

HIGH OR LOW TEMPERATURE NONCORROSIVE APPLICATIONS

PIP #: ASH-PI-57

Applicable to:

Capillary Lines and
Diaphragm Seals

A capillary is the preferred approach to connecting an instrument to non-corrosive media which are either very cold, such as liquid nitrogen or hot, such as the heat transfer fluids. Dow Therm[®], Therminol[®] and Syltherm[®] heat transfer fluids must be noncorrosive or they would attack the piping. To quote the Syltherm[®] bulletin:

“Syltherm 800 is noncorrosive toward common metals and alloys as long as it remains uncontaminated. Most corrosion problems are caused by chemicals introduced into the system during cleaning or from process leaks.”

A simple five-foot length of stainless-steel capillary will bring the instrument down to ambient temperature. The capillary is suitable only to 750 °F. Above that, the stainless steel starts to lose its corrosion resistance due to a metallurgical phenomenon called “sensitization.” At temperatures above 750 °F the customer should use his or her own piping to connect the gauge. The smaller the diameter of the piping or tubing and the longer the line, the less heat will reach the gauge. We do not (or should not) make recommendations about the length of piping required; there are too many variables. A five-foot length of capillary can cover nearly any condition up to 750 °F – or down to –300 °F for liquid nitrogen and other cryogenic gases. If the service is Oxygen, the capillary must be X6B cleaned. Of course, you should investigate and use proper analysis and techniques appropriate to each situation.

The capillary is already approved for use up to 15,000 psi at room temperature with seals. ASME B16.5 (Flanges) de-rates 304SS & 316SS by about 55% at 750°F. So, at 750°F, the capillary should not be used over 8000 psi.

Silicone fill can be used up to a media temperature of 600°F, and Syltherm[®] 800 fluid up to 750°F. The pressure limits of flanges and other connections should be de-rated in accordance with ASME B16.5. or other applicable specification.