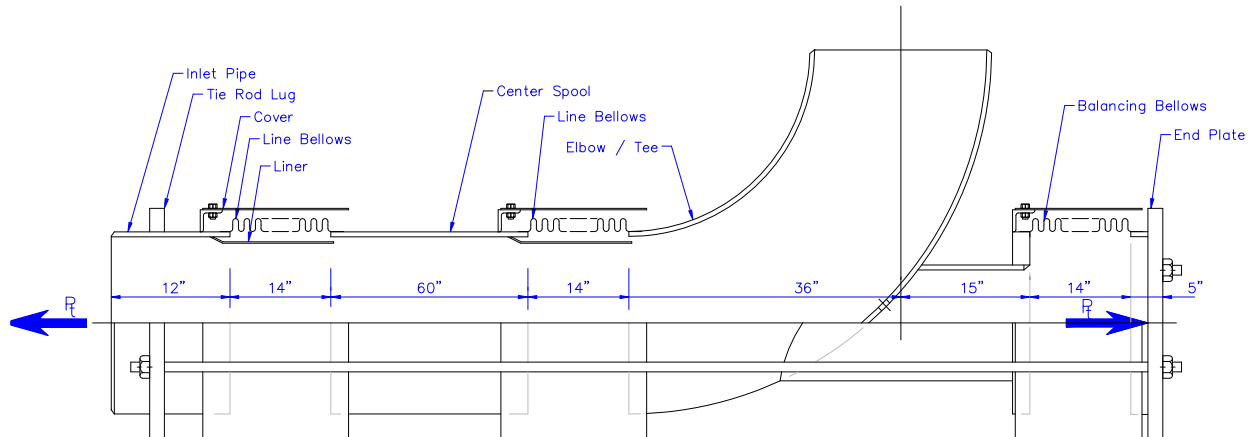


PRESSURE BALANCED ELBOW & TEES



PRESSURE BALANCED ELBOW EXAMPLE

Figure 1

HOW THEY WORK – A Pressure Balanced Elbow (PBE) or Tee (PBT) expansion joint is capable of absorbing axial and lateral movements while still cancelling out the system pressure thrust (P_t). They do this by adding a third bellows on the back side of the elbow / tee which moves the typical location of the pressure thrust from the elbow to the balancing end plate. Thus, the elbow/tee is isolated from the piping on the left and can move freely.

WHEN TO USE PBE/T's – They are typically used in confined spaces where there is insufficient room for pipe loops, tied universal or other options.

WHEN NOT TO USE PBE/T's - Due to the addition of the third bellows and associated dummy legs and plates, the PBE/T are more expensive than a traditional tied universal and it is recommended that a tied universal option be tried first. Also, the balancing bellows creates several special considerations the primary one being accumulation of particulates. In this case, it is recommended that the unit be located in the vertical axis with the balancing end on top so that they are self draining. The second consideration is the operating temperature. The balancing bellows will operate at a significantly reduced temperature that could cause condensate / congeal problems. For these applications, a heating blanket over the balancing bellows may be required.

SPECIAL CONSIDERATIONS – PBE/T have several special considerations as follows:

- 1) When the line pipe is greater than 36" diameter, a reduced dummy leg pipe of approximately 75% of the line pipe should be used to avoid ovalizing the elbow and distorting the bellows.
- 2) The balancing bellows cavity should have a 3/4" minimum drain port to allow the hydro test water to be drained.
- 3) Special care should be taken when designing two tied rod joints due to the potential for the end plate to become unstable and cause the bellows to squirm.
- 4) The squirm pressure of the balancing bellows should be carefully evaluated when considering the deadweight of the end plate assembly.

