Metering cryogenic fluids using the Rota*MASS* coriolis flowmeter.

Liquid Nitrogen, Carbon Dioxide, Argon, Oxygen, and LNG/LPG are some examples of cryogenic fluids which are perfect for a Coriolis mass flowmeter. Their fluid properties change wildly with small variances in temperature or pressure. The biggest problem is that most meters on the market literally freeze up and stop working when metering these fluids. Eventually these cryogens and subzero fluids freeze the internal measuring components restricting the meter's motion and halting the measurement. You're left with a rather large block of ice enclosing a non-functional Coriolis meter.

Just when the cyrogenic market was about to give up on Coriolis technology, along comes Rota*MASS* Series 3 with remote sensors that can continuously handle fluid temperatures down to 328°F (-200°C).

Here's how!

Inside the sensor, the driver and coil components are made from materials selected for their performance and durability at cryogenic temperatures. The design of these components is critical to successful operation under such difficult conditions.

In addition, the interior space of the Rota*MASS* sensor must be kept free of any air that could contain moisture. This is accomplished by filling the meter with a dry, inert gas.
But this is only part of the reason for Yokogawa's success in these applications.

In measuring these fluids it also important to maintain a consistent temperature through the meter. Fluid properties change dramatically and affect the process performance. Even the slightest warming can cause these fluid to flash off, generating bubbles and erroneous measurements.

In order to maintain the fluid's thermal inertia, Yokogawa can provide, as a standard factory option, an insulating enclosure for the Rota*MASS* sensor.

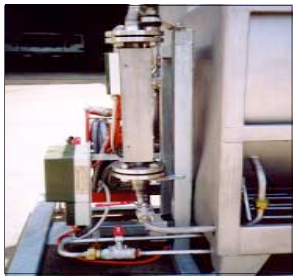
Thermal Enclosure

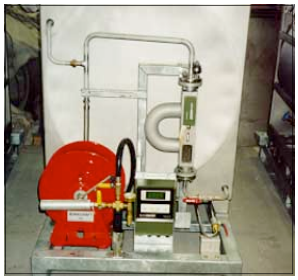
Rota*MASS* sensor and process heating is contained in a two-part enclosure. Insulation wool is added to fill the void. The two halves are then riveted together. The terminal box is mounted externally to allow for easy access in the field.

Thermal Enclosure

Liquefied Gas Applications

An application of this technology on Liquid Argon on a cryogenic delivery tanker is pictured below. Note the vertical orientation of the RotaMASS sensor.





Note that there is no thermal enclosure around this sensor because the fill times are very short and filling is at a fixed rate.

Combine this with a process temperature range of up to 662°F (350°C) and the best zero stability in the industry and you can see why RotaMASS is truly the "Best-In-Class" Coriolis meter that you can buy!