes 2 1/2 inches through 4 inches use 1/16 inch perforations on 304 SS screen; pipes 6 inches and over use 1/8 inch perforation on 304 SS screen, with 3/64" perforations at 233 per square inch.
 - 1. Provide strainers with 150 psi working pressure rating for low pressure applications.
 - 2. Threaded Ends, 2" and Smaller: Cast-iron body, screwed screen retainer with centered blowdown fitted with pipe plug.
 - 3. Threaded Ends, 2-1/2" and Larger: Cast-iron body, bolted screen retainer with off-center blowdown fitted with pipe plug.
 - 4. Flanged Ends, 2-1/2" and Larger: Cast-iron body, bolted screen retainer with off-center blowdown fitted with pipe plug.
 - 5. Butt Welded Ends, 2-1/2" and Larger For Low Pressure Application: Schedule 40 cast carbon steel body, bolted screen retainer with off-center blowdown fitted with pipe plug.
 - 6. Grooved Ends, 2-1/2" and Larger: Tee pattern, ductile-iron or malleable-iron body and access end cap, access coupling with EDPM gasket.
- F. Sleeves:
 - 1. Sheet-Metal Sleeves: 10 gage, galvanized sheet metal, round tube closed with welded longitudinal joint.
 - 2. Steel Sleeves: Schedule 40 galvanized, welded steel pipe, ASTM A53, Grade A.
- G. Mechanical Sleeve Seals: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between pipe and sleeve, connected with bolts and pressure plates which cause rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

3.0 EXECUTION

3.1 PREPARATION

- A. Ream ends of pipes and tubes, and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris for both inside and outside of piping and fittings before assembly.

3.2 INSTALLATIONS

- A. General Locations and Arrangements: Drawings (plans, schematics, and diagrams) indicate the general location, routing and arrangement of the piping systems. Location and arrangement of piping layout take into consideration pipe sizing and friction loss, expansion, pump sizing, and other design considerations. So far as practical, install piping as indicated. Refer to individual system specifications for requirements of drawing submittals.
- B. Conceal all pipe installations in walls, pipe chases, utility spaces, above ceilings, below grade or floors, unless indicated otherwise.
- C. Install piping free of sags or bends and with ample space between piping to permit proper insulation applications.
- D. Install exposed piping at right angles or parallel to building walls. Diagonal runs are not permitted, unless expressly indicated on the Drawings.
- E. Install piping tight to slabs, beams, joists, columns, walls, and other permanent elements of the building. Provide space to permit insulation applications, with 1" clearance outside the insulation. Allow sufficient space above removable ceiling panels to allow for panel removal.
- F. Locate groups of pipes parallel to each other, spaced to permit applying full insulation and servicing of valves.
- G. Install drains at low points in mains, risers, and branch lines consisting of a tee fitting, 3/4" ball valve, and short 3/4" threaded nipple and cap.
- H. Exterior Wall Penetrations: Seal pipe penetrations through exterior walls using sleeves and mechanical sleeve seals. Pipe sleeves smaller than 6" shall be steel; pipe sleeves 6" and larger shall be sheet metal.
- I. Fire Barrier Penetrations: Where pipes pass through fire rated walls, partitions, ceilings, or floors, the fire rated integrity shall be maintained.

3.3 FITTINGS AND SPECIALTIES

- A. Use fittings for all changes in direction and all branch connections.
- B. Remake leaking joints using new materials.
- C. Install strainers on the supply side of each control valve, pressure reducing or regulating valve, solenoid valve, and elsewhere as indicated.
- D. Install unions adjacent to each valve and at the final connection to each piece of equipment and plumbing fixture having 2" and smaller connections, and elsewhere as indicated.
- E. Install Flanges in piping 2-1/2" and larger, where indicated, adjacent to each

valve, and at the final connection to each piece of equipment. Provide flanges compatible with valves, equipment and fittings as to class, rated pressure and working dimensions.

- F. Install dielectric fittings to connect piping materials of dissimilar metals in wet piping systems.

3.4 JOINTS

A. Steel Pipe Joints:

1. Pipe 2" and Smaller: Thread pipe with tapered pipe threads in accordance with ANSI B2.1. Cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Apply pipe joint lubricant or sealant suitable for the service for which the pipe is intended on the male threads at each joint and tighten joint to leave not more than 3 threads exposed.
2. Pipe Larger Than 2":
 - a. Weld pipe joints (except for exterior water service pipe) in accordance with ASME Code for Pressure Piping, B31.
 - b. Weld pipe joints of exterior water service pipe in accordance with AWWA C206.
 - c. Install flanges on all valves, apparatus, and equipment. Weld pipe flanges to pipe ends in accordance with ASME B31.1.0 Code for Pressure Piping. Clean flange faces and install gaskets. Tighten bolts to torque specified by manufacturer of flange and flange bolts, to provide uniform compression of gaskets.

B. Non-ferrous Pipe Joints:

1. Brazed and Soldered Joints: For copper tube and fitting joints, braze joints in accordance with ANSI B31.1.0 - Standard Code for Pressure Piping, Power Piping and ANSI B9.1 - Standard Safety Code for Mechanical Refrigeration.
2. Thoroughly clean tube surface and inside surface of the cup of the fittings, using very fine emory cloth and prior to making soldered or brazed joints. Wipe tube and fittings clean and apply flux. Flux shall not be used as the sole means for cleaning tube and fitting surfaces.

- C. Joints for other piping materials are specified within the respective piping system sections.

3.5 FIELD QUALITY CONTROL

- A. Testing: Refer to individual piping system specification sections.

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