

Centrifugal Pumps Handle Chocolate

Overcoming the challenges of pumping heavy products

Perry's Ice Cream in Akron, NY manufactures 42 different frozen novelties. Three key coatings for their novelty production are a milk chocolate, a dark chocolate, and white predip. The solids in these coatings, which comprise as much as 40-50% of their volume, will drop out of suspension without constant agitation. To prevent this, Perry's installed an agitator and a recirculation loop, complete with a dedicated pump, at each coating tank. Constant movement in the recirculation loop ensures an even distribution of solids despite the fact that production's needs are intermittent.

The chocolate supplier recommended diaphragm pumps for the recirculation loops because of the heavy and abrasive nature of the chocolate. "The diaphragm pumps became a costly maintenance item," noted Harold Bruning, Maintenance Technician. "It didn't seem as though they were designed for 24-hour service. Every couple of weeks a diaphragm or a flapper would need to be replaced. Not only did the cost of the parts add up, but we also had our labor, downtime, and lost product. As a result, we began looking for other alternatives."

Centrifugal pumps were rejected initially because of concern about the erosive effect of the gritty chocolate and the slippage resulting from pumping such a heavy product. During its search for an alternative, Perry's discussed its problem with a representative of Fristam Pumps Inc. who asked if Fristam could evaluate the application.

Despite product viscosities which ranged as high as 1,000 centipoise, Fristam recommended a standard pump with a 1750-rpm motor and internal tolerances of .020 in. The low speed motor was used to minimize abrasion from the cocoa and sugar solids. Carbide seal surfaces, the hardest commonly available, were also chosen to counteract the product's abrasiveness. A flow rate of 12-15 gpm was expected to improve the solids dispersion.

Jacket and water-flushed seal for milk chocolate

To ensure that the pump performed as expected, Fristam offered a trial unit. The initial installation on dark chocolate worked well. As Bruning noted, "The close tolerance between the impeller and the housing reduced slippage so much that erosion was not a problem. We were also

happy that the pump did not add unwanted heat to the product either."

Pumps operated smoothly on the dark chocolate and white predip coatings, but problems arose with the unit installed on milk chocolate. Due to difference in its ingredients, the milk chocolate tended to set up in the pump housing and seal area. To solve this new problem, Fristam turned to a jacketed pump and seal-flush.

As Art Senf, Engineering Manager, observed, "These pumps now run continuously and require very little maintenance. They've saved us a great deal in downtime and lost product. An unexpected bonus was that we've also reduced the noise level in that area by eliminating the air discharges.

"We've found that we can run more than a year on a seal despite the extended operating hours and the abrasive nature of chocolate. This is particularly surprising since two of the pumps do not have seal-flushes. We've been very pleased with both the equipment and the way the Fristam Pumps' engineers worked with us to solve our problems."

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