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Coal-Gen 2009

Temperature Measurement from JMS

designed for your specific needs

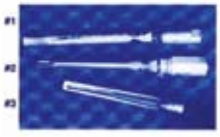
JMS PULVERIZED COAL THERMOWELLS

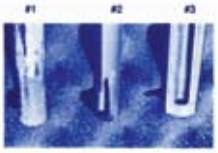
Long lasting consistent response thermowell solution to small particle erosion (SPE)

ADVANTAGES

- *Reliability -- Less wear over time yields a more consistent response time.*
- *Energy Savings - Consistent response times means greater efficiency in utilizing PID control instrumentation that cannot "see" that wear is accelerating sensor response time.*
- *Less down time - durability reduces unscheduled maintenance responding to sensor failure caused by wear.*
- *Purchasing cost - Significantly less expensive than stellite coated thermowells.*
- *Reduced Total Cost of Ownership - Less time spent fixing, less money to purchase and less energy to run your plant efficiently means savings to you*

APPLICATIONS





- *Coal Pulverizers*
- *Fluidized Beds*
- *Any place where contact instrumentation might be subjected to SPE.*

Previously in this application, customers were using a hard-faced thermowell made of 316SS and coated with various materials. These thermowells do not withstand the harsh erosive environment of pulverized coal.

JMS has therefore developed a dependable alternative. Thermowells pictured following 3 mos. installation.Design #1: JMS Pulverized Coal Thermowell, Design #2: Alumina Oxide Coating, Design #3: Stellite Coating. To date, JMS has had Pulverized Coal thermowells in service for 6 years without appreciable wear.

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JMS MOTOR SLEEVE BEARING T-COUPLES

The challenge with measuring the temperature of motor sleeve bearings is getting the sensor close enough to the bearing.

SHEATH DESIGN

JMS has discovered that drilling a hole in the babbit containing the bearings works quite well. A 1/8" O.D. probe is then positioned in the hole and secured to the casing with a compression fitting or a spring loaded oil sealed fitting. The leadwire, protected by flexible armor is run to a junction box termination outside the motor. This application typically uses a type J thermocouple with a grounded junction.

"PING IN PLACE" WIRE DESIGN

JMS has designed a ping in assembly that uses robust gauge wire thermocouples through an oil sealed feed through fitting with a tip that can be pinged or sealed into place using an epoxy into recesses drilled into the babbit.

JMS BOILER TUBE & TUBE SKIN PROBES

Tube skins are designed for measuring the temperature of tube walls. This can be done with a flat, curved or knife edge weld pad in perpendicular or parallel position to the pad. The weld pad can be curved to fit the radius of the customer's pipe. For tube skin thermocouples, JMS uses sheath material which allows for proper insulation, expansion loops and easy installation. The expansion loop on these sensors is made by supplying an additional 12 inches that can be coiled into 3" - 4" O.D. coils.

TRADITIONAL DESIGNS

Square weld pads are the most common style utilized in power applications. JMS recommends that these pads be welded at the four corners of the pad only to allow the pad to expand and contract with the pipe during cooling and reheating conditions. For more information, see pages 4-3 and 4-4 of the JMS Southeast Technical Catalog. Replacement of these sensors can be expensive and time consuming as it requires grinding the old pad off, sanding and welding the new probe into place.

The Edge design has the advantage of being weldable to any size or schedule pipe for simplification of your inventory. However, lack of proper welding can lead to poor contact and improper temperature measurement. As with the pad design, old thermocouples must be sanded off and new probes welded back into place.

FASTTRAX: IMPROVEMENT ON TRADITION

When typical tube skin thermocouples wear out or are damaged, replacement requires time consuming and expensive welding and sanding operations.

The Fasttrax™ design enables the user to install hardware that allows probes to be installed and removed with tools not fancier than a pair of pliers with wire cutters in the jaw. This probe is available in all thermocouple and RTD calibrations and constructions. The installation hardware acts as a heat shield and can be ordered with a ceramic coating in cases where such a design is desired by the customer.

TYPE N VS TYPE E OR K THERMOCOUPLE

Type K thermocouples and Type E thermocouples are commonly specified for power applications but have been plagued by instability due to the chromel / alumel material in a type K and the chromel material in a type E. The type N is a good replacement for these sensors as it is constructed of a Nicrosil (nickel chrome alloy) positive leg and a Nisil (Nickel Silicon) negative leg. The type N can be combined with our special Stabaloy alloy sheath material for optimum performance at high temperatures. The type N thermocouple has the same accuracies and temperature range as a type K thermocouple and the price difference between the two calibrations ranges from nominal to nonexistent.

APPLICATIONS

- *Gas Turbines: Gas turbines experience fast heat up and extended running conditions. They may go from 25 to 650° C in as little as 15 minutes. This would create the potential for a large hysteresis effect in a Type K or E thermocouple, but the Type N is well suited to thermal stability during this part of the operation as well as subsequent extended run times at elevated temperatures.*
- *Boiler Tubes: Compared to the Type K the Type N characteristics of improved thermal stability and probe life will provide tighter process control than a type K.*
- *Steam Headers: Steam header temperatures are taken at the top of the boiler or right before steam enters the turbine. The temperature of the steam at this point is used to determine the performance of the turbine and accuracy is critical. The temperature can range from 900 to 1100° C depending on the turbine yielding a significant advantage to using a Type N thermocouple.*
- *Steam Chest: The steam chest is located in the turbine below the insulating blankets and is used to monitor the temperature drop of steam through the turbine. These temperature measurements along with those at the header are used to determine the efficiency of the turbine. Hence, the suitability of the Type N thermocouple's greater reliability.*

EMISSIONS STACKS

An extremely common application for thermocouples and RTDs is in emissions stacks and scrubbers. For years, JMS has worked with customers to design multipoint sensors to meet EPA standards as they become more rigorous. These designs include removable sensors, flexible multipoints, special supports for mounting the assembly in the stack and sensors protruding through the wall of the protection tube for quicker response. These tubes can be constructed from any customer specified metal and special coatings are also available.