

Truck loading, entrained gas solved at Kuwait Petroleum Company with Micro Motion Coriolis

RESULTS

- Increased accuracy to +/- 0.15% and repeatability to 1.5%
- Eliminated required cleaning actions due to product spill during erratic overload
- Eliminated additional fill actions
- Easy installation and reduced maintenance
- No loss of time at weighing bridge



APPLICATION

Kuwait Petroleum Company (KPC) owns and operates a primary oil blending company in Belgium that loads trucks with oil blending products. In multiproduct loading bays, product contamination must be avoided; therefore, the lines are cleared of products (pigged) after each batch. Each loading batch starts and ends with empty process piping. A batch that starts and ends with empty pipes is called an “empty-full-empty” (EFE) batch process, a common practice.

CHALLENGE

During the loading process, KPC starts and ends each EFE batch with the installed positive displacement (PD) meters (oval gears). At the end of each loading operation the lines are pigged and air is introduced into the process as entrained gas. Due to the presence of entrained gas, measurements from the installed PD meter were often incorrect.

The PD meter only measures the volumetric flow of the mixture. Since gas occupies a large volume for a very low weight, it can cause measurement inaccuracies when introduced into a liquid mixture. The inaccurate measurements caused the trucks to be under and overfilled, and KPC was forced to implement corrective actions each time. If the truck was underfilled, it was detected on the weighing bridge after the process was finished, which was too late. The truck was required to repeat the process until accurate fill was achieved.

If the truck was overfilled, the product was spilled into the loading bay and cleaning was required.

Also, if a truck is overfilled (the admitted bruto weight on the road differs per country), the truck often is required to drive back to the oil company to partially unload the truck and then drive back to the international country of destination.

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Truckloading Bay



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These consequences of both under and overfilling are costly and time consuming.

SOLUTION

KPC installed Emerson's Micro Motion® ELITE® Coriolis flowmeter, Model CMF300 with 2700 MVD™ technology, which is capable of measuring flow with the presence of entrained gas. This flowmeter measures mass directly.

Several meters were tested during the test phase and the ELITE meter performed best. Other meters installed had slightly curved tubes, which resulted in poor accuracy with an average of 2% to 3% and repeatability was only between -10% to +12%.

The Micro Motion ELITE Coriolis meter, Model CMF300, has heavy curved tubes and a low frequency (typical low resonant frequency 90Hz), which perform well under dual phase conditions. Measurement accuracy increased to +/-0.15% for each batch and repeatability is now between +/-1.5%.

The meter also works well under environmental vibrational conditions. As a result of installation, achieved benefits include: increased time management, improved safety and eliminating corrective actions such as cleaning the loading bay and repeating the filling process.

KPC has now installed 10 additional Micro Motion ELITE Coriolis flowmeters for other loading bay areas due to the great success achieved in Belgium.



To the left: a CMF300 insulated, in flag position, flowing upwards.



ELITE CMF300 meter pictured in vertical flow upwards, operating in harsh entrained gas and vibrational conditions.

