

# Micro Motion<sup>®</sup> Enables Reuse of High-Density High-Viscosity Process Byproducts as Boiler Fuel

## RESULTS

- Enhanced plant efficiency
- Improved utilization of raw materials
- Reduced fire hazard
- Reduced noxious emissions



## APPLICATION

A petrochemical plant producing para-methylstyrene, vinyltoluene, divinylbenzene, and tertiary-Butylstyrene also produces a process byproduct similar to No. 8 fuel oil. These waste tars, or “heavy bottoms,” are used to fuel approximately 25% of boiler burn hours.

To ensure high boiler efficiency, the proper stoichiometric ratio of hydrocarbon to combustion air must be supplied:

- Supplying too little air results in a high level of hydrocarbon emissions and in carbon deposit in the boiler system, or “coking.” The effect of coking is to add a layer of thermal insulation, which lowers combustion efficiency and increases the fuel requirement. Coking can also constitute a serious fire hazard.
- Supplying too much air results in lowered combustion efficiency and wasted energy. The combustion temperature rises, causing wear and tear on the refractory, furnace, and boiler system, and producing potentially dangerous hot spots. In addition, the production of NO<sub>x</sub> rises, increasing the possibility of violating environmental regulations.

In other words, air must be supplied in correct proportion to the quantity of tar, and also in correct proportion to the specific chemical makeup of the tar. Accordingly, both flow data and density data are required.

*Savings estimated at \$160,000 per year.*

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## CHALLENGE

While measurement of air flow is easy and can be handled with traditional technologies, measurement of tar is much more difficult, due to the high viscosity of the fluid. PD meters have traditionally been used for this purpose. However, PD meters, when used with fluids of variable viscosity, have high “slip” error; that is, a significant quantity of fluid “slips” through the system unmeasured.

This application requires a measurement technology that yields accurate measurement on high-viscosity variable-density fluids. Without a solution to this problem, the utilization of heavy bottoms as boiler fuel cannot be optimized for energy efficiency, cost, or safety.

## SOLUTION

A Micro Motion® T-Series meter was installed to measure the mass flow and density of the heavy bottoms, thereby enabling accurate adjustment of the air supply. No other meter had been able to measure these fluids adequately.

If we estimate that fueling the boiler using 100% natural gas costs \$50,000 per month, using these essentially free waste products will reduce fuel costs by \$12,500 per month or approximately \$150,000 per year. If boiler and refractory rework costing \$100,000 is required every five years, and better control can double this period, the total savings is \$160,000 per year. Additionally, using waste products in this manner has the side benefit of reducing waste disposal costs.

