

A Solution Worth Shouting About

NEW ICE CREAM MIXES RAISE THE REQUIREMENTS FOR VOLUMETRICALLY CONSISTENT PUMPING TECHNOLOGY AND MOUVEX® SLS SERIES ECCENTRIC DISC PUMPS HIT THE OPERATIONAL SWEET SPOT

By Sueli Roel Backes



Faced with new recipes that were taxing the efficiency of the centrifugal pumps used in its manufacturing process, Ysco, a prominent leader in the production of private-label ice cream, knew that it needed a better pumping solution. With the help of Engineering Assistant Krist Levrouw, the company found the perfect solution in the SLS Series Eccentric Disc Pump from Mouvéx®.

Most people are familiar with the 1920s novelty song titled “Ice Cream,” with its instantly recognizable refrain: “I scream, you scream, we all scream for ice cream.” All these years later, consumers still scream for their favorite dessert choice.

There is, however, screaming that is not desirable when it comes to discussing ice cream. These are the howls of frustration that can be heard coming from ice cream manufacturers who are confronted with an underperforming production process that is adversely affecting the expected high quality of their product. Specifically, an inconsistency of flow rate, pressure and speed during the transfer of mixes during production could result in the formation of ice crystals that are too large, which compromises the end product’s taste, visual appeal and creamy sensation.

The production of ice cream is actually a relatively straightforward process: an ingredient mix is pumped through a pipeline to a double-wall tube or tunnel freezer that is chilled by liquid ammonia to -30°C (-22°F). Inside the

QUICK FACTS

- Company:** Ysco
- Location:** Langemark, Belgium
- Market:** Ice Cream
- Distributor:** Spin Pompen, Assen, The Netherlands
- Challenge:** Identify and implement a reliable pumping technology that will provide the necessary consistency of flow rate, pressure and speed that is imperative in ice cream manufacturing
- Solution:** Mouvéx® SLS Series Eccentric Disc Pumps



From its production facilities in Langemark, Belgium, and Argentan, France, Ysco annually produces 174 million liters (41.2 million gallons) of ice cream.

freezer, a slow-turning agitator or scraper forces the mix outward, where it briefly touches the frozen outer wall before it is turned back inward. This is when the ice crystals, which eventually become ice cream, are formed. In order to achieve the required taste and expected creamy “mouth feel”, the ice cream mix can only spend a highly regulated amount of time in contact with the freezer’s outer wall. This is why the transfer flow and pressure have to be so accurate.

“If during the transfer to the ice cream freezer the flow is pulsating then the time the mix spends on the wall isn’t under control,” explained Peter Van de Sompel, Manager Bellux for Spin Pompen, an Assen, The Netherlands-based specialized distributor of pumps and related equipment for use in the of food, beverages and pharmaceutical industries. “When the flow is constant and optimized to the freezer requirement, then the ice cream coming out of there will have ice crystals that are impossible to detect by the eye and impossible to taste; that’s what makes good ice cream. It should be like a cream and solid at the same time, that’s what makes good ice cream.”

Achieving proper production within the freezer used to be relatively easy. That has changed over the years, however, as ice cream has evolved from traditional compositions like vanilla, chocolate and Neapolitan to much more complicated recipes that can include different ingredients, flavors, nuts and chunks of fruit or candy.

“Ten to 15 years ago, the majority of ice cream mixes were low viscosity,” said Van de Sompel. “Over the years, what we’ve noticed is that the flowability of ice cream mixes changed because of specific market demands. There are more variants and more components added for taste, etc., that render the mix more viscous.”

Questions Are Raised

The combination of a strict manufacturing process and a change in the makeup and viscosity of the ice cream mixes has brought into question the effectiveness of the pumping technology that has been traditionally used in ice cream manufacture, namely centrifugal pumps.

“The ice cream freezer is very sensitive, it has to be fed with continuous pressure, which has to be maintained in a very narrow range,” said Van de Sompel. “That’s why the centrifugal pump was a good solution. But with higher viscosity you need a volumetric pump with a very stable flow and that can be regulated in a very linear way. If you look at that, you need a pump with an equal flow and a 1:1 ratio of flow to speed.”



When the higher viscosities of the ice cream mixes were becoming incompatible with the operational capabilities of the centrifugal pumps at Ysco, it prompted Krist Levrouw to begin searching for a better solution.

One company that has mastered the production of ice cream over the years is Ysco, Langemark, Belgium, which, since 1949, has been a major player in the production of private-label ice cream products for retail chains. From its production facilities in Langemark and Argentan, France, Ysco annually produces 174 million liters (41.2 million gallons) of ice cream in the form of one-to five-liter (0.26 to 1.3-gallon) tubs, cones, molded and extruded sticks, cakes and small cups. That volume resulted in sales of more than 245 million euros (US\$244 million) in 2015.

