

**Pumping applications to allow the troublefree pumping of gas-containing liquids and the use of non-contacting sealing systems without sealing water while saving energy.**

A core problem frequently presented to the pump industry by sugar and starch manufactures concerns air deposited in the medium in some phases of the process, in this case especially in extraction, at rates of up to 40 per cent, something that causes foaming and even stoppages.

If the initial pressure is too low, the air carried with the flow collects in the front of the impeller and builds up into a bubble that further reduces pump performance while clogging the impeller eye until the flow eventually stops and a shutdown is required for air removal from the device. Another, in some respects even worse problem is presented by shock pressures that occur at moments when a bubble is forced through the pump. This situation is partly created by the idea of having the impeller clearance overdimensioned to such a degree that the risk of clogging is eliminated. Apart from the resulting high rate of energy consumption, these shock pressures nevertheless have a negative impact on pump performance and may damage the intermediate filter.

Given the constant price pressure and a demand for ever higher profitability, sugar and starch mills have increased in size in recent years and are required to handle increasing volumes. This means higher requirements on pumps. Hence, it is good economy to demand pumps that give the highest possible performance – without stoppages required for the repair of the filters or for air removal – and save energy at the same time (overdimensioning no further needed). On the basis of this fact, the question poses itself, how this problem of air build-up, clogging bubble or bubble shocks should best be dealt with; it should indeed be possible to evacuate the bubbles at the initial stage of their formation and to reduce overdimensioning at the same time.

For the above-mentioned reasons, and as a solution to this problem that we have been aware of for years, Sulzer Pumps is offering a process pump that guarantees an undisturbed flow at optimized power consumption while removing most of the free air from the flow with an insignificant demand for energy.

The Ahlstar™ ASP Self Priming Gas Removal Pump is a self-priming pump for mediums with high gas contents; it guarantees a frictionless pumping process as well as the evacuation of gas from the medium. Thereby process flows remain undisturbed and stable, pressure or volume fluctuations are eliminated and maintenance costs are minimized.

This is achieved by means of an integrated vacuum pump that functions as an annular water pump siphoning and reversing the accumulated air through apertures provided in the vanes of the purpose-designed impeller and sends it either forward or back in the process or removes it from the process.

This pump has been successfully used for years in many of the leading starch mills and has performed excellently not least because of its solid structure and quality. Like the rest of the Ahlstar programme for process pumps manufactured in Finland, this pump is meant to be built into a normal standard pump and it is made available in different materials, with base plate of steel or concrete, or equipped with a belt drive in 25 alternative sizes ( 6 stock sizes ) at relatively short notice. The fact that Sulzer owns and operates the largest Finnish foundry for cast items of acid proof steel, ensures an appropriate selection of materials and optimal design.

In addition to its suitability for undisturbed displacement of gas-containing fluids, ASP performs particularly well in the displacement of mediums with high viscosity, up to ca. 2000 cP, as required for the crystallization of sugar, for example.

Another application of value for sugar and starch producers is the Dynamic shaft seal (D01) which is maintenance-free and works without sealing water. This seal, introduced by Sulzer as early as 1987 and successfully used in more than 27.000 pumps, essentially consists of an auxiliary impeller, expeller, that builds up a liquid ring and thereby seals the shaft. As soon as the pump is stopped, the liquid ring withdraws, the medium presses a flexible disc against the sleeve so as to cut the medium flow. When the pump is started the auxiliary impeller creates a vacuum in the space between the disc and auxiliary impeller, the flexible disc is disconnected from the sleeve and a contact-free seal is reestablished. The Dynamic Seal can be used for material densities up to 8%; for special cases flushing connections are available. Even if this type of sealing requires a positive intake pressure and somewhat higher power supply compared with normal mechanical seals, its service life is longer and much less maintenance is required than by conventional sealing systems; in addition, savings are achieved in sewage costs, as no seal water is needed. This dynamic shaft seal is supplied by Sulzer Pumps not only for new pumps but also as a replacement set for all existing Ahlstar™ APP, NPP and WPP pumps.

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