

# New Milk Receiving Measurement Solutions Improve Dairy and Cheese Making Operations

By Thomas Roemer and Olivier Reglat, KROHNE, Inc.

The milk receiving step at dairy and cheese making operations is critical to product quality. Dairy operations need measurement solutions that help them deal with two key milk receiving issues – the aeration that occurs due to agitation in milk trucks traveling from the farm to the dairy plant; and the need to identify and measure the milk components. Older measuring solutions for these milk receiving issues are slow, costly, and inaccurate. Now, new inline measurement devices are available that help with process optimization and quality improvement.

## Transportation = Aeration

When a raw milk truck arrives at a dairy plant downloading station, the milk is always aerated due to the moving and shaking associated with its transportation. There is also typically a significant amount of air introduced at the beginning of the milk transfer line and at the end when the milk transfer level is low, due to the syphon effect.

The traditional way to milk receiving is the use of a large scale onto which the truck drives. Operators extract the milk and use measurements taken before and after unloading the milk to determine how much milk has been unloaded. This option is quite slow and results in an average error rate of at least 2 percent.

An alternative to the scale is the milk transferred is measured by volume flow, which does not distinguish between air and milk. Therefore, air in the transfer line leads to measuring errors. Volumetric flow meters produce an error of about 1 percent. The alternative technology for measuring the incoming milk is a Coriolis mass meter. Most Coriolis mass meters however cannot handle high amounts of air. If an air pocket passes the meter, it typically stalls and the measurement is lost.

To get an accurate measurement, operators typically have to use de-aerators to remove air in the milk, which delays and complicates the transfer process. Dairy operators are looking for faster milk transfer for several reasons. One critical motivation is processing time. The faster milk moves from the farm to the pressurization stage, the safer it is for the product and the less risk of bacterial contamination. Every minute of additional processing adds to possible product degradation.



OPTIMASS includes entrained gas management system and provides full transfer with accuracy of 0.2 percent or less

In addition, it can take up to 30 minutes to unload a truck and there may only be a certain limited number of loading bays. End users typically want to unload the truck as quick as possible so the next truck can unload. Ideally the downloading process should be reduced to 4...5 minutes, but current deaerating process does not allow that.

Finally, de-aerators can be costly capital equipment, which takes up space and needs to be maintained, cleaned and sterilized frequently – adding to operating costs.

The preferred option is removing the de-aerator altogether, which can be achieved with the use of new straight tubes Coriolis mass meter technology that includes an entrained gas management

(EGM) system. For example, the new OPTIMASS developed by KROHNE can handle these challenging measuring conditions without stalling the meter. It provides full transfer with a global accuracy of 0.2 percent or less.

### **New meter helps dairy with high air content**

The new meter with EGM was used recently for flow measurement of raw milk at German dairy Frischli, which manufactures individual coffee cream portions. The raw milk needed for production is fed through via two pipelines to several buffer tanks. The company previously used two standard mass flow meters, but found their measurements were repeatedly affected by entrained gas in the raw milk caused during transportation. The de-aeration tank could not fully eliminate the entrained air, which was affecting their traditional measuring device. This was causing inconsistent measuring amplitudes, and disruption of electronics resulting in significant measuring errors or frozen measured values.

They installed the OPTIMASS in front of the buffer tank, and found it to be immune to the negative effects of entrained gas in raw milk. Using the EGM feature, the device continuously maintained the volume, mass and density measurement, even with entrained gas between 0-100 percent. The problems of flow measurement caused by entrained gas have now been resolved and they now have continuous monitoring of the raw milk. The dairy uses the information on raw milk volume delivered compared to coffee cream produced to optimize its operational processes.

The new meter is currently considered at a California dairy which is installing a new loading bay and was trying to decide between a large scale and a flow measurement device. Their interest in the OPTIMASS flow meter with the new gas management feature is for the following reasons: higher accuracy and a faster transfer rate. It will also lower their capital costs, since they do not have to purchase a de-aerator or a truck scale, which costs five to ten times more than the meter.

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