SECTION 220516 - EXPANSION FITTINGS AND LOOPS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Metal-bellows expansion joints.
   2. Flexible-hose expansion joints.
   3. Pipe bends and loops.
   4. Alignment guides and anchors.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Delegated-Design Submittal: For each anchor and alignment guide indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
   1. Design Calculations: Calculate requirements for thermal expansion of piping systems and for selecting and designing expansion joints, loops, and bends.
   2. Anchor Details: Detail fabrication of each anchor indicated. Show dimensions and methods of assembly and attachment to building structure.
   3. Alignment Guide Details: Detail field assembly and attachment to building structure.
   4. Schedule: Indicate type, manufacturer's number, size, material, pressure rating, end connections, and location for each expansion joint.

C. Welding certificates.

D. Product certificates.

E. Maintenance data.

1.3 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:
   2. Welding to Piping: ASME Boiler and Pressure Vessel Code: Section IX.

PART 2 - PRODUCTS

2.1 EXPANSION JOINTS

A. Metal-Bellows Expansion Joints: ASTM F 1120, circular-corrugated-bellows type with external tie rods.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Flex-Hose Co., Inc.
   b. Flex-Weld, Inc.
   c. Hyspan Precision Products, Inc.
   d. Metraflex, Inc.
   e. Proco Products, Inc.

2. Metal-Bellows Expansion Joints for Copper Piping: Multiple-ply phosphor-bronze bellows, copper pipe end connections, and brass shrouds.


5. Minimum Pressure Rating: 150 psig, unless otherwise indicated.

6. Configuration: Double-bellows type with base, unless otherwise indicated.

7. End Connections: Flanged or weld.

B. Flexible-Hose Expansion Joints: Manufactured assembly of two flexible-metal-hose legs joined by a long radius, 180-degree return bend or center section of flexible hose with rigid elbows; with inlet and outlet elbow fittings, corrugated-metal inner hoses, and braided outer sheath.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Flex-Hose Co., Inc.
   b. Metraflex, Inc.

2. Flexible-Hose Expansion Joints for Copper Piping: Copper-alloy fittings with solder-joint end connections:
   a. NPS 2 and Smaller: Bronze hose and single-braid bronze sheath.

3. Flexible-Hose Expansion Joints for Steel Piping: Carbon-steel fittings, stainless-steel hose and single-braid, stainless steel-sheath:
   a. NPS 2 and Smaller: Threaded ends.
   b. NPS 2-1/2 to NPS 6: Flanged ends.

   a.

2.2 ALIGNMENT GUIDES

A. Description: Steel, factory fabricated, with bolted two-section outer cylinder and base for alignment of piping and two-section guiding spider for bolting to pipe.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Flex-Hose Co., Inc.
   b. Flex-Weld, Inc.
   c. Hyspan Precision Products, Inc.
   d. Metraflex, Inc.

2.3 MATERIALS FOR ANCHORS

A. Steel Shapes and Plates: ASTM A 36/A 36M.

B. Bolts and Nuts: ASME B18.10 or ASTM A 183, steel, hex head.

C. Washers: ASTM F 844, steel, plain, flat washers.
D. Mechanical Fasteners: Insert-wedge-type stud with expansion plug anchor for use in hardened portland cement concrete, and tension and shear capacities appropriate for application.
   2. Expansion Plug: Zinc-coated steel.

E. Concrete: Portland cement mix, 3000 psi minimum. Comply with requirements in Division 3 for formwork, reinforcement, and concrete.

F. Grout: ASTM C 1107, factory-mixed and packaged, dry, hydraulic-cement, nonshrink, nonmetallic grout; suitable for interior and exterior applications.
   2. Design Mix: 5000 psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 EXPANSION-JOINT INSTALLATION
   A. Install manufactured, nonmetallic expansion joints according to FSA’s "Technical Handbook: Non-Metallic Expansion Joints and Flexible Pipe Connectors."
   B. Install expansion joints of sizes matching size of piping in which they are installed.
   C. Install alignment guides to allow expansion and to avoid end-loading and torsional stress.

3.2 PIPE BEND AND LOOP INSTALLATION
   A. Attach pipe bends and loops to anchors.
      2. Concrete Anchors: Attach by fasteners. Follow fastener manufacturer’s written instructions.

3.3 SWING CONNECTIONS
   A. Connect risers and branch connections to mains with at least five pipe fittings, including tee in main.
   B. Connect risers and branch connections to terminal units with at least four pipe fittings, including tee in riser.
   C. Connect mains and branch connections to terminal units with at least four pipe fittings, including tee in main.

3.4 ALIGNMENT-GUIDE INSTALLATION
   A. Install guides on piping adjoining pipe expansion fittings and loops.
B. Attach guides to pipe and secure to building structure.

3.5 ANCHOR INSTALLATION

A. Install anchors at locations to prevent stresses from exceeding those permitted by ASME B31.9 and to prevent transfer of loading and stresses to connected equipment.

B. Fabricate and install steel anchors by welding steel shapes, plates, and bars to piping and to structure. Comply with ASME B31.9 and AWS D1.1.

C. Construct concrete anchors of poured-in-place concrete of dimensions indicated and include embedded fasteners.

D. Install pipe anchors according to expansion-joint manufacturer's written instructions if expansion joints are indicated.

E. Use grout to form flat bearing surfaces for expansion fittings, guides, and anchors installed on or in concrete.

END OF SECTION