

Progressing cavity pumps in the production of dry pet food

Progressing cavity pumps from Allweiler AG have been standard equipment in food and beverage production for many decades. With stators and gaskets made of food-grade materials, CIP and SIP configurations (**C**leaning **i**n **P**lace, **S**teaming **i**n **P**lace), and stainless steel casings and rotors, these pumps are well suited for a variety of applications. For the plant operator, it is also important that cleaning can take place during ongoing operation. This saves time and makes it easier to perform cleaning tasks at short intervals because it is not necessary to empty the system and disassemble the pumps. But ultimately, of course, the pumps must be designed to handle the specific properties of the liquids they are moving. Common examples of liquids include viscous syrups, honey, and marmalade; foaming liquids; and liquids with sensitive solids like fruit yoghurt.

In all of these situations, the pumping systems must work without leaving behind residual material and with complete chemical and bacterial neutrality. In addition, abrasive or pasty liquids may not cause scoring and abrasion of external materials. Only special design solutions can fulfill both of these requirements. Gear pumps, for example, are unsuitable for use with abrasive and/or pasty liquids because they wear quickly at higher capacities, causing contamination of the liquid. Pumps constructed of anything other than high-grade stainless steel are also unsuitable for food-related applications. The surfaces of any metallic components that will come into contact with sensitive pumped liquids may be constructed only of stainless steel and must exhibit a smoothness (and lack of porosity) that will prevent residuals of the pumped liquid from depositing on the surface.

Economical and flexible

These pumps move liquids economically, uniformly, gently, and with low pulsation. Even fibers and solid particles will not interrupt operation. They can tolerate liquids with larger grains and longer fibers without limitation or loss of performance. Capacity is infinitely adjustable by altering speed. Typical applications include dosed additions of ingredients during batch or continuous processing, use in filling systems, introduction of additives, generating product mixtures, or any other situation where exact portions must be measured.

One example of such pumps are the progressing cavity pumps from Allweiler AG. The hydrodynamic shape of the pump's internal space ensures that there will be no dead spaces (where the product does not flow) during cleaning. This characteristic also prevents the formation of deposits within the flow area. As a result, the pump can be cleaned without leaving behind any residual material. These progressing cavity pumps are self-priming and can be cleaned without residuals using the CIP method.

Technically mature pumps are characterized by their ability to adapt to specific liquids and pumping tasks. Specific characteristics include a multistage design for higher discharge pressure and optional heating or cooling of the pump for temperature-sensitive liquids.

Use of specific and optimized materials for FDA-approved stators, shaft seals, and casing parts is another indication of a well-engineered design. Pumps that meet these criteria achieve longer service lives with less wear.

Typical applications are the production of carbonated refreshments from viscous concentrates, production of a variety of dairy products, wine and liquor production, and processing of bulk chocolate. Progressing cavity pumps from Allweiler AG are available in a variety of sizes. The largest of this type achieve maximum capacity of 750 l/min. at 400 rpm. They generate discharge pressure as high as 20 bar and can handle a liquid temperature of up to 130 °C. The viscosity of the pumped liquid can be as high as 150,000 mPa*s.

Well-suited for pet food

Mera Tiernahrung GmbH, a German pet food manufacturer, selected these pumps in 2004 for use in a new plant. They had had good experiences with progressing cavity pumps in their old plant, and their plant builder was also quick to recommend them. Mera uses a variety of plant and animal-based raw materials to produce high-quality dog and cat food at their highly advanced production plant. The company's motto is "Five stars for four legs". According to Technical Director Johannes Hendrix, "We chose Allweiler pumps because the requirements for producing domestic animal food are nearly as stringent as for producing human food." Many of the starting materials have a consistency that is similar to coarse liverwurst, but may also be as viscous as honey or mayonnaise.

Grain size is usually less than 1 mm, but it is sometimes also necessary to pump solid components that range in size from 3 to 5 mm. The ten pumps used at Mera have a capacity range of 100 to 10,000 liters per hour. They are used to move vegetable and animal fats, natural aromas and dyes, as well as a variety of meat, water, and fat slurries. Viscosity of the liquids is commonly greater than 20,000 mPa*s. The pH of individual ingredients may be as low as 3.2, so materials used in the pumps must be especially durable.

When manufacturing dry dog and cat food, the dried extrudate (lumps) is sprayed with a variety of liquids in a complex coating system.

The progressing cavity pumps move the base liquids from tanks holding 50 metric tons into smaller dosing tanks. In the proportioning tanks, the liquids are warmed and thoroughly mixed before the proportioning pumps spray them onto the extrudate during the coating process. This process depends on achieving the exact dosages

specified in the recipe. Deviations must be less than one percent. Dyes are added according to similarly strict tolerances. In this case, the pumps may not continue running once stopped, because this is the only way to achieve precise dosages.

One supplier for all pumps

Mera uses progressing cavity pumps from Allweiler at every stage of its production process. "For us it is important to have a compact, space saving design and to have a simple, hygienic means of cleaning the pumps," according to J. Hendrix. Like the stainless steel version used in the food industry, the industrial version is also characterized by very smooth surfaces and only very few edges and dead spaces. Options like flow monitoring, dry-running protection, and frequency-regulated drives are additional benefits of using Allweiler pumps.

