



APPLICATION REPORT Chemical

Flow and density measurement of paint additives and bases

- Coriolis flow measurement improves overall production consistency of paints
- Unobstructed flow stream saves processing time and improves throughput
- In line continuous density measurement assures proper recipe blending and waste reduction
- Replacement of rotary meters with single straight tube flowmeters with no moving parts



1. Background

MF Paints, headquartered in Laval, Canada, is a premium producer of stains and paints for a wide range of applications. The high-quality products are manufactured in state-of-the-art batch processes. To maintain a consistent product quality, the paint producer uses an automated skid to dose a variety of paint additives and bases to mixing tanks. In this way, performance can be improved while minimizing manual handling of chemical fluids to boost occupational safety.

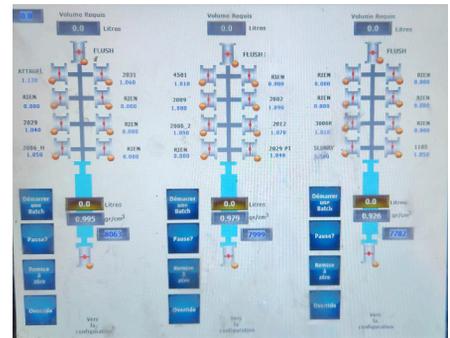
2. Measurement requirements

For dosing purposes, the paint manufacturer had been using a mechanical rotary flowmeter, a meter type with a rotating disc, to measure volumetric flow on the skid. They were entering the amount of additives required for each batch on a Human Machine Interface (HMI) tied to a control system. Based on the additive fluids' known densities, which vary between 1050 kg/m^3 (66 lb/ft³) and 2360 kg/m^3 (147 lb/ft³), the operator would be able to determine the transferred mass.

Since all the recipes are based on volume, an accurate measurement with a very fast response time is crucial for the operation. Since the skid's positive displacement pump does not produce a steady flow, the meter's lowest possible signal dampening setting had to be optimized on site to allow for fast reaction with flow changes for the control system to operate and totalize accurately. This was a time-consuming procedure and called for a much more suitable flow principle to improve automation and optimize the batching process.

3. KROHNE solution

The customer selected OPTIMASS 7400 single straight tube Coriolis flowmeters to measure the fluid transfers for each batch. Three meters are now installed on the skid and each meter can dose up to 8 different products. The blending system HMI uses the pulse output of the meters to control the pumps and valves based on totalized values. Compressed air is used to flush the lines to ensure that all products measured by the KROHNE meters are transferred to the tank at the end of every batch.



Blending system HMI

The OPTIMASS 7400 is designed for direct measurement of mass, but it can quickly determine the real time volumetric flow by using its direct measurement of fluid density and mass flow. In this way, the meter can provide much more information on the process as compared to the rotary meters previously used. The KROHNE meter has no moving parts or obstructions and features fast and completely digital signal processing ideal for batching processes of viscous liquids.

4. Customer benefits

The use of the OPTIMASS 7400 has significantly increased production efficiency and response time. The most significant improvement for the customer came from reducing the necessary cycle time for each batch. They estimate that each produced batch now takes about a third of the time it took before.



OPTIMASS 7400 for batching of paint additives

The old mechanical flowmeters also created a significant pressure loss based on their reduced internal diameters which effectively reduced the process line from 50 mm (2") to 25mm (1"). The unobstructed single straight tube OPTIMASS 7400 produces almost no pressure drop which means the viscous and high-density fluids flow at a higher velocity thereby greatly improving the throughput while saving on pump capacity.

The straight tube meters were easy to install in the skid since they matched the pipework, and they are easy to clean. Featuring Entrained Gas Management (EGM™), the KROHNE meters even maintain operation in the presence of entrained gas. This is helpful to ensure that all batch fluids are transferred accurately.

From an operational standpoint, the Bluetooth® connectivity and the available OPTICHECK Flow Mobile app-based verification are extremely beneficial since the cluttered environment and tight installation space makes it difficult to access to the instruments to view or modify parameters. It allows the operator to make configuration changes, review every real-time meter value, and even generate a complete diagnostic report via their smart phone.

5. Product used

OPTIMASS 7400

- Single straight tube Coriolis mass flowmeter for advanced process applications
- High accuracy mass, density and volume flow measurement ($\pm 0.1\%$ of MV)
- Maintains operation over a wide range of gas fractions and complex flow conditions (EGM™)



Contact

Would you like further information about these or other applications?
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