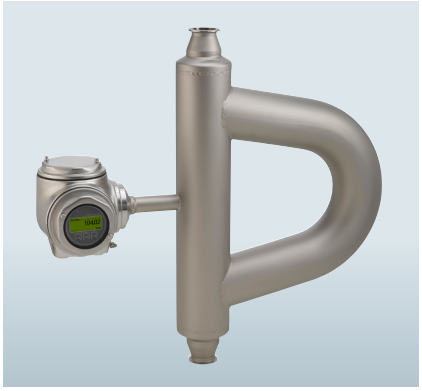
Milk Receiving and Cream Load Out Metering

Promass® Q improves dairy throughput and plant mass balance

Benefits at a Glance

- Increase truck turns and reduce maintenance cost by eliminating truck scales
- Provide mass, volume, continuous milk fat percentage and temperature for load on ticket and receiving documentation
- <50 lb. accuracy for 50,000 lb. loads
- Eliminate error of up to 75 lb. per load due to snow/rain or excessive rinse water
- Identify potential operator errors that can cause contamination (not using gaskets, excessive water flushing etc.)
- 3" line capable of 750 gpm with minimal pressure drop



Summary Meter-based milk intake is generally used for internal accounting and plant mass balance or as a legal for trade measurement. Endress+Hauser has developed an application solution to ensure accurate measurement of milk received or cream outload using the Proline Promass Q Coriolis mass flowmeter.

Challenge Entrained micro bubbles in the milk cause measurement challenges. The micro bubbles are caused by pumping and sloshing during truck transfer or by insufficient suction head which creates cavitation in the pump. This is common with grade level loading bays or non-priming impeller pumps. This challenge has limited the use of Coriolis mass flowmeters in the past.

Solution The Promass Q provides the highest measurement accuracy and repeatability for mass flow, volume flow, and density. It has been optimized using patented Multi-Frequency Technology (MFT®) for liquid applications where entrained air is known to be present which makes it ideal for milk intake. For full custody transfer, Endress+Hauser also has a batch controller and ticket printer. Meter performance verification and diagnostics are performed via Ethernet/IP® utilizing Heartbeat Technology® to ensure operational reliability.

Results The Promass Q was deployed for milk intake during 2019. Performance from several thousand tanker loads of 50-54,000 lb. have shown an average deviation of <0.09% compared to traditional truck scales. This enables the Promass Q to be used in custody transfer installations according to NIST Handbook 44, section 3.37, and eliminates costly truck scales that cause time consuming bottlenecks. A return on investment of three months has been realized.

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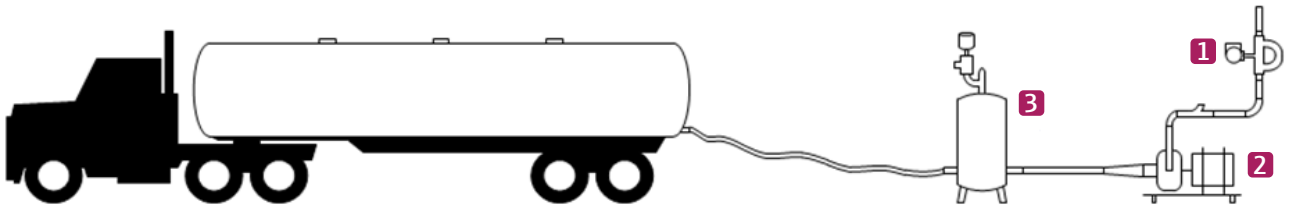

1 Promass Q Coriolis flowmeter provides a Gold Standard measurement in terms of accuracy, repeatability, in installations with possibility for entrained air.
The Promass Q has been optimized for liquid applications where entrained air is known to be present, using patented Multi-Frequency Technology. The dual measurement tubes are excited at two different resonant frequencies simultaneously, and the response to the resonant frequencies are used to compensate for measurement error due to entrained air.

2 Ensure the pump is capable of operation at the minimum available suction head without cavitating. The flow of milk from the truck to the pump suction is gravity fed. The height of the truck outlet nozzle is generally about 30 inches above grade, and the height of the pump suction is about eight inches above the floor. That leaves an available NPSH of two feet at the end of unloading. Load accuracy is assured by sizing pump correctly to minimize cavitation or funneling at the end of the load.

3 Ensure a properly sized air eliminator is used to keep slugs of air out of the unloading pump.
The air eliminator ensures that the pump suction is always flooded to prevent error in the flow measurement. The air eliminator does not remove the microbubbles in the milk itself, it prevents the larger slugs of air that might be present if system is not primed properly.

For information on the Promass Q visit eh.digital/promass_q_us.

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