**Note to users: items shown in red indicated edits / selections that need to be made to tailor the specification for the application.**

Retain and edit "Delegated-Design Submittal" Paragraph 1.E below if design services have been delegated to the contractor. The delegated design may be completed entirely by the contractor or may also involve the equipment manufacturer. Typically, the contractor would be responsible for the means and methods to attach anchors and guides to the structure, and field-fabrication of anchors. Expansion joint manufacturers may be involved in the piping analysis and selection of expansion joints and placement of anchors and guides.

Product Specifications

# Externally Pressurized Expansion Joint:

1. General:
2. Provide expansion joints as indicated on the contract drawings or as required to accommodate any axial thermal expansion or contraction of the piping system.
3. Expansion joints to be of the packless, externally pressurized type where system line pressure is external to the bellows to minimize squirm.
4. Externally pressurized bellows expansion joints shall not be utilized to compensate for lateral, angular or rotational movements.
5. All materials of construction, pressure ratings, and end fittings shall be appropriate for the application. Guiding and anchoring per EJMA recommendations and guidelines
6. Delegated-Design Submittal: Provide analysis signed and sealed by a qualified professional engineer. Submittal shall include [edit as required for project]:
	1. Design Calculations: Calculate requirements for thermal expansion of piping systems and criteria for selecting and designing expansion joints, hard-pipe loops, and swing connections.
	2. Schedule and drawings: Indicate type, manufacturer's number, size, material, pressure rating, end connections, and locations for each expansion joint, anchor and guide.
	3. Anchor Details: Detail fabrication of each anchor indicated. Show dimensions, methods of assembly, and attachment to building structure.
	4. Alignment Guide Details: Detail field assembly and attachment to building structure.

2 Products

1. Manufacturer: Expansion joints shall be **“MetraGator”** as manufactured by The Metraflex Company®, Chicago, IL.
2. Expansion joints shall conform to ASTM F-2934 and MIL–E–17813H
3. Pressure rating.
	1. Expansion joints shall be pressure rated for 150 psi @ 500⁰ F.
	2. Expansion joints shall be pressure rated for 300 psi @ 500° F.
4. Test pressure for 150 PSI joints shall be 225 PSI at 70⁰ F, Test pressure for 300 PSI joints shall be 450 PSI at 70⁰ F.
5. Movement capabilities
	1. for single joints shall be 4”, 6”, or 8” axial compression,
	2. For double joints movement capabilities shall be 8”, 12” or 16” axial compression.
	3. As required by calculation.
6. Construction: All welded construction with stainless steel bellows, steel shroud, integral guide rings, and internal liner.
7. Bellows: Bellows shall be 2 ply, low corrugation style manufactured from T 304 stainless steel. The number of corrugations and overall length of the expansion joints shall be determined by the thermal expansion requirements, system design engineer, and manufacturer’s recommendations based on EJMA (Expansion Joint Manufacturers Association) standards.
8. End connections shall be:
	1. Raised Face Flange.
	2. Weld End.
	3. Grooved end.

I. Traveling end of expansion joint shall be equipped with a O-Ring debris shield to inhibit debris from entering expansion joint.

J. All joints to be provided with drain connection and lifting lug. Double end joints shall have anchor base to act as intermediate anchor.

3. Execution

A. Guiding: Pipe guides adjacent to the expansion joint shall be in accordance with EJMA guidelines based on design pressure and line size. Alternative guiding may be acceptable after design review by manufacturer, calculations with qualified design professional’s signature and seal shall be submitted.

B. When installed in vertical pipe runs expansion joint shall be installed with the traveling end on top to facilitate drainage of the expansion joint.

C. Drain: Expansion joint shall be installed so that the drain connection is on the low end of the joint.

D. Installation shall be in accordance with manufacturers printed instructions.

E. Standard joints are supplied set for pipe expansion in hot systems. Purchaser shall specify If joint is to be installed for contraction in a chilled system.