

# Operating costs minimized – yield increased

## Hygienic centrifugal pumps with high efficiency

**H**igh-performance pumps are in use in filtration systems of the dairy industry. A continuous use often around the clock and large quantities to be circulated require "work animals" whose number of providers is quite manageable. And to design centrifugal pumps of such capacity hygienically and as energy-efficiently as possible is a real challenge.

Acquired in 1994 by the Theo Müller Group, Sachsenmilch Leppersdorf GmbH is today regarded as one of the most powerful and state-of-the-art dairies in Europe. Each year, with around 2,600 employees, more than 1.8 billion kilograms of raw milk are refined into a wide variety of products such as UHT milk, milk powder, butter, cheese or whey derivatives. Since the acquisition, the location has been constantly expanded or modernized and has now invested a total of over one billion euros over time.

A considerable sum was used to build facilities for whey processing, which currently employs around 160 people. This independent business unit has been set up since 2002 in several steps. The Whey V section, which was commissioned in April 2016, stands for the production of lactose according to the Dry Mix standard for use in the baby food industry.



The Whey V-building of the Sachsenmilch plant in Leppersdorf

All expansion stages have one thing in common – and this applies in particular to Whey V – not only ensuring the highest levels of hygiene is a top priority, but also important aspects of energy efficiency when using modern mechanical equipment. This also includes the selection of the right pump equipment, which has to fulfil various tasks in production.

### Ideal cooperation

As the ideal partner in terms of filtration and process technology, VA GmbH was hired. Headquartered in Stuttgart and with assembly center in Heilbronn, Germany, the company specializes in the planning and installation of process equipment for the food and dairy industry and has been responsible for the overall project Molke V and others.

After a short time, the performance of the pumps used there was put to the test and they were looking for alternatives in this capacity range. The choice was made for centrifugal pumps from Diksmuide-based manufacturer Packo Inox, whose German representative Koch Pumpentechnik was responsible for the technical advice as well as the organizational handling and accompanied the conversion on site.

Based on the assumption that centrifugal pumps in filtration applications are in operation 24 hours a day, almost 365 days a year, high efficiency, lower operating costs and low maintenance were important factors in the decision-making process. Three years ago, at one



Maintaining a good cooperation: Michael Kühn (center), Head of Technical Projects of Sachsenmilch, Uwe Koch (right) and Stefan Strömich, Koch Pumpentechnik

of the ultrafiltration plants, one of the 16 built-in pumps equipped with 110 kW motors was first exchanged by a Packo Inox MFP3 stainless steel centrifugal pump. The approximately four-month test promoted amazing results in several respects.

## Optimized flow behaviour due to spiral construction

Of great importance was the achievement of an increased efficiency, since the exchanged pump has a welding construction. The MFP3 is equipped with an efficiency-optimizing 316L stainless steel cast housing and also features a hygienic closed impeller made of precision cast stainless steel.

Packo Inox is one of the few manufacturers of hygienic centrifugal pumps that meet or exceed the high technical requirements of Regulation (EU) No. 547/2012, which is actually required by the EU for water pumps, with regard to the MEI (Minimum Efficiency Index). These outstanding efficiency levels for centrifugal pumps are made possible by constructive optimization of the pump housings and impellers with the aid of state-of-the-art flow simulation programs. The improvement of the flow behaviour is essentially achieved by a spiral construction of the housing.

## Falling energy consumption

Due to the higher efficiency achieved, in some cases over 80 percent, energy consumption drops significantly. Thus, the energy savings determined in practical operation became the decisive criterion. It is on the order of about 15 to 20 percent. In the specific case, the type MFP3/150-315/9004 (C-360) was used, which works with a four-pole 90 kW motor.

Given a real power consumption of 70 kW, the 75 kW model of the series might have been sufficient, which also includes designs up to an engine output of 250 kW and a maximum of 1,800 m<sup>3</sup>/h delivery. Another positive effect of the high efficiencies is the very gentle promotion of the media to be pumped. It also showed that the Packo pump runs much quieter than the previously used model.

## Low maintenance costs

As an additional plus, maintenance costs are considerably lower. So far, for example, if the mechanical seals had to be replaced once a year, the Packo pumps have been running trouble-free with the first seal set for almost two years now. Not only are they particularly easy to maintain in this respect, but they also generally reduce the annual audit costs significantly. The successful completion of the test resulted in a respectable order from Koch Pumpentechnik and Packo Inox for a total of 16 MFP3 pumps, which were installed on the filtration systems in 2016. In addition, in the production environment, for example for the extraction from the tanks, a further 54, also exclusively in hygienic design manufactured centrifugal pumps have been installed. With outputs between 1.1 and 90 kW, they reflect the wide bandwidth of the Packo program.

## Positive practical experience

Michael Kühn, Head of Technical Projects at Sachsenmilch Leppersdorf GmbH, assesses the pump reinstallation in great detail and practical relevance, not least because of his more than 30 years of professional experience. His previous findings are extremely positive: "For me as a process engineer, the flow optimization achieved by the



**The optimization of flow and the resulting energy savings are achieved by a cast spiral housing**



**In the first conversion phase, a total of 16 Packo centrifugal pumps type MFP 3 with a capacity of 90 kW were installed**



**Currently in the installation are even more powerful MFP3 pumps with 200 kW engines**

special spiral-shaped construction and the resulting energy savings are crucial. Differences in motorization play an important role in the power consumption we are talking about here. Benefits of energy consumption can only be achieved by minimizing the loss in the pump itself. And that is then just a question of flow optimization. This was demonstrated very vividly during a visit to the Belgian manufacturer. We had the chance to look over Packo's developers' shoulders and learned that pumps there are first checked by software before they go into the casting production. So we could assume that they are designed for the particular application and work to the point. The numbers on paper have come true. In practice, we were able to quickly and clearly reconstruct the promised energy savings of around 15 to 20 percent."

Mr Kühn is equally pleased with the low maintenance of the pumps, which are regularly maintained as preventative measures. "We have found that such a pump does not have to be opened every three months. An additional plus is certainly that Packo Inox uses only standard parts in all series."

Michael Kühn is also pleased with the organizational handling of the conversion: "The entire, quite extensive installation was completely trouble-free, even though we used completely new pumps."

## Comprehensive follow-up order

In view of this extremely positive assessment, it is not surprising that in December 2017, Koch Pumpentechnik received an extensive follow-up order from VA GmbH for Sachsenmilch. It concerns a microfiltration system equipped with seven MFP3 pumps. These are in part to types with 200 kW engines and maximum flow rates up to 1,800 m<sup>3</sup>/h and thus of an even more powerful size than the aforementioned. In addition, 36 models were installed for other projects – starting with a motor output of 3 kW – and around 20 additional Packo centrifugal pumps were installed at the periphery. (Photos: Kimberly Wittlieb)