

**PART 1 - GENERAL REQUIREMENTS**

**1.01 SUMMARY**

- A. This Section includes the following:
  - 1. Flexible Expansion loops
  - 2. Expansion loops

**1.02 SUBMITTALS**

- A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections.
  - 1. Product data for each type of pipe expansion joints specified. Submit expansion compensation schedule showing manufacturer's figure number, size, location, connections, material, and displacement for each required expansion joint.
  - 2. Assembly-type shop drawings for each type of expansion compensation product, indicating dimensions, weights, required clearances, and methods of assembly of components. Detail fabrication of pipe anchors, hangers, special pipe support assemblies, and their attachment to the building structure. Submit calculations of pipe expansion forces at anchor points for structural engineer review.
  - 3. Shop drawings for field-fabricated expansion loops indicating location, dimensions, pipe sizes, calculations for compression or tension required, and location. Detail fabrication of pipe anchors, hangers, special pipe support assemblies, and their attachment to the building structure. Submit calculations of pipe expansion forces at anchor points for structural engineer review.
  - 4. Maintenance data for expansion joints for inclusion in Operating and Maintenance Manuals specified in Division 1 and Division 23 Section "General Mechanical Requirements."

**1.03 QUALITY ASSURANCE**

- A. Regulatory Requirements: Comply with the provisions of the following codes:
  - 1. ASME B31.9 "Building Services Piping" for materials, products, and installation. Safety valves and pressure vessels shall bear the appropriate ASME label.
  - 2. ASME Boiler and Pressure Vessel Code, Section IX, "Welding and Brazing Qualifications" for Qualifications for Welding Processes and Operators.
- B. Expansion joints shall be manufactured in plants located in the United States or certified to meet the specified ASTM and ANSI standards.

## **PART 2 - PRODUCTS AND MATERIALS**

### **2.01 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Flexible Expansion Loop
    - a) Flex-Hose Co.,Inc.
    - b) Flexicraft Industries
    - c) Metraflex Co. Metraloop
    - d) Twin City Hose.

### **2.02 PIPE EXPANSION JOINTS, GENERAL**

- A. Pipe expansion joints shall provide 200 percent absorption capacity of piping expansion between anchors.

### **2.03 FLEXIBLE EXPANSION LOOPS**

- A. Provide prefabricated expansion compensator loops with inlet and outlet elbow fittings and two (2) sections of metal hose and braid joined by long-radius, 180-degree return bend or center section of metal hose and braid, suitable for an operating pressure and temperature of system. End connections shall match rest of piping system and as required for the size specified in Division 23 Section "Hydronic Piping".

### **2.04 EXPANSION LOOPS**

- A. Provide pipe expansion loop constructed of main pipe material. Acceptable methods include use of elbows in a U or Z shape as defined by ASHRAE or ASME; or a detailed stress analysis may be utilized to define areas of expansion.

### **2.05 ALIGNMENT GUIDES AND ANCHORS**

- A. Provide alignment guides and anchors as specified in specification Division 23 Section "Hangers & Supports for HVAC Piping & Equipment".

## **PART 3 - EXECUTION**

### **3.01 INSTALLATION, GENERAL**

- A. Install products in accordance with manufacturer's instructions.
- B. Install expansion joints and expansion loops where indicated on the drawings and where required for adequate expansion of installed piping system.
- C. Anchor piping to ensure proper direction of expansion and contraction.

### **3.02 EXPANSION JOINTS**

- A. Align joints to avoid end loading and torsional stress.

### **3.03 EXPANSION COMPENSATION FOR RISERS AND TERMINALS**

- A. Install connection between piping mains and risers with at least 5 pipe fittings including tee in main. Install connections between piping risers and terminal heating and cooling units with at least 4 pipe fittings including tee in riser.

### **3.04 FLEXIBLE EXPANSION LOOPS**

- A. Install loops at locations indicated on plans. Amount of expansion shall be as indicated on plans. Loop shall be installed horizontally for steam systems. If installed vertically in chilled or hot water systems, drains and manual air vents shall be installed as required in Division 23 Section “Hydronic Piping”. Support loop as required by manufacturer and to prevent binding or sagging per Division 23 Section “Hangers & Supports for HVAC Piping and Equipment”.

### **3.05 EXPANSION LOOPS**

- A. Expansion loop locations and dimensions shall be based on routing shown on plans. If routing is modified, coordinate locations with engineer.
- B. Fabricate expansion loops to dimensions indicated on plans.
- C. Install pipe loops cold-sprung in tension or compression as required to partly absorb tension or compression produced during anticipated change in temperature. After installation remove temporary space holders as required.
- D. Provide air vents and drains for piping in vertical runs in accordance with Division 23 Section “Hydronic Piping”. Provide hangers and supports in accordance with Division 23 Section “Hangers & Supports for HVAC Piping and Equipment”. For expansion loops with horizontal and vertical components, support for the horizontal legs shall be designed for full weight of the pipe with maximum load variation of 25%.
- E. Provide alignment guides at locations indicated on plans and as required for piping expansion. At a minimum, install alignment guides on both sides of expansion loop, spaced at twice the height of the U or Z loop (height defined as perpendicular distance of piping from primary pipe direction) or as required by the expansion joint manufacturer. Alignment shall be sufficient to allow for proper installation of expansion joints to prevent binding or torsional stress on joint.
- F. Provide anchors at locations indicated on plans and as required for piping expansion. At a minimum install anchors on both sides of straight pipe length incorporating expansion loop.

**END OF SECTION**