APPLICATION NOTE

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Recycled Oil Containing Water

Industry: Ceramic Industry
Product: Magnetic Flowmeter, ADMAG CA

Introduction

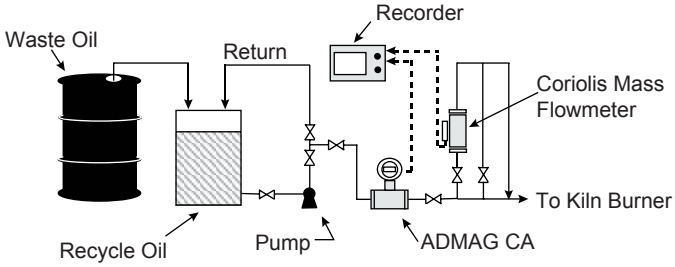
The use of recycled oil as an energy source presents a significant processing problem. Because composition of the fluid is not consistent and it also may contain impurities, the use of conventional flowmeter technologies is not practical. ADMAG CA, however, has been shown to provide reliable and stable flow measurement of recycled oil containing water.

Application

One cement producer uses recycled oil as a kiln fuel. A Coriolis mass flowmeter was used to control the recycled oil flow, however the meter readings were very unstable which made reliable control impossible. The Coriolis meter's problems were related to the separation of the oil and water as the fluid traveled the length of the meter and also the changing composition of the components (oil and water) resulted in unstable densities. In addition, the meter's zero was unstable and it was also difficult to clean the inside of the meter.

Solution

Initially, consideration was given to applying a conventional magnetic flowmeter. However, because the oil and other residuals showed a tendency to build-up in the Coriolis meter, a similar situation was expected to occur in the magmeter and the electrodes would be covered with an insulating coating. With ADMAG CA the non-wetted, capacitively coupled electrodes are immune to the effects of coating. In addition, the shorter lay length, as compared to the Coriolis meter, would better handle the potential layer separation of the oil and water.



The ADMAG CA was tested in series with the Coriolis meter. The test conditions were as follows:

Fluid Conductivity: 2.94-3.07 mS/cm
Fluid Composition: 48% oil, 43% water, 9% other
Flow Range: 0-5 tons/hr
Meter Size: 1"
Temperature: 30˚C (86 deg F)
Pressure: 1MPa (142 psi)
Meter damping: 3 seconds

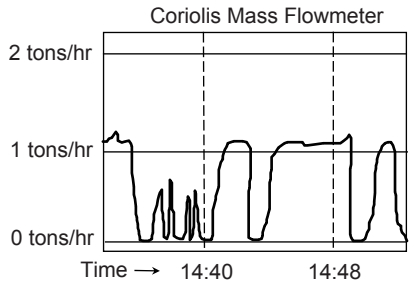
The test set-up used is in the figure above.

The recorded output of the Coriolis meter shows large output fluctuations. The recorded output of ADMAG CA, however, shows the output is stable and tracks the set-point closely.

YOKOGAWA

Notes

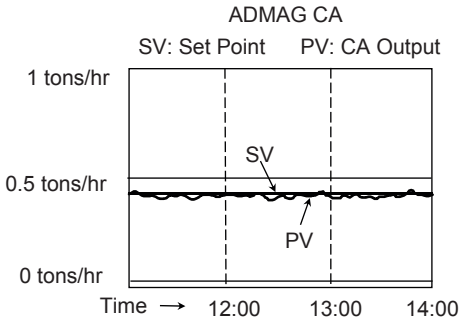
1. Be sure to measure the conductivity of the fluid to insure that consistent values are obtained.
2. The water content and potential water/oil separation can significantly affect the fluid conductivity. Examine a fluid sample to determine whether a two-layer separation occurs immediately or happens gradually. If separation occurs immediately, measurement even with ADMAG CA may not be possible.



The suspected cause for the output fluctuation is the variation in the fluid's density

ADMAG CA

- ❑ **Impervious to coating problems**
- ❑ **Measures ultralow conductivity fluids to 0.01 μS/cm**
- ❑ **Stable output with varying levels of oil and impurities**
- ❑ **Short lay length avoids problems due to fluid separation**



The ADMAG CA output is stable without large output fluctuations