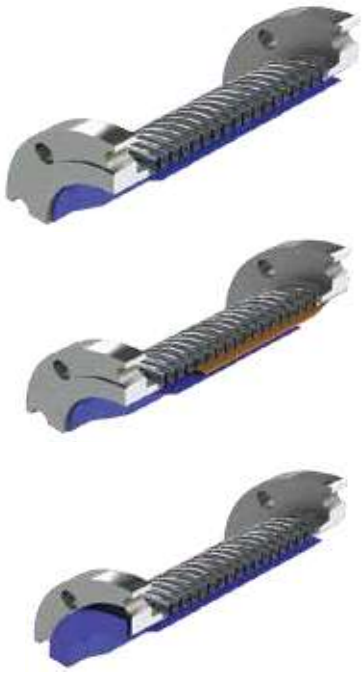
Tie rods are designed to restrain the full pressure thrust generated by the expansion joint. For axial compression applications, the tie rod nuts will lose contact with the lugs during the compression cycle and the thrust force is now directed to the anchors. In the event of a main anchor failure, the tie rods will prevent the bellows from over-extending or over-compressing while restraining the full pressure loading and dynamic forces created by an anchor failure. With the addition of stops the tie rods will also function as limit rods. Standard tie rod construction consists of high strength A193-B7 c/s threaded rods and A516-70 c/s lugs. With stainless pipe and flanges carbon steel or stainless steel tie rods can be furnished.



Flow liners are required to prevent flow induced vibration in the bellows which will lead to pre-mature failure. The Expansion Joint Manufacturers Association (EJMA) has established flow liner requirement guidelines based on a combination of factors. These are based on the bellows diameter, flow velocity, number of plies and length of the liner. A heavy flow liner will be required when abrasive materials are present in the flow media. By incorporating an oversized bellows into the expansion joint design a pipe flow liner that is the same thickness as the piping system can be used. The most common flow liner style is the single welded in liner which attaches to the upstream end fitting. The welded in telescoping liner is a good option for large amounts of axial travel. The drop-in flow liner can be removed and replaced when worn thus extending the life of the expansion joint.

Covers or shroud can be provided to protect the bellows from accidental damage caused by falling objects or mechanical damage caused by welding or cutting splatter. This shield is constructed from stainless steel or carbon steel sheet metal in one or more sections. The shroud is generally bolted on for easy removal when inspection in necessary. Sufficient clearance must be provided when lateral offset is present. As with telescoping flow liners a telescoping cover can be used for systems with large amounts of axial compression. The use of a cover may be required when insulation is necessary to protect personnel.