BURNS ENGINEERING

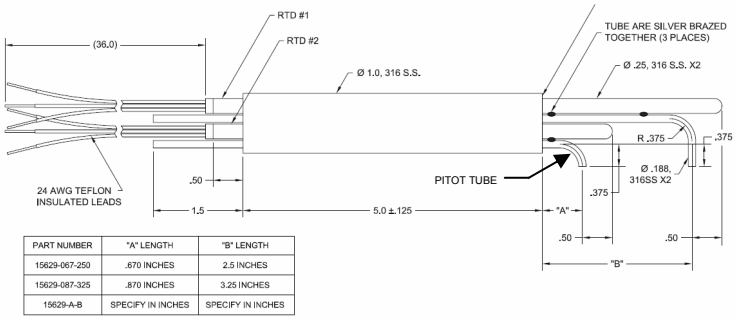
Application Note

A080131

Temperature and Pressure

APPLICATION

An accurate measurement of the flow rate using pressure and temperature of a fluid flowing in a pipe was required. A boundary layer was suspected that altered the measured volume flowing through the pipe so multiple points were required for an accurate measurement.



PART NUMBER	"A" LENGTH	"B" LENGTH
15629-067-250	.670 INCHES	2.5 INCHES
15629-087-325	.870 INCHES	3.25 INCHES
15629-A-B	SPECIFY IN INCHES	SPECIFY IN INCHES

Description

CHALLENGE

Two point temperature and pressure measurement was determined to be the minimum for the measurement. was required for a fluid flowing in a pipe. Two points were required, one near the pipe wall and the other near the center, to make an accurate measurement of the flow rate. Variable immersion was a required option so the optimum immersion depth could be fine-tuned during installation and setup. Only one access point existed in the pipe so the sensor had to combine temperature and pressure.

Replaceable sensing elements was a necessary feature so that they could be recalibrated or replaced without opening the pipe. The assembly had to pass a pressure test of 225 psi for 2 minutes.

SOLUTION

Two RTD temperature sensors and two pitot tubes were combined in a 1" diameter tube and sealed to withstand the 225 psi pressure test as shown in the above drawing. An RTD was chosen over a thermocouple because it can be easily recalibrated and it offered the best accuracy and long term stability. Both sensing elements are held in place with a plastic bushing and are easily removed for recalibration or replacement. A 1" tube compression fitting with a Teflon ferrule was chosen as the process connection for the sensor to allow fine-tuning of the immersion depth and orientation to the flow.

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