

Sealed Thermocouple for Wet Areas

APPLICATION

Wet humid environments can cause problems for temperature sensors by changing their calibration if any moisture gets inside the sensor housing. Add a pressure change and the sealing problem becomes more of a challenge to maintain an accurate and repeatable measurement. Such was the case in a steam turbine application that required a thermocouple to be placed in a humid, wet area that underwent periodic pressure change from ambient to vacuum. It doesn't get much more challenging than that.

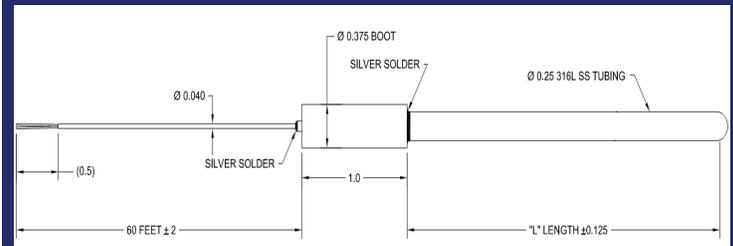


CHALLENGE

Thermocouples, and to a greater degree RTDs, need to be kept dry to maintain the insulation resistance (IR). Low IR causes a low temperature reading by creating a shorter path for electricity to follow. In the case of an RTD the sensing element resistance is decreased by moisture allowing electricity to flow between the element coils rather than through them. Electricity always takes the path of least resistance and that is what causes a low temperature reading when moisture is allowed inside an RTD sensor housing. Sealing the sensor housing against moisture intrusion, whether RTD or thermocouple, is essential in maintaining an accurate measurement and is one of the biggest design challenges.



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Sealed Thermocouple

SOLUTION



A sensor was developed that uses a standard 1/4" diameter thermocouple made from mineral insulated (MI) cable and is terminated with a custom transition fitting that allows brazing a smaller diameter MI cable to the larger MI cable. The smaller diameter is flexible and can be routed easily around obstacles on the way to a dry area where it can be terminated in standard lead-wire configuration. One modification to this design has the small diameter MI cable coiled like a screen door spring to allow even more flexibility. When coiled in a 1/2" diameter or larger coil the flexibility is greatly enhanced.

For more information please call or email as listed below.