

Micro Motion® Improves Ethanol Production via Inline Measurement of % Dry Solids

BENEFITS

- Improved consistency of corn mash slurry
- Eliminated process problems due to variation in process fluid
- Increased process throughput
- Reduced enzyme usage and costs
- Reduced maintenance costs



PROCESS

To produce ethanol fuel from corn by dry milling, the corn is first ground into flour, or “meal.” A weigh belt is used to feed the meal into a mash preparation tank, and water is added in proportion to the weigh belt measurement. To prepare the corn mash slurry for fermentation, the starch in the slurry is converted to sugar by exposing it to enzymes.

The success of the fermentation depends on the completeness of the starch-to-sugar conversion, which in turn depends on the correct ratio of cornmeal, water, and enzymes. A “bad ferm,” or a batch with high or low % dry solids, can cause problems during subsequent processes, e.g., during distillation. To reduce the risk of a bad ferm, most plants “over-add” enzymes, resulting in materials waste and unnecessary costs.

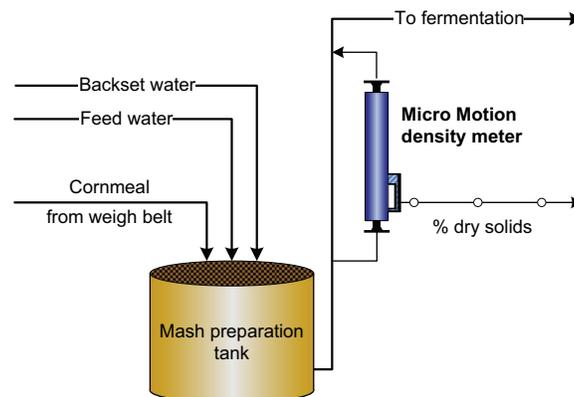
CHALLENGE

Because the weigh belt input varies, and the water input varies due to changes in backset flowrate, the composition of the slurry can vary greatly within a short time. In an ethanol production plant in the midwestern U.S., manual sampling and laboratory analysis were used to determine the amount of water to add to achieve the correct % dry solids. However, the lag time inherent in this method meant that even the most recent data might be out-of-date.

In addition, because of the critical importance of weigh belt data, operators frequently called for emergency checks of the weigh belt, resulting in high maintenance costs.

Real-time % dry solids data improves consistency of corn mash slurry

www.micromotion.com



The % dry solids measurement from Micro Motion enables fast response to changes in weigh belt and backset water input



For more information:
www.EmersonProcess.com/solutions/food_bev
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SOLUTION

The ethanol producer installed a Micro Motion® straight-tube density meter in a slipstream. The system provides real-time % dry solids measurement with an accuracy of $\pm 0.00015 \text{ g/cm}^3$. With this data, the company has been able to control the dry solids content of the slurry to within 0.2%. The straight-tube device was chosen because it is easy to clean – an important consideration for this process fluid.

As side benefits:

- Maintenance costs were reduced, because the weigh belt measurement was no longer critical for slurry consistency and weigh belt checks could be moved to periodic maintenance.
- Enzyme costs were reduced, because it was no longer necessary to “over-add” enzymes to compensate for variation in slurry consistency.

The ethanol producer reports that in the six months since installation, no “bad ferms” have occurred.

