



## APPLICATION REPORT Chemical Industry

### Measurement of aggressive phosgene derivatives at BASF

- Mass flow measurement on loading road tankers with chloroformates and acid chlorides
- Determination of the fill quantity for invoicing purposes
- Consistently high measurement accuracy despite corrosive process liquids

#### 1. Background

At its parent plant in Ludwigshafen, the chemical company BASF manufactures phosgene derivatives such as chloroformates and acid chlorides, which are used in the production of plastics, pharmaceuticals and packaging. Road tankers must be filled with these highly corrosive and poisonous media in order to transport and deliver them to various BASF plants.

#### 2. Measurement requirements

For invoicing purposes, the chemical company needs exact information about the delivered amount of chloroformates and acid chlorides. This requires a reliable mass flow measurement of the liquids filled into the tanks at a flow rate of 60 t/h, a temperature of 50° C / 122° F and a density of 1000 to 1500 kg/m<sup>3</sup> or 1686 to 2529 lb/yd<sup>3</sup>. Because these are very aggressive media, the technical measurement solution must provide a high degree of chemical resistance. Previously, BASF used mass flowmeters from another manufacturer, but they could not withstand the aggressive properties of the process liquids and could not deliver consistent measuring results.

## 3. KROHNE solution

BASF chose to install four OPTIMASS 7300 C Tantalum meters. KROHNE's meter is the first flowmeter in the world with one single, straight measuring tube made of tantalum, which makes it particularly suitable for use with highly corrosive media. The Tantalum alloy used is designated Ta10W and consists of 10% tungsten and 90% tantalum. The tungsten content guarantees higher measuring tube stability. The chemical resistance of tantalum is comparable to that of glass.

Each mass flowmeter, nominal diameter DN 50 / 2", was flange mounted in a pipeline with particularly robust enamel coating. The measuring point in the filling station is also electrically heated to protect the process liquid from frost. As the meter is installation insensitive, no inlet and outlet runs were required for the installation.



Mass flow measurement of aggressive chloroformates and acid chlorides

## 4. Customer benefits

Using the OPTIMASS 7300 C Tantalum, BASF can continuously monitor the amount of phosgene derivatives delivered and can accurately invoice each delivery, based on the measurement results.

This chemical company has used the OPTIMASS 7000 Tantalum meter since 2009 without interruption. The mass flowmeter measures the aggressive media continuously and precisely without having to service the instrument or replace it regularly due to corrosion. Because the OPTIMASS 7000 does not require a flow splitter, practically no product deposits are found in the pipe and it is easy for BASF to clean the straight meter tube.

In contrast to the existing twin U-tube meters, in which both the flange and the flow splitter consist of tantalum, with the OPTIMASS 7300, only the measuring tube and the raised face are made of tantalum. This creates a significant cost benefit for BASF.

## 5. Products used

### OPTIMASS 7300 C

- The only single straight tube meter available in 4 materials – titanium, tantalum, Hastelloy C22, Duplex
- Reliable measurement of mass and volume flow, density, temperature and solid content
- Low pressure drop
- Largest nominal diameter of any single straight tube meter in the world (DN 80 / 3")
- Highest safety factor with PED approved secondary containment (up to 100 bar / 1450 PSI)
- Any installation position, self-draining and easy to clean



### Contact

Would you like further information about these or other applications?  
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