

Paper Mill Reduces Operations and Maintenance Costs and Improves Safety with Rosemount 1199 Seal Assemblies Made of Robust Super Duplex 2507 Diaphragm Seal

RESULTS

- Lowered maintenance costs
- Reduced risk of shutdowns
- Reduced mill and personnel safety risk

APPLICATION

Measure static pressure at the recovery boiler black liquor ring header

APPLICATION CHARACTERISTICS

Elevated temperatures coupled with abrasive and corrosive fluids

CUSTOMER

A mill of a global paper manufacturer in North America

CHALLENGE

The recovery boiler is essential to run the mill with minimum environmental impact. A ring header is used to feed concentrated black liquor to multiple spray guns which inject the black liquor into the recovery boiler for combustion. Due to recent regulatory requirements, pressure measurements are taken at each liquor gun to allow safe operation of the boiler. Black liquor is abrasive and corrosive. Since this is considered a safety critical measurement, redundant pressure transmitters are installed on each liquor gun.

Initial competitive pressure transmitters with 316L SST remote diaphragms failed within two weeks of installation. The failures were characterized by a complete loss of the 316L SST remote seal diaphragm. Next, a competitive unit with an Alloy C-276 diaphragm was used. Those units failed within an average of two months.

The customer experienced a number of negative business consequences from the transmitter failures. First, operations and maintenance costs were increased due to the short two month service life and the need to frequently replace transmitters. Second, the risk of unscheduled shutdowns was increased due to the safety requirement to trip the boiler if a pressure reading is unavailable. If the boiler is shut down, black liquor normally burned in the boiler must be stored in tanks. When the tanks are full, production must stop.



The Super Duplex 2507 isolator material on the Rosemount 1199 Seal Assembly increased service life from less than 2 months to more than 3 years.



Figure 1. Installed Rosemount 1199 Gage Pressure Transmitter

SOLUTION

A Rosemount 1199 Seal Assembly was constructed of a material called Super Duplex 2507. This material has 2-3 times the yield strength, and twice the hardness of 316L stainless steel. This higher yield strength and hardness is able to resist mechanical damage from solids in the black liquor. In addition, this material exhibits corrosion rates which are as much as 15 times less than 316L SST in select black liquor environments.

A number of positive business results were experienced by the mill. First, the Super Duplex 2507 based seal assemblies have been in continuous operation for over three years without a failure. This has dramatically reduced maintenance costs. In addition, boiler trips due to seal failures have been eliminated. This has reduced the risk of a production outage. Finally, mill safety is improved through compliance with regulatory requirements, and a reduced need for plant personnel to perform maintenance on the recovery boiler.

RESOURCES

Emerson Process Management Pulp & Paper Industry

<http://www.emersonprocess.com/solutions/paper/>

Rosemount 1199 Diaphragm Seal Systems

<http://www2.emersonprocess.com/en-US/brands/rosemount/Level/Differential-Pressure-Level/1199-Remote-Seals/Pages/index.aspx>

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