

Tantalum Sleeve Minimizes Corrosion on a Thermowell in Steel Pickling Process

APPLICATION

A steel mill is treating their mill run metal surfaces with a process called pickling. Strong mineral acids remove impurities, stains, rust and scale with sulfuric acid. The acid etches away surface contaminants at rate proportional to pH and temperature. Measuring the temperature is critical to process control optimizing the etch process and minimizing waste.

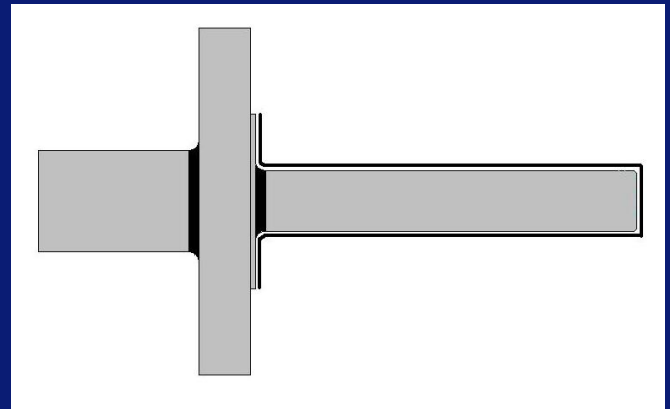


CHALLENGE

A temperature sensor was installed in the pickle liquor feed line to monitor the liquid temperature. Due to the high flow rate in the line, time response was crucial to the effectiveness of the measurement. They were using direct immersion thermocouples and were having challenges with both the accuracy of the measurement and the lifespan of the thermocouple due to etching of the sheath. They wanted to switch to an RTD temperature sensor but were reluctant to do so due to the higher cost and the frequency at which they change out.



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▶ Flanged Thermowell with Tantalum Sleeve

SOLUTION

To increase the accuracy of the measurement an RTD was proposed. To increase the life expectancy of the RTD a thermowell was needed. A Teflon thermowell is corrosion resistant but slowed down the time response too much. A metal thermowell was required but to manufacture a metal thermowell completely out of corrosive resistant metal became cost prohibitive. The solution was to use a standard 304 SS thermowell but make a tantalum sleeve to protect the thermowell sheath. The end result was a temperature measurement of greater accuracy and lower maintenance cost overall.