Ysco is part of Milcobel cvba, Kallo, Belgium, a farming cooperative that was formed in 2004 with the merger of BZU Melkaanvoer and Belgomilk, and today collects, processes and commercializes the milk from 2,800 dairy farms, in the process of growing to become Belgium's largest dairy group. Ice cream, of which Ysco's production accounts for 22% of Milcobel's annual production volume, joins milk, cheese, and butter and cream as the major products that Milcobel produces.

The changes in ice cream recipes, however, were beginning to hamper Ysco's ability to reliably produce finished products that met the demands of itself and its customers. Namely, the higher viscosities of the mixes were incompatible with the operational capabilities of the centrifugal pumps that were being used to transfer the mix from the preparation vessels through the pipelines and into the ice cream freezers.

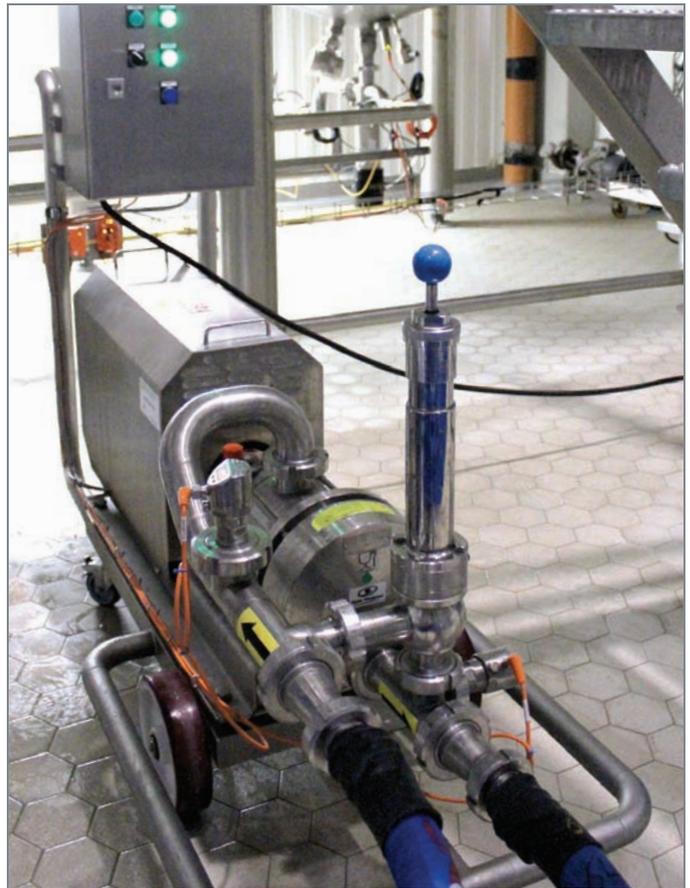
That prompted Krist Levrouw, an Engineering Assistant who has been employed at the Langemark facility for 26 years, to initiate a search for a better pumping solution.

"The classic centrifugal pump solution does not work properly with mixes in excess of 500 cP, often as high as 2500 cP," said Levrouw. "Under these circumstances centrifugal pumps are unable to generate the pressure required to transfer the mix and feed the freezer properly. As a result, you can't empty the vessels completely and you have too much waste."

A New Flavor Of The Day

Some years ago, Ysco's Argentan facility had begun using C Series Eccentric Disc Pumps from Mouvéx®, Auxerre, France, a product brand of PSG®, Oakbrook Terrace, IL, USA, a Dover company, for its liquid-transfer operations. In talking to his colleagues at the Argentan plant, Levrouw learned of the success they had been experiencing with the Mouvéx pumps and he reached out to Spin Pompen to see if they could suggest a solution for his needs.

"Krist Levrouw called us up. He said he needed a Mouvéx pump because his colleagues told him it was a good pump to solve a problem," said Van de Sompel. "Of course, we knew that the Mouvéx technology would solve his problem, which was covering the distance between the tanks and the ice



The SLS Series Eccentric Disc Pump from Mouvéx® is able to overcome the challenges presented by higher-viscosity ice cream formulas, while also possessing the operational characteristics that make enhanced product recovery possible.

cream generator in a controlled way, with constant flow and no pressure peaks, so that the product characteristics were respected."

The challenge was considerably big because of the layout of the Langemark facility. The supply tanks are located unusually far from the ice cream freezers — 220 meters (720 feet) — which was putting additional strain on the centrifugal pumps.

"If you're pumping ice cream over 220 meters you don't want pulsation, which will cause pressure peaks, which is very unbeneficial for the generation of ice cream," said Van de Sompel.

