



SECTION 23 05 16 - EXPANSION FITTINGS AND LOOPS FOR HVAC PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Flexible pipe connectors.
 - 2. Expansion joints.
 - 3. Expansion compensators.
 - 4. Pipe alignment guides.
 - 5. Pipe anchors.

1.2 REFERENCES

- A. American Society of Mechanical Engineers:
 - 1. ASME B31.1 - Power Piping.
 - 2. ASME B31.5 - Refrigeration Piping.
 - 3. ASME B31.9 - Building Services Piping.
 - 4. ASME Section IX - Boiler and Pressure Vessel Code - Welding and Brazing Qualifications.
- B. American Welding Society:
 - 1. AWS D1.1 - Structural Welding Code - Steel.

1.3 DESIGN REQUIREMENTS

- A. Provide structural work and equipment required for expansion and contraction of piping. Verify anchors, guides, and expansion joints provide and adequately protect system.
- B. Expansion Compensation Design Criteria:
 - 1. Installation Temperature: 50 degrees F.
 - 2. Hot Water Heating System Temperature: 210 degrees F.
 - 3. Chilled Water: 40 degrees F.

1.4 SUBMITTALS

- A. Shop Drawings: Indicate layout of piping systems, including flexible connectors, expansion joints, expansion compensators, loops, offsets and swing joints. Submit shop drawings sealed by a registered California Mechanical Professional Engineer.



- B. Product Data:
 - 1. Flexible Pipe Connectors: Indicate maximum temperature and pressure rating, face-to-face length, live length, hose wall thickness, hose convolutions per foot and per assembly, fundamental frequency of assembly, braid structure, and total number of wires in braid.
 - 2. Expansion Joints: Indicate maximum temperature and pressure rating, and maximum expansion compensation.
- C. Design Data: Indicate criteria and show calculations.
- D. Manufacturer's Installation Instructions: Submit special procedures.
- E. Provide Manufacturer's Certificate.
- F. Manufacturer's Field Reports: Indicate results of inspection by manufacturer's representative.

PART 2 - PRODUCTS

2.1 FLEXIBLE PIPE CONNECTORS

- A. Manufacturers:
 - 1. **Flexicraft.**
 - 2. **Flex Hose.**
 - 3. **Metraflex.**
- B. Steel Piping:
 - 1. Inner Hose: Stainless Steel.
 - 2. Exterior Sleeve: Double braided stainless steel.
 - 3. Pressure Rating: 200 psig WOG and 250 degrees F.
 - 4. Joint: As specified for pipe joints.
 - 5. Size: Use pipe-sized units.
 - 6. Maximum offset: 3/4 inch to 1 inch on each side of installed center line.
- C. Copper Piping:
 - 1. Inner Hose: Bronze.
 - 2. Exterior Sleeve: Braided bronze.
 - 3. Pressure Rating: 200 psig WOG and 250 degrees F.
 - 4. Joint: As specified for pipe joints.
 - 5. Size: Use pipe sized units.
 - 6. Maximum offset: 3/4 inch on each side of installed center line.



2.2 EXPANSION JOINTS

- A. Manufacturers:
 - 1. **Flexicraft.**
 - 2. **Flex Hose.**
 - 3. **Metraflex.**

- B. Stainless Steel Bellows Type:
 - 1. Pressure Rating: 200 psig WOG and 250 degrees F.
 - 2. Maximum Compression: 1-3/4 inch.
 - 3. Maximum Extension: 1/4 inch.
 - 4. Joint: As specified in for piping system.
 - 5. Size: Use pipe sized units.
 - 6. Application: Steel piping 3 inch and smaller.

- C. External Ring Controlled Stainless Steel Bellows Type:
 - 1. Pressure Rating: 200 psig WOG and 250 degrees F.
 - 2. Maximum Compression: 15/16 inch.
 - 3. Maximum Extension: 5/16 inch 3/8 inch.
 - 4. Maximum Offset: 1/8 inch.
 - 5. Joint: Flanged.
 - 6. Size: Use pipe sized units.
 - 7. Accessories: Internal flow liner.
 - 8. Application: Steel piping 3 inch and larger.

2.3 ACCESSORIES

- A. Pipe Alignment Guides: Two piece welded steel with enamel paint, bolted, with spider to fit standard pipe, frame with four mounting holes, clearance for minimum 1 inch thick insulation, minimum 3 inch travel.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install flexible pipe connectors on pipes connected to equipment supported by vibration isolation. Provide line size flexible connectors.



- B. Install flexible connectors at right angles to displacement. Install one end immediately adjacent to isolated equipment and anchor other end. Install in horizontal plane unless indicated otherwise.
- C. Rigidly anchor pipe to building structure. Provide pipe guides to direct movement only along axis of pipe. Erect piping so strain and weight is not on cast connections or apparatus.
- D. Provide support and anchors for controlling expansion and contraction of piping. Provide loops, pipe offsets, and swing joints, or expansion joints where required.
- E. Provide grooved piping systems with minimum one joint per inch pipe diameter instead of flexible connector supported by vibration isolation. Grooved piping systems need not be anchored.

3.2 MANUFACTURER'S FIELD SERVICES

- A. Furnish inspection services by flexible pipe manufacturer's representative for final installation and certify installation is in accordance with manufacturer's recommendations and connectors are performing satisfactorily.

END OF SECTION 23 05 16