



## APPLICATION NOTE Chemical

### Mass flow measurement in paint and varnish production

- Mass flow measurement of products that are viscous, shear-sensitive and contain solids
- Virtually no additional pressure loss through the measuring tube
- Accurate and reliable measurement to maintain constant quality of end products

#### 1. Background

Processes such as mixing, dosing and milling are essential components in the production of paint and varnish. To guarantee a high degree of automation, precise, reliable measurement of flow volume is crucial. The production processes sometimes use very expensive raw materials. For this reason, product losses or a plant stoppage can be very costly. The precise and continuous measurement of chemical volumes is not only important when it comes to the quality of the end product but also in terms of operating costs.

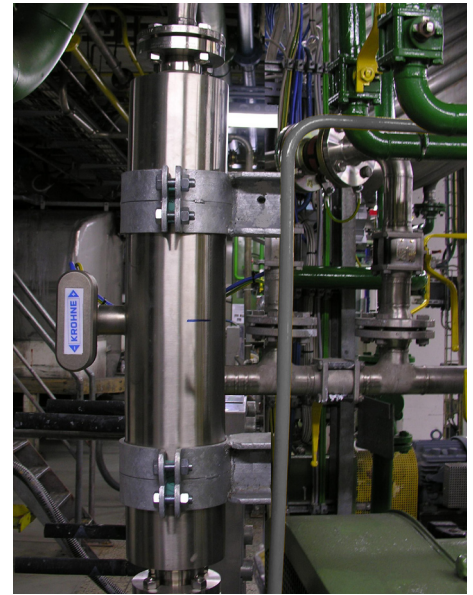
#### 2. Measurement requirements

In colour pigment grinding processes, components move from mobile finishing mixers into the mill and back. This process runs automatically several times in a period of 36 to 48 hours to ensure that each colour pigment has gone through the mill at least once. The hoses used to connect the mixers and mills represent weak spots when operation is unsupervised. As the entire process takes place as a circuit, it is enough for each of these plants to have one measuring device in the outlet to shut down the plants immediately in the event of a leak.

The raw materials used to make varnish are highly viscous and processing takes place at low flow velocities and are generally shear thinning, i. e. the behaviour changes depending on the flow velocity. In addition, the media may have high pigment content. Only CORIOLIS mass flowmeters with a single straight measuring tube may be used to prevent the media from damaging or blocking pipe elbows and flow splitters. The measuring devices must be self-draining, easy to clean and maintenance-free.

## 3. KROHNE solution

For these applications, KROHNE provided OPTIMASS 7300 mass flowmeters, size DN 40. These varnish milling plants are designed for mass flows of approx. 5000 kg/h. Paste-like pre-products are ground, are then finalised later on and processed into end products. Communication with the PLC (Programmable Logic Controller) takes place via the 4...20 mA current output of the MFC 300 signal converter. The PLC saves a flow measurement every 90 seconds in order to compare it to the next value. In the event of deviations greater than 360 kg/h, the plant shuts down automatically. The smallest detectable leak volume is 36 kg/h. When switching on heat exchangers, fluctuations in the flow occurred, triggering the false alarm. After performing tests it was determined that fluctuations were caused by a slight deformation of the wall between the heat exchanger and the medium. For this reason, the leak value was increased to eliminate the false alarm. The leak volume was cut in half so that fail-safe alarm messages could be sent out, even with different processes in plants.



OPTIMASS 7000 F in a milling plant

## 4. Customer benefits

KROHNE's mass flowmeters featuring a single straight measuring tube are perfect for these applications. There is no risk of blockage. With the OPTIMASS 7300, even extremely small leaks can be detected. For the customer, the number of stoppages in its milling plants decreased significantly and end product losses also went down considerably. The very slight increase in sensor pressure loss does not require higher pump output.



Control panel

## 5. Product used

### OPTIMASS 7300

- The only mass flowmeter with a single straight measuring tube available in Stainless Steel, Hastelloy®, Titanium or Tantalum
- Minimal pressure loss
- Any installation position, self-draining and easy to clean
- High accuracy even when product changes
- Reliable measurement of mass and volume flow, density, temperature, concentration as well as liquids with solid content
- Available as compact or remote version



Measuring Sensor  
OPTIMASS 7000 F



Signal converter  
MFC 300 W

## Contact

Please visit our website for a current list of all KROHNE contacts and addresses.



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