

Metering High Temperature Fluids with the RotaMASS Coriolis Flowmeter

Molten sulfur, bitumen, pitch, paint resins and liquid toffee are just a few of the fluids transported at high temperature. Their fluid properties change wildly with small variations in temperature, which presents a problem for most metering technologies, while the coriolis flowmeter is perfect for such measurements. However, a potential problem for most coriolis flowmeters on the market is that they are literally cooked by the high temperature fluids. Also, in measuring these fluids it's important to maintain their thermal inertia:

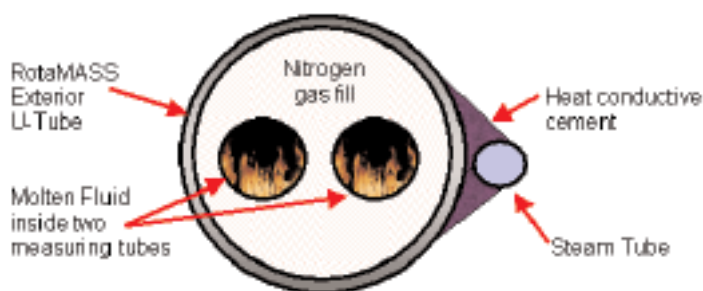
- Loss of heat in the fluid can be expensive to restore
- Fluid properties change dramatically and affect the process performance
- Even slight cooling can cause the fluid to stick to the walls, precipitate or bind together.

Just when the market was about to give up on Coriolis technology, along comes the RotaMASS 3 Series that utilizes sensors that can continuously handle fluid temperatures up to 662°F (350°C) and also features an insulated enclosure with heat tracing.

Here's how!

The driver and coil components inside the sensor are made from materials selected for their performance and durability at elevated temperatures. The design of these components is critical to successful operation under such difficult operating conditions. But this is only half the key to Yokogawa's success.

To maintain the fluid's thermal inertia, the RotaMASS 3 Series design includes external process heating as shown below:



In addition to the external process heating, Yokogawa provides as a standard factory option an insulated enclosure for the RotaMASS sensor:

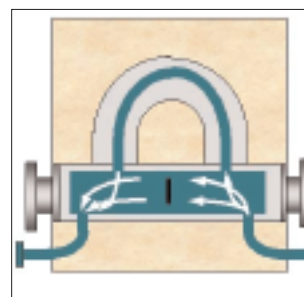


RotaMASS sensor and process heating is contained in a two-part enclosure. Insulation wool is added to fill the void.



The two halves are then riveted together. The terminal box is extended beyond the exterior of the enclosure to allow for field serviceability.

Since the temperature of the measuring tubes dramatically affects their flexibility and resonant characteristics, it is important that there is not a significant temperature difference between the start and end of the U-Tubes that would translate into errors in both the flow and density measurements. It is imperative that the heat is transported from the protection tube to the measuring tubes via the nitrogen. In the RotaMASS 3 Series design, one steam tube is sufficient to heat the protection tube from only one side. This is because the protection tube is very well insulated by the stone-wool and the heat conductivity is much greater than the nitrogen.



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Pictured below is an application of this technology on hot Bitumen at a loading terminal.



The versatile ROTAMASS can be used in the most difficult applications from cryogenics to molten liquids as well as sanitary applications and aggressive chemicals.

- Heavy wall, seamless, dual tube design guarantees stability under high pressure
- Process temperatures from -328 to 662°F . Insulated enclosures and steam jackets available.
- Operating pressures to 3600 PSI
- Density measurement with accuracies to ± 1 g/l
- True sanitary design