



APPLICATION NOTE

INDUSTRY: FOOD

MARKET NICHE: CHOCOLATE

PRODUCT: DC-I POSITIVE DISPLACEMENT FLOWMETERS

FLUID: CHOCOLATE

SERVICE: MIXING • VISCOSITY: 30,000 cP STATIC, 75,000 cP DYNAMIC

OVERVIEW

Chocolate presents some special challenges to food processors. It is generally very thick, abrasive, and hard to clean. It must be kept warm enough, so that it does not harden in the process lines while not letting it get so hot that it burns. These are just some of the characteristics of chocolate that make most flowmeters inaccurate or in some cases inoperative. Flow Technology's simple design delivers very accurate measurements in chocolate applications. Flow Technology positive displacement flowmeters were designed for fluids with high viscosities and high percentages of solids. Flow Technology typically provides $\pm 0.5\%$ accuracy (linearity) with up to a 1000:1 turndown. If temperature control is necessary, simply wrap electrical heat tracing around the meter body to maintain a constant temperature inside the meter.

SITUATION

A chocolate manufacturer needed to control a mixing process. The customer had tried several meters, but was unable to find one that would survive the chocolate and provide accurate measurements over a large turndown range.

SYSTEM DESCRIPTION

The Flow Technology flowmeter was placed in a 2" line between a positive displacement pump and a mixing tank. Electrical heat tracing was wrapped around the meter to maintain a constant temperature. The signal from the flowmeter sensor was sent through a signal conditioner and then into a PLC. The PLC controlled the mixing process by monitoring the flow rate through the flowmeter.

ANALYSIS

Most of the flowmeters that the customer tried quickly clogged or were damaged by the thick abrasive chocolate. A mass coriolis flowmeter survived initially, but produced a very high pressure drop and was only accurate over a very narrow turndown range. In addition, when the mass coriolis meter did clog up, the plant personnel found it very difficult to clear the chocolate out of the small tubes in the meter. An electromagnetic meter, which uses the conductivity of the fluid to determine flow rate, was not even considered since chocolate is nonconductive.

SALES INFORMATION

After hearing that Flow Technology performed well on chocolate, the local sales representative contacted the chocolate manufacturer about possible applications. The customer was skeptical about Flow Technology's chances of working on chocolate. Flow Technology's Flow-Thru Guarantee convinced them to try the flowmeter. Once the flowmeter was installed, it delivered the high accuracy and turndown that was promised. The customer was pleased with the performance as well as the low maintenance requirements of the meter and has purchased more Flow Technology flowmeters for other applications and 2" raised face flanges

TECHNICAL DATA

Flowmeter: DC20I-6113-5220-013 with UHMWPE impellers
(3A certification was not needed at this point in the system)

Flow rate: 2.05 gpm normal

Fluid: Chocolate 30,000 cP (static), 7,555 cP (dynamic) at 104° F



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