The Sky is the Limit

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Check out how this new progressive cavity pump stator technology is improving the production of old-fashioned candy.

In 1937, NECCO (New England Confectionery Company) introduced its first Sky Bar®, a four-section molded chocolate bar with four different centers: caramel, nougat, toffee and fudge.

NECCO confidently marketed their new candy to the public with a dramatic sky writing campaign, and their Depression-era gamble paid off. The Sky Bar® became a popular treat immediately, and is now enjoying a renewed popularity nearly 70 years later.

NECCO, founded in 1847, is the oldest continuously operating candy company in the U.S.

Best known for their NECCO wafers and conversation candy hearts, they recently undertook an expansion project that would take them out of the heart of Cambridge, MA, and into a new, state-of-the-art facility which included a brand new molding line for Sky Bar® production.

Before their move, NECCO had been relying on traditional positive displacement pumps to transfer their Sky Bar® fillings from storage to fill line. But, even as they began planning their expansion, design engineers encouraged management to consider progressive cavity (PC) pumps for their new facility.

They suggested that, among other benefits, PC pumps would run at the higher pressures needed for the viscous candy fillings.

NECCO management subsequently called on fluids handling firm Diversified Pump and Compressor

Basic Operation

In operation, a progressive cavity pump's single helix rotor rotates within an elastomeric double helix stator to form sealed cavities that progress from the suction side to the discharge end of the pump.

The continuous seal between the rotor and the stator helices moves the fluid steadily, without valves or pulsations, at a fixed flow rate proportional to the rotational speed of the pump and independent of pressure fluctuations that can result from varying densities of conveyed product.

(Hampton, NH), who recommended seepex (Enon, OH) PC pumps. Several factors made these sanitary pc pumps their choice for the new facility:

- The pumps use an even wall stator (see sidebar), meaning the same performance can be achieved with a compact 2-stage pump that would usually require a much longer 4-stage with conventional stator geometry.
- The stators are also molded to size, not cut, with integral seals molded into the ends, and are offered in a wide selection of food-grade elastomers.
- These more economical and longer lasting closed joint sanitary pumps are perfectly suited for candy fillings, whereas a dairy-compliant open joint would be unnecessarily maintenance intensive and expensive for this application.
- Their 'block,' or close coupled, design conserves additional space.
- These units pump without pulsation, and at variable speeds they can be counted on to pump the fillings gently, with no shear or product damage.

NECCO purchased four 2-12 BCSB range sanitary pumps with Therban® even wall stators, Duktil®-coated stainless steel rotors, and closed sanitary joints for their new plant.

The closed joint pumps are furnished with cost effective pin joints and filled with special food-grade grease, making these pumps especially suited to high operating pressures. NECCO's pumps are rated to handle up to .25-USgpm on continuous service, customized for viscosity of 125,000-cPs, at 120-deg F.

The pumps are equipped with VFDs for process control, with speeds proportional to a 4-20 mA signal coming from a level sensor on the filling machine.

The space-saving block (close-coupled) design utilizes the gear reducer bearings to absorb the axial and radial loads of the pump. In fact, these units are assured of being capable of a minimum of an AFBM (Anti-Friction Bearing Manufacturers)-L-10 life of 50,000 hours. Optionally, an L-10 life of >100,000 hours is also available.

NECCO's block pumps require only simple bent steel 'top hat' base plates for mounting.

Therban® is a proprietary HNBR (hydrogenated nitrile butadiene rubber) elastomer made by Laxess (formerly Bayer Elastomer). The compound is made to CFR § 177.2600 and is considered "food grade." HNBR offers superior abrasion and temperature resistance compared with NBR compounds or EPDM, which are commonly offered for food applications.

The HNBR in an even wall configuration has consistently outlasted NBR by a factor of five times or more in these applications.

Duktil® is also a proprietary coating offered by seepex. Sometimes referred to as 'chromium nitriding', it involves plating chromium at extremely high currents and heat. The result is a coating that exceeds a hardness of 90 on the Rockwell "C" scale and actually diffuses into the base metal. Consequently, it can bend (having ductile properties) without cracking, as standard hard chrome can.

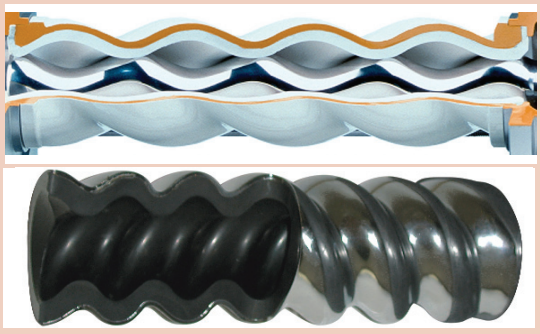
NECCO's PC pumps presently transfer Sky Bar® nougat, toffee, fudge and caramel fillings. The pumps have now performed reliably and efficiently for two years.

The company has realized savings in minimal downtime for repairs and in low energy usage. Additionally, the same pumps can be used for the four different fillings, with their viscosity variations, because of the variable speed possibilities and the ease of cleaning between operations.

Plant management subsequently purchased eight additional seepex pumps for other applications in the new facility.

P&S

Even-wall Stators



Even-wall stators are made with a special procedure using a metal tube that is hydraulically bent into a double helix, the same shape as the helix forming the cavity inside the pumping element. This makes the thickness of the rubber within the stator constant, as opposed to the thin and thick sections of elastomer existing in a normal cylindrical tube.

Even-wall stators can handle twice the pressure of conventional designs on non-abrasive fluids, with an even smaller footprint than conventional pc pumps. Both hysteresis failures and bond failures are practically eliminated.

These stators are excellent for food applications that have wide temperature variations that can result from low temperature operation and high temperature cleaning. Users report that their even wall stators routinely last up to five times longer than conventional design stators.

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