

Improved Efficiency in Scotch Whisky Tanker and Cask Fill with Micro Motion® Flowmeters

RESULTS

- Tanker loading times reduced 50%
- Customs & Excise approval
- Reduced maintenance compared to PD meters
- Unaffected by “Char”



APPLICATION

The Cambus site in Stirlingshire, Scotland, is a storage and cask filling facility operated by Diageo plc. Grain spirit and malt spirit are delivered by tanker from outlying distilleries to the site where they are matured and, many years later, blended to create such brands as Johnnie Walker, J&B Rare and Bell's Scotch Whisky. The tanker off-loading operations require flow measurement to record and control the delivery. At Cambus, some spirit is reduced, a process where water is added to the spirit to reduce its strength. Other spirits are stored and then later transferred to the cask filling lines as required, or loaded back into road tankers for onward delivery.

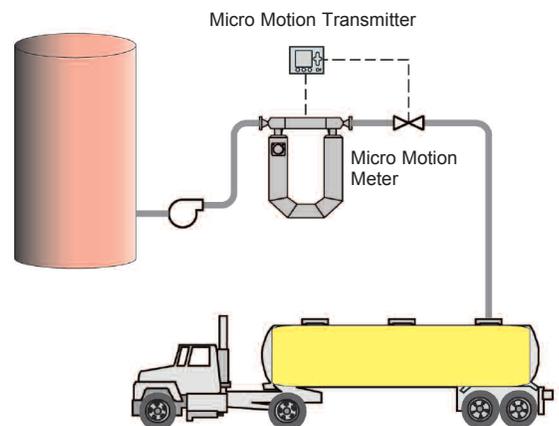
While Diageo need to control flow rates and batch totals for production and inventory control, all whisky and spirit transfers require Customs and Excise approved measurement systems, to ensure the correct duty is paid.

CHALLENGE

Seeking greater productivity at the site from the tanks and tanker facilities available, the site wished to increase flows in the various transfer processes and tanker fill rates from 70m³/hr to 90m³/hr or more, one objective being to reduce the tanker offloading and loading times.

The existing 3" PD meters used for flow monitoring required regular maintenance and calibration checks: this down time produced inefficiency.

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All metering had to meet the C&E volume flow measurement accuracy requirements.

SOLUTION

Initial trials showed that replacing the PD meters on site with a Micro Motion® CMF300 3” meter allowed the increased flow rates required, even using existing pipework. This increase was due to the lack of a significant pressure drop across the meter, which also improved efficiency. Another immediate advantage was that the Micro Motion meters could be blown-through with air after the batch completion, to remove all traces of the previous product and avoid any taint between batches.

To gain Customs and Excise approval for the meters, the site engineering management had to demonstrate that the Micro Motion meters were capable of consistently measuring flows to the required accuracy. This arose because at the time of the first installation, Micro Motion meters had not previously been applied to Scotch whisky. A series of tests passed a known amount of spirit through several meters connected in series. This showed an accuracy of 0.1% or better, with 0.05% accuracy achieved “most of the time”. Customs and Excise requirements are based on volume flow measurement, so the Micro Motion mass flow meters provide this output by measuring the liquid density, and then computing flow volume.

A total of 16 Micro Motion CMF300 ELITE® meters have now been installed on the Cambus site, connected to rack mounted totaliser and batcher units located in the main control centre. Four of these are used to meter tanker on and off loading, where they have reduced the time that 27,000 litre vehicles are in the loading bays from 1 hour to around 35 minutes, achieving the initial project objective.

Further CMF300 units are used for the whisky reduction processes, where water is added to reduce the alcohol strength. Conventional process control used a sampling system to monitor the percentage alcohol: with the density and temperature outputs from the Micro Motion unit this has provided an on-line alcohol measurement, giving potential for improved control and efficiency.



After the first year of operation, over 52 million litres of spirit had been measured by these Micro Motion meters at Cambus. A calibration check showed that there was no change in the meter calibration – it was not necessary to carry out any maintenance or changes. The original PD meters had moving parts, and were affected by the wear produced by “Char”, an abrasive present in some spirits, so had needed regular recalibration and repair. This work has now been avoided.

On site the advantages of using Micro Motion CMF300 units with larger line sizes, such as 4” lines, would mean lower fluid velocities and pressure drops, and less possibility of problems from static electricity build-up, so this is under consideration.