Addressing these operational challenges, Van de Sompel recommended to Levrouw the seal-less Mouvéx SLS Series Eccentric Disc Pump. SLS Series pumps have been designed specifically for operation in food-and-beverage manufacturing applications. The seal-less design is ideal for hygienic applications because it reduces the risk of product contamination and leaks while avoiding messy spills, waste and product spoilage. Constructed in stainless steel, Mouvéx pumps feature an innovative design that incorporates a double-wall bellows into the pump's construction, along with monitoring that is done via pressure switch. By

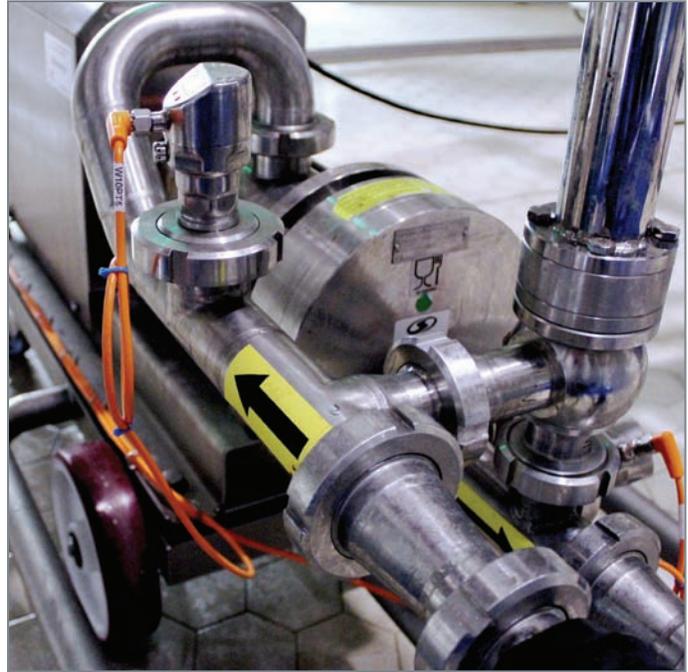
mounting the pressure switch on the bellows flange, the bellows become an independent sub-assembly within the pump, resulting in easier and safer operation. The design has helped the SLS pumps get the required certifications from EC 1935/2004, 3A, FDA and EHEDG, for use in food-processing applications. Due to the fact that the pump has only two wear parts, the maintenance is easy and can be performed while the pump is online.

Along with these advancements, the SLS Series pumps offer the standard benefits that Mouvex eccentric disc pumps have long been recognized for, including low shear rate; very low pulsation; very low slip; self-priming and dry-run capabilities; exceptional volumetric consistency; repeatability and clean-in-place (CIP) capability. In addition, it offers the capability of line stripping promoting a high degree of product recovery thanks to the strong vacuum and compression effect generated by the tight contact between disc and cylinder.

“The reality for ice cream manufacturers is that one day they have ice cream mix as milk, then the next day they might have ice cream as thick as 500 cP, up to 2,500 cP,” said Van de Sompel. “The Mouvex pump shows very limited variation in flow rate under varying conditions of pressure and viscosity. Other pump principles will suffer from slip or flow return effects. In combination with the constant pressure regulation on the inlet of the freezer, this will result in either under- or oversteer effects and thus in flow variations. However, a constant flow is one of the critical process quality criteria in the production of ice cream.”

Conclusion

While consumers may scream for ice cream, when it comes to its production, silence is golden, meaning that there are no shouts from producers who are fed up with underperforming pumps that compromise the end product’s quality and appeal. Faced with new recipes that were taxing the efficiency of the centrifugal pumps used in its manufacturing process, Ysco searched for a better solution and found a perfect one in the SLS Series Eccentric Disc Pump from Mouvex. SLS Series pumps are able to overcome the challenges presented by today’s higher-viscosity ice cream formulas, while also possessing the operational characteristics that make enhanced product recovery possible, which lowers production costs and leads to a healthier bottom line. They are also easy to operate and maintain, which is another crucial consideration.



Not only does the SLS Series pump offer the standard features that Mouvex® eccentric disc pumps have long been recognized for, but the design has helped it earn approval from EC 1935/2004, along with 3A, FDA and EHEDG, for use in food-processing applications.

“The pump is idiot-proof, which is very important since we are running 24 hours and everyone has to handle it,” said Levrouw. “If the pump is too difficult to clean and maintain, then it’s a problem. It will be destroyed in a short time. It has to be simple to use, simple to clean and simple to maintain. Every step in the process is important. Every step is complicated, but the Mouvex pump makes life easier. No stress.”

About the Author:

Sueli Roel Backes is Market Manager, Food & Beverage for Mouvex® and PSG® and can be reached at +49 172 1052842 or sueli.roel@psgdoover.com. Auxerre, France-based Mouvex was incorporated in 1906 and is a leading manufacturer of positive displacement pumps, screw compressors and hydraulic coolers for use in the refined-fuels, oilfield, energy, food/sanitary, military, transport and chemical-process industries, and is a product brand of PSG®, a Dover company. Headquartered in Oakbrook Terrace, IL, USA, PSG is comprised of several leading pump brands, including Abaque®, Almatec®, Blackmer®, Ebsray®, EnviroGear®, Griswold™, Mouvex®, Neptune™, Quattroflow™, RedScrew™ and Wilden®. For more information on Mouvex or PSG, please go to mouvex.com or psgdoover.com.



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