

Effect of Purge Flow Rate on Thermocouple Temperature Measurement

Delta Controls model HTP and HTX Thermocouples used in Claus Sulfur Recovery Reactors utilize an air or nitrogen purge to prevent thermocouple contamination due to process gases that can diffuse through the ceramic thermal well. Because the diffusion process is slow, a very low flow rate of purge gas is capable of protecting the thermocouple from contamination.

Because the purge impinges directly onto the thermocouple element, some have raised concerns that the accuracy of the measurement is compromised due to the cooling effect of the purge gas on the thermocouple junction. The graph below, derived from careful measurements under operating conditions, shows that for the recommended purge flow rate of 0.5 cubic feet per hour, the cooling effect is only a few degrees. This amount is considered to be insignificant.

