



Level



Pressure



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Analysis



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# Promass 83F in Light and Heavy Corn Steepwater- Renewable Fuels

## Coriolis mass flow meter allows for density and flow control



Corn field



Promass 83F



Corn unloading operation

### Product information

The process of corn steeping is used in many grain applications. These include starch separation, concentration of steepwater prior to fermentation operations, for sugar, alcohol and ethanol plant production.

The range of steepwater densities could vary from as little as 9% to higher concentrations up to 65% in stillage applications. Heavy stillage is a by-product of the Ethanol process which is used as a feed additive for livestock.

### Customer Profile

Up to 27 corn plants and 83 Ethanol plants utilize corn steeping or processes which could benefit from custom concentration measurement. The ability to control processes by mass in lieu of typical volumetric flow units lowers energy usage, chemical addition, and production turn-around times.

### Application description

The steeping process requires the use of chemical (acid/enzyme) addition to create a finished product. Energy is used for heating in the process.

Typical volumetric meters used in corn steeping operations do not permit a measurement of the % solids, product density, or mass flow rates.

Traditional Coriolis meters of other manufacturers can plug or foul leading to expensive cleaning or replacement activities.

### Application challenges

The corn steeping process can produce coating or settling on wetted surfaces when the process temperatures or operating velocities are not properly maintained.

The meter must support aggressive CIP or SIP operations when fouling has occurred.

Velocity rules must be observed to prevent accumulation of product or coating which can compromise measurement accuracy.

Care should be taken to ensure back pressure is maintained on the outlet of the Coriolis meter to limit gas effects which prejudice density measurement accuracy.

### Instrument used

Promass 83F Coriolis mass flow meters

### Previous instrument

Nuclear densitometers, magmeters and other manufacturers Coriolis mass flow meters

### Measurement results

A major Midwest corn refining operation with existing volumetric flow meters was interested in the prospect of density and mass flow measurement in light and heavy steepwater processes. This process was operated for years with a yield based in mass engineering units.

A test meter was installed into the process to gauge the accuracy of % solids measurement to maximize utility and yield performance. The ability to readout in mass units could allow for a direct comparison of the raw products used in the process.

The customer found that changes in product density measured by the Promass Coriolis meter could allow for more accurate control of energy and chemical addition, speeding the yield of quality product.

The meter allows a chemical CIP or low pressure steam in place operation (< 400°F) for maintenance.

### Instrument description

The Promass 83F Coriolis mass flow meter with custom concentration function is a multivariable meter designed to produce a direct measurement of mass flow, density, temperature, reference density, custom concentration, or a counter-inferred measurement of volumetric flow. The meter is ideally suited for solids laden fluids. The meter allows full drainability when installed in a vertical orientation. Additional features include detection of coating or settling solids for predictive maintenance control.

### Measuring principle

Coriolis meters produce a measurement of mass flow based on the Coriolis effect from two vibrating tubes in the sensor system. An independent measurement of product density is calculated from the resonant frequency of the sensing tube vibration.

### For more information contact

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