

Micro Motion® Coriolis Flow Meters Improve Lauter Tun Efficiency in Brewing Process

BENEFITS

- High accuracy, real-time monitoring of wort concentration ($\pm 0.1^\circ$ Plato/Balling)
- Reduced costs and improved safety related to the elimination of sampling wort concentration during sparging
- Reduced beer loss by optimizing lauter tun cut-off to brew kettle



APPLICATION

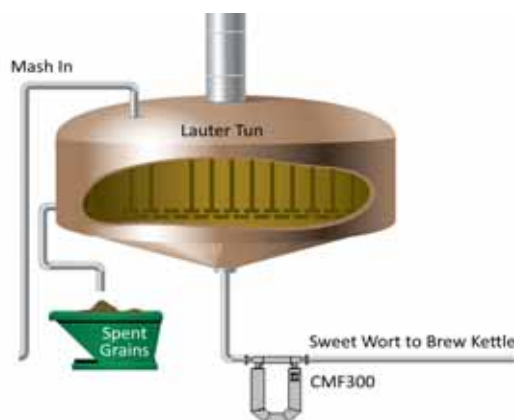
During the production of beer, barley and other grains are cooked in boiling water to produce a thick slurry called mash. After cooking, the mash is transferred to a vessel known as the lauter tun. In the lauter tun, a filtration process occurs that separates the sugar-bearing liquid (wort) from grain husks and other solids present in the mash. The husks and other solids form the filtration media as they settle to the bottom of the tun. The wort drains through these solids and out small slots in the false bottom of the tun and is pumped to the brew kettle for further processing.

Near the end of this filtration process, hot water is sprayed over the filtration bed in order to extract any residual sugars clinging to the remaining solids. This process is called "sparging." As sparging progresses, the concentration of the fermentable sugar in the wort, usually measured in Plato or Balling, decreases to a point where it is no longer economical to send to the brew kettle. At this point, referred to as a "kettle break," the flow to the kettle is cut off.

CHALLENGE

A large international brewer was manually sampling the wort draw-off during the sparging process to measure the concentration of the fermentable sugar in the wort. Because of the inherent delays in manual sampling, this process made it difficult to optimize the cut-off to the brew kettle, either leaving fermentable sugars in the lauter tun or sending excess water to the brew kettle. Leaving fermentable sugars resulted in "beer loss" as it reduced the amount of alcohol that could be generated from the initial grain load. Sending excess water to

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The lauter tun is a cylindrical tank with a false bottom and slotted plates upon which the mash settles. The mash is added to the lauter tun and an internal rake system is circulated to evenly distribute the solids. This process creates a filter bed of grain husks to naturally strain the wort through the false bottom of the lauter tun.



For more information:

www.EmersonProcess.com/solutions/food_bev

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the brew kettle was also a financial burden as it required additional energy (steam) to condense the wort to the optimal concentration prior to fermentation.

In order to improve operational efficiency, final product quality, and worker safety, the brewer was seeking a solution that would allow them to do the following:

- Accurately measure the volume and concentration of wort delivered to the brew kettle
- Eliminate the need to manually draw samples of hot wort (165°F)
- Reduce beer loss by optimizing cut-off of wort to the brew kettle.

SOLUTION

The brewer chose to install a Micro Motion Coriolis meter at the outlet of the lauter tun on the kettle feed lines. They purchased a three-inch ELITE series sensor with 2700 series transmitter because of its unique ability to measure the full range of Plato/Balling concentration out-of-the-box, without a costly on-site, single-point density calibration that is required by other Coriolis vendors. Additionally, the brewer purchased the meter based on the following advantages:

- Real-time Plato/Balling monitoring of wort to control the kettle break
- High-accuracy concentration measurement ($\pm 0.1^\circ$ Plato/Balling) that is unavailable in other Coriolis meters
- High-accuracy flow measurement ($\pm 0.05\%$) of the wort to the brew kettle
- Ability to clean the sensor with the existing clean-in-place (CIP) process.

Because of the meter's ability to provide real-time measurements of both flow and concentration, the customer no longer had to interrupt activities to take manual measurements and the progress of the lautering process was always available.

After installing the Coriolis meters, the brewer achieved the following financial and operational benefits:

- Reduced costs and improved safety of the brewing process due to the elimination of manually sampling the wort
- Improved yield due to the optimized cut-off of wort to the brew kettle
- A reduced grain bill as more fermentable sugar was utilized from each batch.

