Ink Producer Increases TNPT Production by 50 Batches Per Year with Micro Motion® ELITE® Meter

**BENEFITS**

- Produced 50 additional on-spec batches per year, worth US$1.25 Million
- Reduced production costs and waste of raw materials
- Saw a six-day payback period on the cost of installation

**APPLICATION**

A major ink producer in the United Kingdom makes Tetrabutyl Titanate (or TNPT) as an intermediate ingredient in the ink production process. TNPT is commonly added to increase the paint and ink pigment quality in adhering to a substrate. This additive is quite valuable when comparing it to the price of ink itself. TNPT is sold at US$50 per kilogram.

To produce the TNPT: alcohol, tetra compound, and a solvent are fed into the ink process reactor in precise mass ratios. Ammonia (NH₃) is added continuously throughout the production process until the end of the polymerization reaction. Adding ammonia alters the pH levels and halts the polymerization reaction via a sparge ring. The last few molecules of ammonia gas that are fed into the process are critical for producing TNPT, and must be added in precise amounts to neutralize the reaction at the appropriate time for each batch.

The ammonia fed at the end of the process runs at a flow rate of 0–4.4 lb/min (0–2 kg/min), 45–145 psig (3.1–10 bar) of pressure, and 104–176°F (40–80°C) of temperature.

**CHALLENGE**

For traditional flowmeters to work well, the customer needs to be able to control a wide gas flow range and fluctuations in temperature and pressure. For the customer, mass measurement is preferable.

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to the other measurements because they run a gas — of which volume and density can vary
due to the fluctuations in temperature and pressure. The customer tried using thermal
mass meters, but these meters could not produce sufficient accuracy for the process
conditions. Thermal mass meters were only accurate to 10% under the range of the
conditions, which was not precise enough to stop the polymerization reaction to produce
TNPT effectively.

SOLUTION

The customer chose to install a Micro Motion® ELITE® meter in its TNPT production process
to control the flow rate of ammonia gas. The ELITE meter can achieve as high as 0.35%
accuracy over a wide flow range of gas. These meters are easy to install and do not require
any run-pipe or conditioner prior to fluid flowing into the meter.

With the installation of the Coriolis meter, the customer saw the following benefits:

• Reduced costs on raw materials by minimizing the overage of raw materials fed into the
  TNPT reaction process

• Increased process efficiency by allowing them to increase their production capacity by
  50 batches per year, which is worth US$1.25 million a year on a 500 kg-batch size basis

• Saw additional cost savings in not having to reheat the fluid due to low pressure drop
  that occurs when using other types of technologies.

Given these benefits, the customer was able to break even on the US$20,000 installation
costs in 6 days, or what is equivalent to an additional batch of TNPT produced.

Location of the ELITE meter installation at the customer site

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