SECTION 23 1113
FACILITY FUEL-OIL PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Piping and fittings.

B. Flanges and piping components.

C. Pipe hangers and supports.

D. Valves.

E. Strainers.

1.02 REFERENCE STANDARDS

A. API RP 1615 - Installation of Underground Petroleum Storage Systems; 2011.

B. ASME BPVC - Boiler and Pressure Vessel Code; 2017.

C. ASME B1.1 - Unified Inch Screw Threads; 2003 (Reaffirmed 2008).

D. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2016.

E. ASME B16.5 - Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24 Metric/Inch Standard; 2017.

F. ASME B16.11 - Forged Fittings, Socket-welding and Threaded; 2016 (Errata 2017).

G. ASME B16.12 - Cast Iron Threaded Drainage Fittings; 2009.

H. ASME B18.2.1 - Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Hex Flange, Lobed Head, and Lag Screws (Inch Series); 2012, Including July 2013 Errata.

I. ASME B18.2.2 - Nuts for General Applications: Machine Screw Nuts, Hex, Square, Hex Flange, and Coupling Nuts (Inch Series); 2015.

J. ASME B31.1 - Power Piping; 2016.

K. ASME B31.3 - Process Piping; 2016.

L. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.

M. ASTM A105/A105M - Standard Specification for Carbon Steel Forgings for Piping Applications; 2018.

N. ASTM A182/A182M - Standard Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service; 2017.

O. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014 (Editorial 2017).

P. ASTM A563/A563M - Standard Specification for Carbon and Alloy Steel Nuts (Inch and Metric); 2021a.

Q. ASTM D229 - Standard Test Methods for Rigid Sheet and Plate Materials Used for Electrical Insulation; 2013.

R. ASTM F844 - Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use; 2007a (Reapproved 2013).

S. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2009.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

C. Shop Drawings: Indicate tanks, system layout, pipe sizes, location, and elevations. For fuel oil tanks, indicate dimensions and accessories, including manholes and hold down straps.

1.04 QUALITY ASSURANCE

A. Welding Materials and Procedures: Comply with ASME BPVC.

PART 2 PRODUCTS

2.01 PIPING AND FITTINGS

A. Regulatory Requirements:
   1. Comply with the material, fabrication, and operating requirements of ASME B31.3, except as modified herein.
   2. Comply with ASME B31.1 for installation of fuel oil piping.
   3. Comply with applicable regulations for installation of fuel oil system.

B. Comply with the material, fabrication, and operating requirements of ASME B31.3, except as modified herein.

C. Carbon Steel Pipe:
   1. Comply with One of the Following:
      a. ASTM A53/A53M, Type E or S, Grade B, seamless or electric welded, Schedule 80 for pipe less than 2-1/2 inches (65 mm) in diameter or Schedule 40 for pipe 2-1/2 inches (65 mm) in diameter and larger.
   2. End Connections:
      a. Forged, socket weld type, complying with ASTM A182/A182M and ASME B16.11 for pipe or fittings less than 2-1/2 inches (65 mm).
      b. Threaded type complying with ASME B16.3, Class 150 or ASME B16.11.

2.02 FLANGES, COUPLINGS, AND PIPING COMPONENTS

A. Flanges:
   1. Provide flanged end connections on equipment, fittings, piping, piping components, adapters, couplings, and valves complying with ASME B16.5, Class 150.
   2. Carbon Steel: Comply with ASTM A105/A105M.
   3. Gaskets, Non-Isolating:
      a. 1/8 inch (3.2 mm) thick.
      b. Comply with ASME B16.12, raised-faced type.
      c. Material: Buna-N.
   4. Gaskets, Electrically Isolating:
      a. Comply with ASTM D229.
      b. Electrical Insulating Material: 1000 ohms resistance.
      c. Chemically compatible with fuel handled.
      d. Full face type.
      e. Provide full surface, spiral-wound, mylar, insulating sleeves between bolts and holes of flanges.
      f. Furnish bolt shank diameter not less than diameter at root of threads.
      g. Provide high-strength 1/8 inch (3.2 mm) thick, phenolic, insulating washers next to flanges with flat, circular, stainless steel washers over the insulating and under bolt heads and nuts.
      h. Supply adequate bolt length to accommodate insulating gaskets and stainless steel washers.
   5. Bolts, Nuts, and Washers:
      a. Comply with ASME B18.2.1 and ASME B18.2.2.
      b. Bolts:
         1) Regular hexagonal type.
         2) Threaded in accordance with ASME B1.1, Class 2A fit, Coarse Thread Series, for sizes 1 inch (25 mm) and smaller and Eight-Pitch Thread Series for sizes larger than 1 inch (25 mm).
         3) Provide sufficient length to obtain full bearing on nuts, projecting no more than two full threads beyond nuts with bolts tightened to required torque.
      c. Nuts:
         1) Hexagonal, heavy series type.

2) Threaded in accordance with ASME B1.1, Class 2B fit, Coarse Thread Series for sizes 1 inch (25 mm) and smaller and Eight-Pitch Thread Series for sizes larger than 1 inch (25 mm).

d. Carbon Steel Material:
   1) Bolts: Comply with ASTM A307, Grade B, hot-dipped galvanized.
   2) Nuts: Comply with ASTM A563/A563M, Grade A, hex-style, hot-dipped galvanized.
   3) Washers: Comply with ASTM F844, hot-dipped galvanized.

B. Piping Components:
   1. Provide components that meet the material, fabrication, and operating requirements of ASME B31.3, except as modified herein.
   2. Pressure Design Class: Class 150, as defined in ASME B16.5.

2.03 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with MSS SP-58.
   1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.

B. Hangers for Pipe Sizes 1/2 to 1-1/2 Inches (15 to 40 mm): Malleable iron, adjustable swivel, split ring.

C. Hangers for Pipe Sizes 2 Inches (50 mm) and Over: Carbon steel, adjustable, clevis.

D. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

PART 3 EXECUTION

3.01 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.02 PIPING INSTALLATION

A. Install in accordance with manufacturer's instructions and API RP 1615.

B. Route piping in orderly manner and maintain gradient.

C. Group piping whenever practical at common elevations.

D. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

E. Provide clearance for installation of insulation and access to valves and fittings.

END OF SECTION