



Delivering Food to the Table

The food and beverage industry covers a huge range of applications that require pumps to keep materials moving through production stream. From the processing of tough raw materials, like sugar cane, to the hygienic transport of finished products, pumps of all shapes and sizes play a crucial role in bringing food to our table.

Production managers and maintenance engineers are under constant pressure to minimize downtime and maximize productivity. Achieving this goal requires long-lasting, reliable production equipment, a precise specification process, and a well-organized, preventative maintenance program.

In an ideal world, production engineers would be able to specify brand-new pumps that incorporate the latest technology every time a process changes or an old pump fails. However, the reality is that such decisions are cost driven, and that life cycle costs are now at the forefront of considerations when making a pump selection. Designs with high pumping efficiency as well as low operational and maintenance costs are chosen most often.

Demanding pump fluids

Food and beverage pumps have to operate in many unforgiving environments. They also have to transfer a wide range of materials, some of which can be particularly aggressive or abrasive. Sugar production, for example, starts with either sugar cane or sugar beet. Each of these poses its own challenges to the processing equipment from raw material to finished end product. Washing creates a muddy, sand-laden, abrasive water mixture that needs to be transferred away from the washing area to a treatment system that can recycle the water. Such an abrasive suspension needs pumps designed with excellent wear resistance properties and seals that perform reliably in this aggressive environment (Fig. 2).



2 State-of-the-art materials are used for Sulzer's pumps and retrofit solutions.



3 Sulzer's AHLSTAR self-priming degassing pump.

Savings in a wet corn mill

In a wet corn mill in the United States, Sulzer installed properly specified, modern pumping equipment. After the installation, the customer discovered that it was saving more than expected on its operating costs with the new pump. Previously, two conventional centrifugal pumps had been used to transfer a slurry mixture of starch and fiber from a storage vessel to the fiber separation screens. The liquid contained 20%–30% of air, so the mill engineers had to use large amounts of defoamer to achieve the required production rate.

Sulzer's analysis of the application showed that both of the original pumps could be replaced with a single, duplex stainless steel, self-priming, gas removal process pump, capable of producing a head of 70 meters at 408 to 454 m³/h (Fig. 2). As soon as the new pump had been installed, the amount of expensive defoamer was reduced by 90%. This saved not only money but had also a positive effect on the quality of the final product. Coupled with increased reliability and performance, the new equipment has proven to be a very cost-effective solution.

At each stage of the production, the application must be analyzed carefully to assess the challenges. Sulzer process engineers are, thus, able to specify the most appropriate pump for each task.

This step is becoming even more relevant as technicians look to minimize costs and rely on duty pumps only, regarding standby units as an unnecessary cost. Therefore, it is essential that the pump is specified correctly and unnecessary downtime is avoided. Routine maintenance has to be completed during planned shutdown periods.

Replacement of existing pumps

When older equipment is replaced with pumps that incorporate the latest technology and design, reliability and performance increase and the costs decrease.

The food and beverage industry presents a wide range of challenges including abrasive media, high viscosities, temperature, corrosion, and entrained air. Identifying the ideal combination of design characteristics requires skill, expert knowledge, and experience of the industry and its requirements. Selecting the most appropriate replacement rarely involves just using the specification of the item to be replaced. Innovations in materials, coating systems, sealing components, and impeller designs have enabled process engineers to fine-tune a pump specification to a particular application.

Sulzer works very closely with process engineers from a wide range of industries to better understand the issues and challenges that affect pumps of all sizes. This leads to improved designs; not just of complete pumps, but also of individual components that can be retrofitted to existing equipment.

Technical support over the whole lifetime

Maintaining pump performance is crucial for maximizing productivity. By understanding the most likely causes of faults and failures, this is achieved more easily. As previously mentioned, the correct specification is essential, but so are the installation and alignment of the pump. These three steps are crucial for a reliable installation.

A successful pump installation requires both the process knowledge of the on-site engineers and the product and materials expertise of an original equipment manufacturer (OEM). Working closely from an early stage of a retrofit project leads to the best results for an installation and forms the base for optimal after-sales support. Sulzer pumps are known for their robustness and long lifetime. Inevitably, there are changes in the use of the pumps during their lifetime — either as part of a routine intervention or as part of a process change within the manufacturing procedures. Production lines may need to be adapted to suit new processes or materials. This requires expert advice in order to maintain the reliability and performance of the pump.

Working directly with a pump manufacturer brings a host of advantages, including access to the latest materials designed to operate in existing equipment and a wealth of experience applicable to each industry. Sulzer's global manufacturing and engineering network ensures that this high level of technical support can be accessed anywhere in the world. Sulzer customers can communicate with a single, local point of contact, and — nevertheless — benefit from the global expertise and service structure/portfolio of an international company.

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Duplex stainless steel

In recent years, duplex stainless steel has been used more commonly in manufacturing — mainly because of advances in the steelmaking techniques, in particular, in control of nitrogen content during production. The food and beverage industry has used stainless materials such as 316SS and 317SS for a considerable time, but the numerous grades of duplex stainless steel that are now available bring additional options. Duplex stainless steel can have twice the design strength of austenitic and ferritic stainless steels as well as improved corrosion, abrasion, and pitting resistance (Fig. 4). All of which can benefit the food and beverage industry.



4 Processing of a pump casing from duplex stainless steel.