Problem-free pumping of crystal mush with Allweiler progressing cavity pumps

The Chemische Fabrik Budenheim KG (CFB) (Chemical Factory Budenheim) produces precursors and ingredients for a wide range of a variety of final products. It ranges from baking powder to flame retardants. Phosphates form the basis and the factory is specialized in special products in the area of phosphate chemistry. CFB has developed its own solutions and processes in order to crystallize various phosphates and to dry it afterwards.

In this process the pumps play a central role in pumping the crystal mush from the preparation tanks into the rotary pipe, and with that, for further processing. In Budenheim the physical and chemical characteristics of the various liquids pose specific demands to the pumps. The crystal mush is highly abrasive, very viscous and in part very hot. Wolfgang Müller, Maintenance Manger at CFB: “We have liquids that have to be pumped at 100 ºC.” The density lies between 1.3 to 1.8 and the solids proportion of the crystal mush is considerable. Moreover, to pump these volumes to the required level of precision via filters and through nozzles, a constant high discharge pressure is necessary. FC (frequency converter) controls make exact dosing possible.

Strict hygienic requirements are called for if food or basic food substances for baking powder, such as in Budenheim, have to be conveyed. The respective liquid also requires special pump technology. Abrasive or paste-like liquids such as the ones at CFB place severe strain on the pumps. The choice of materials therefore largely determines how economical a pump functions. This not only applies to the cost of parts subject to wear. The expenses caused by frequent production interruptions due to regular pump maintenance are a major cost factor.

In the food and beverages industry progressing cavity pumps from Allweiler AG have for decades been part of the standard production equipment. With stators and seals, CIP und SIP equipment (Cleaning in Place, Steaming in Place) and stainless steel casings and rotors from materials suitable for food, these pumps are well-suited for many applications. Moreover, it is important for the user of the plants that cleaning during operation in progress is possible. This saves time and facilitates cleaning at

short intervals, because the plant does not have to be emptied and the pumps need not be dismantled. The pumps must after all cater for the specific characteristics of the liquid. Good examples are viscous syrups, honey and marmalade, foaming liquids and liquids with delicate solids, such as fruit yoghurt.

CFB has been using Allweiler AG's processing cavity pumps for more than 15 years. These pumps function economically, consistently, sparingly and with low pulsation. Not even solid parts hamper its operation. The pumps tolerate liquids with larger grains without loss of performance or limitations. The capacity can be regulated fully variable and exactly. The pumps are ideally suited to add dosages of extra ingredients during batch and uninterrupted operation, to introduce additives in filling plants, when product mixtures are produced or exact portioning is required.

The progressing cavity pumps from Allweiler AG are an example of such pumps. The hydrodynamic shape of the inside of the pump guarantees that there are no dead spaces without receiving the necessary rinsing during cleaning. That means that not even small deposits can build up on the inside of the pump. That makes a residue-free cleaning of the pump possible. These progressing cavity pumps are self-priming and can be cleaned residue-free via CIP. Optional adaptations such as multistage design for higher discharge pressure, heating or cooling and individual stator materials with FDA certification optimized for the liquid, shaft seals and housing components are the features of well-engineered designs.

Typical applications are the production of fizzy soft drinks from viscous concentrates, the production of a wide variety of milk products, production of wine and spirits and the preparation of chocolate mass. The Allweiler AG progressing cavity pumps are available in different sizes. It reaches maximum capacity of 750 l/min at 400 rpm and is designed for a maximum discharge pressure of 20 bar and a maximum liquid temperature of 130 ºC. The viscosity of the liquid can amount to 150 000 mPa*s.

The construction of progressing cavity pumps is generally well-engineered and different makes are comparable. But important differences are to be found in the detail. It was important to CFB that Allweiler, in comparison with other manufacturers, could design its pumps in the thermal cycle in such a way that the stator and rotor fit together perfectly at high liquid temperatures. Allweiler manufactures all its stators itself. That shortens development times. The manufacturer can in each case select

the ideal one from more than 20 materials. Both have paid off for CFB. “In cooperation with the manufacturer we have tested several materials for our stators – partly in our factory and partly with our liquids at Allweiler.”, according to W. Müller. A special chlorosulfonated polyethylene (CSPE) quality (Hypalon) has proven itself as being superior. With that CFB achieves the longest service life in brighter food quality. Silicon and fluorinated elastomers (Viton), in contrast, were less suitable.

The factory operates on five lines with two pumps each of the SEP range, and with AE as a redundant installation. The pumps convey in 24-hour continuous operation approximately 60 000 to 80 000 m^3 crystal mush of varying quality per year. On-call agreements guarantee CFB that Allweiler will supply new stators reliably within two to three days. The factory saves on keeping its own large spare part warehouse and can nevertheless keep up production without long interruptions. Whether original parts or parts from other suppliers should be used has never been an issue. Only original parts guarantee the highest quality, is the opinion of W. Müller. Moreover, the factory has been certified on several systems and could in case of audits only present the required quality with original parts.

In addition to its long service life, the Allweiler pumps are also characterized by other great design solutions. That pertains to the universal joint shafts, which, with very resistant sleeves, are likewise encapsulated with special material. If these sleeves start leaking quickly, frequent maintenance would be necessary. The pumps are very compact and thus make installation easier. Designs with flexible shafts instead of universal joint shafts, in contrast, need more space. Because of the two-stage design, the pumps also consistently achieve the high discharge pressure. These are examples of design details, which demonstrate that not every pump manufacturer automatically is a supplier of good food pumps.

According to W. Müller, four criteria determine the quality of a pump manufacturer in food chemistry: The pumps must have a long service life, supply of spare parts must be dependable and fast, individual adaptations and models must be possible and the manufacturer must have specialists onsite in the factory. The pumps in use attain its long service life from the specific materials. An individual spare part concept guarantees supply at short notice. The wide product range by Allweiler provides a good basis for individual solutions. And finally, employees of the manufacturer advise

users onsite and give practical tips on how the pumps in use can be operated more cost-efficiently.

ABOUT ALLWEILER:

Founded in 1860, Allweiler AG is the oldest German pump manufacturer and market and technology leader in the areas of ship-building, power generation and special industrial applications. Its product portfolio includes centrifugal pumps, propeller pumps, screw pumps, progressing cavity pumps, hose pumps and macerators as well as complete pump systems. Allweiler AG owns a foundry and manufactures its own stators. The company also produces ready-to-use fuel skids, lube-oil skids, and rinsing-water facilities. Allweiler AG has its main German headquarters in Radolfzell on Lake Constance as well as a major production site in Bottrop, Germany. Allweiler AG has been part of the Colfax Corporation since 1998.

ABOUT COLFAX CORPORATION

Colfax Corporation is a global leader in critical fluid-handling products and technologies. Through its global operating subsidiaries, Colfax manufactures positive displacement industrial pumps and valves used in oil & gas, power generation, commercial marine, defense and general industrial markets. Colfax's operating subsidiaries supply products under the well-known brands Allweiler, Fairmount Automation, Houttuin, Imo, LSC, Portland Valve, Tushaco, Warren and Zenith. Colfax is traded on the NYSE under the ticker "CFX." Additional information about Colfax is available at www.colfaxcorp.com.