Being physically close to the manufacturer also plays a role. Mera runs its production 24 hours per day and cannot tolerate long machine downtime. Although it has never been necessary, it would be possible to replace a pump's stator and bring it back into operation within just a few hours. Incidentally, Mera has clearly come down in favor of original spare parts over third-party products. After conducting a test of third-party parts, they determined that any benefits from lower procurement costs are greatly outweighed by the disadvantages of parts with short service lives. It is always worthwhile to spend more for original spare parts. Irrespective of the liquid being pumped, service times are always at least four years. And since Allweiler is one of the few pump manufacturers to produce its own stators, they are able to select the most ideal materials for the customer's liquid from more than 20 different choices.

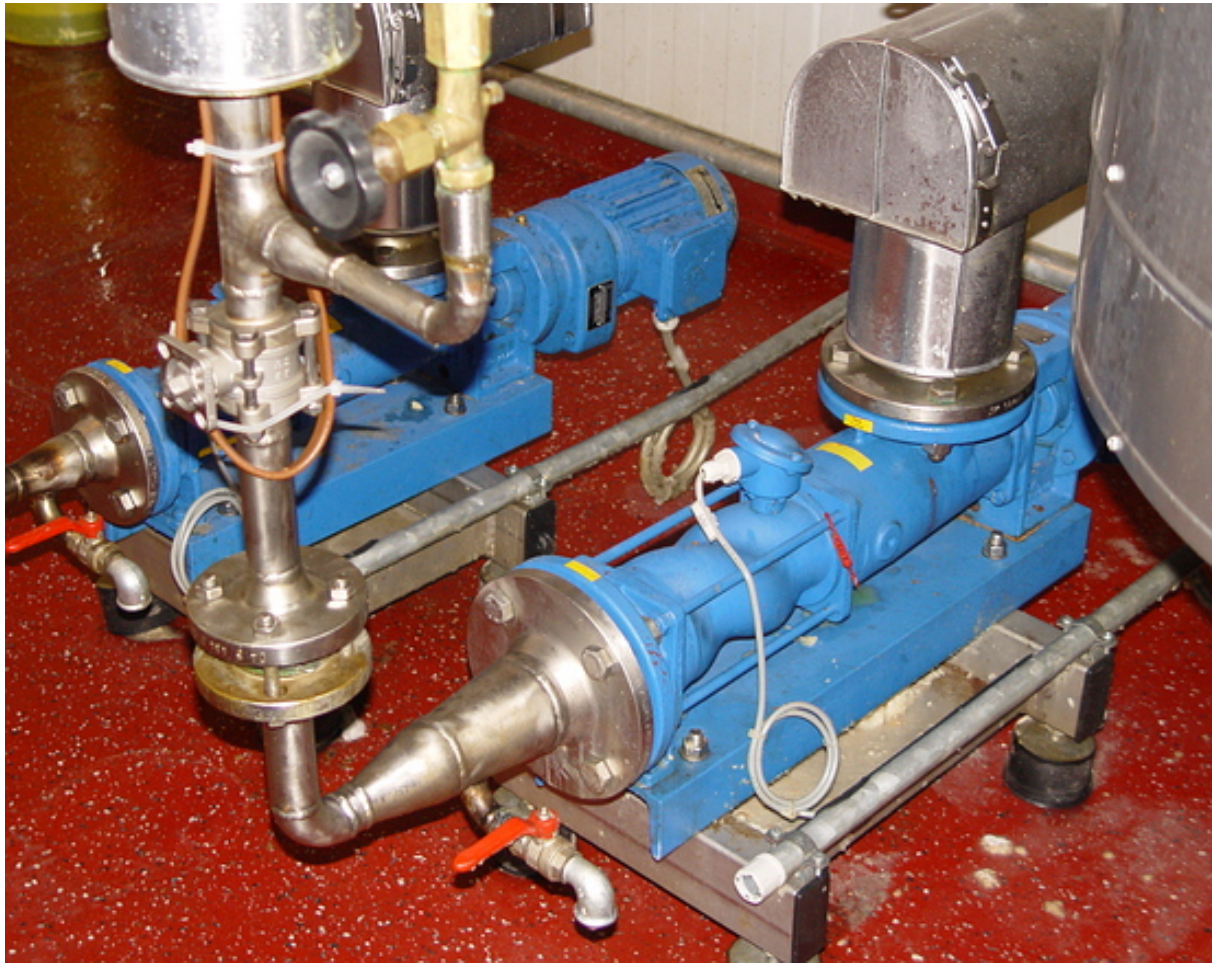
In Mera's view, the decision to use Allweiler progressing cavity pumps in their new plant was clearly the right one. According to J. Hendrix, the service life of wearing parts, the price/performance relationship, and Allweiler's excellent service are all good reasons to choose Allweiler.



The pumps are located on top of the silos because the starting materials are water pollutants. For this reason, the progressing cavity pumps must be self priming at a height of 6 m.



The new Mera Tiernahrung GmbH plant. Founded more than 50 years ago, this company produces premium dry animal food under the motto "Five stars for four legs". Mera exports its products to 27 countries.



Allweiler progressing cavity pump of the AEB1E380 series with a uniform-wall stator;
liquid: fats; volume: 60-3600 kg/h; pressure: up to 10 bar; distance: 15-35 m.



Allweiler progressing cavity pump of the AEB1E380 series; liquid: fat; volume 12,000 kg/h; pressure: 2 bar; temperature: 30-65 °C; distance: 65 m.