Application Note

Industry: Food
Market Niche: Liquid Sweeteners
Product: DCI Positive Displacement Flowmeters
Fluid: High Fructose Corn Syrup
Service: Batching • **Viscosity:** 160 cP

Overview

Little changes in the environment often have significant effects on the flow profile or the way that fluid flows through the pipe. These changes reduce the accuracy of meters that do not measure the total flow such as an insert paddle wheel meter. This meter infers total flow by measuring the flow velocity at a single point across a pipe section. Inaccuracies result because changes in flow conditions may not be truly reflected at the measurement point. On the other hand, the Flow Technology positive displacement meter directly measures the total flow through a pipe. Therefore, high accuracy can be maintained even if the flow profile changes.

Situation

A Northeastern manufacturer of specialty doughs used insert paddle wheel meters to batch water and liquid sugar. While the insert paddle wheel meters performed satisfactorily for water, their repeatability was unacceptable for the liquid sugar. The batches varied from the required 134 pounds to over 200 pounds. The result was poor product quality and occasional ruined batches of dough.

A Flow Technology positive displacement meter replaced the insert paddle wheel in the liquid sugar line. The plant representative said, “Now I get 134 pounds each batch.”

System Description

The liquid sugar for danish dough was stored in a 7000-gallon outdoor storage tank heated to keep the contents at +85° F (+29° C). A 3-inch line carried the fluid to the plant about 50 feet away. The line had heat tracing, but it did not always work. In the plant, the line split into two 1-inch lines, each of which could feed a mixer. Only one mixer was used for the danish dough, while both were used for other products.

Analysis

In this case, temperature fluctuations were causing fluid viscosity changes. The situation was worse in the winter, or whenever the heat tracing system was not operating. The viscosity changes altered the flow profile creating the dramatic changes in meter performance. There also seemed to be a buildup of thicker fluid at the paddle wheel. A drift in meter repeatability gradually increased the batch size from 134 to 160 pounds.

The Flow Technology PD flowmeter handled the application effectively for two reasons. First, the flow rate remained fairly constant. Secondly, the viscosity was relatively high (160 cP), therefore viscosity changes did not significantly affect the accuracy.

Sales Information

The sales representative responded to an advertising sales lead and solved the problem.

Comments

The Flow Technology PD meter was furnished with a magnetic pickup instead of the standard Hall Effect sensor to allow the meter to be used with the existing batch controller that had been furnished with the insert paddle wheel meter.

Technical Data

Flowmeter: DC10I-4113-5110000 (was FD10I-4113-3110-000)
Flow Rate: 10–15 gpm, normally steady at about 13 gpm, +70° F to +100° F (+21° C to +38° C), normally +85° F (+29° C)
Fluid: High fructose corn syrup, 160 cP at +80° F, 1.352 Sp.G., 71% dissolved solids
Fluid: Danish dough, 1–4 days per week, 2 shifts per day, 50 batches per day, 134 lbs. liquid sugar per batch

FTI FLOW TECHNOLOGY™

8930 S. Beck Avenue, Ste 107, Tempe, Arizona 85284 USA
Tel: (480) 240-3400 • Fax: (480) 240-3401 • Toll Free: 1-800-528-4225
E-mail: ftimarket@ftimeters.com • Web: www.ftimeters.com