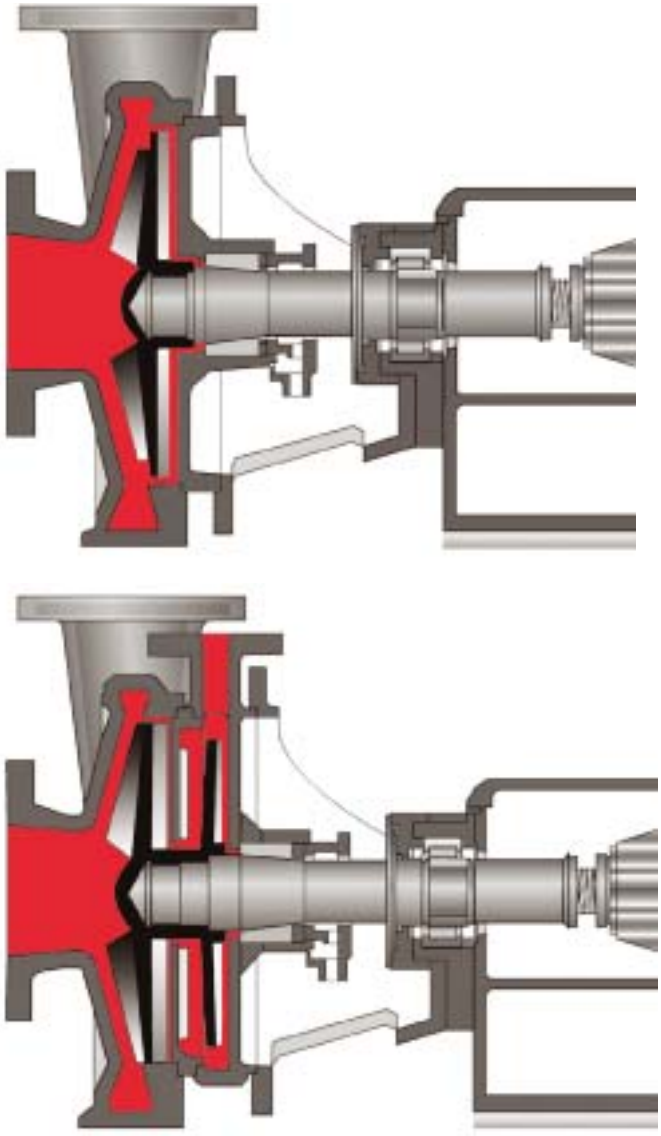
Simultaneous pumping of hot, abrasive and corrosive media

Slurry pumps for tough process conditions

Their suitability for solids is legendary: one MOR pump recently dismantled had been running since 1948. It was fully functional to the last. Back in those days, the MOR pumped maize mash – hence the M. The robustness of the horizontal pump has endured and a lot of expertise has been gathered along the way. Today, these friction-free, wear-free pumps excel at difficult tasks worldwide. They are used in chemical plants to pump materials such as ammonium nitrate, urea solutions and nitric, sulphuric or phosphoric acid.

MOS/UMOS and MOR/UMOR centrifugal pumps reliably pump even extreme media, which can be simultaneously hot, abrasive and corrosive. They work with a frictionless, hydrodynamic shaft sealing system. Basically, this seal consists of additional impeller back vanes. The pumping medium is thus carried away from the shaft seal protecting the downstream shaft seal system. Depending on the suction head, another seal expeller is added. This exerts an equal pressure opposing the residual and/or pumping pressure. Thanks to these impeller back vanes and the additional seal expeller, the pump speed is conveniently adjustable – without affecting the hydrodynamic sealing effect. The capabilities of the special centrifugal pumps in this series are many and varied. Custom-built for specific requirements, they feature different pump casings, impeller and shaft seal designs. The basic MOS variant is fitted with a cylindrical packed gland and is suitable for low suction heads. UMOS, equipped with an additional seal expeller, is the version for high suction heads. Like all other pumps in the series, it needs virtually no maintenance and operates without leakage. Depending on the challenges presented by the process conditions, the selection of the ma-



The horizontal centrifugal MOR (up) and UMOR (down) pumps operate without friction or wear

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Wear plates made from SiC are used to optimise the service life of the impeller

terials can be handled flexibly. Enormous advantages in the battle against wear are offered by the new material based on SiC, which significantly extends the service life of the components, as this field report will show.

"The difficulties posed by corrosive, abrasive, sticky, gaseous, crystallising or even gelling pumping media likewise do not trouble the pumps in our MOS/UMOS and MOR/UMOR series", explains Hans Möllmann. A graduate engineer, he is responsible for the Research and Development department at Bungartz and also much in demand as a lecturer. At pump seminars, he delivers impressive practical examples.

Successful pump replacement

There are a number of pumps in use at a plant in Northern Europe. The medium pumped by one of them is a complicated mixture of acids (nitric, phosphoric, hexafluorosilicic), fertiliser (40 % calcium nitrate) and up to 15 % sand. The pumping temperature is +80 °C. The design data is as follows: 200 m³/h, 42 m and 7 m suction head. A normal-priming centrifugal pump previously caused significant problems for the owner. Within the space of a month, the old pump generally had to be repaired up to ten times. When specialists from Bungartz were called in, their recommendation was to install the M-MOG. This special centrifugal pump with a double mechanical seal, integrated flowing-water cooling system and speed regulator masters the challenging task. As a result, the pump has meanwhile been running for six months without any problems. The use of wear plates and an impeller made from silicon carbide ensure that the flow inside the casing is eddy-free. Owing to the excellent flow conditions, the casing still only displays minor wear. A service life of around two years is now achieved. The changeover to the robust special pump from Bungartz is impressive due to the significant increase in availability and the substantial savings. Replacing the normal-priming pumps in the plant saves up to 170,000 euros per year and pump unit. The special centrifugal pumps quickly pay for themselves at this North European facility and ensure the operator success in the long term.

UMOR in operation

Facility in Pakistan

Fatima Fertilizer Company Ltd. is a member of the listed Fatima Group in Pakistan. The Group operates several major industrial facilities, including production plants for fertilisers. At one new facility, a uniform mix with 22 % nitrogen and 20 % phosphorus is produced from inferior phosphate rocks. The plant manufactures 360,000 t of nitrophosphate fertiliser per year. The process requires six pumps. In 2010, a single manufacturer was chosen for the complete set of pump equipment. Bungartz, known for its special centrifugal models, supplied MOR and UMOR type pumps in sizes ranging from 200 to 500 mm and with pressure ports from DN 40 to DN 400. "We thus completed the largest order for the operator so far – and we did so to their complete satisfaction", reports Frank Bungartz, who is the third generation to manage the company. The first special centrifugal pumps for a fertiliser plant belonging to Fatima were installed thirty years ago. These pumps ran for decades in continuous operation without any problems. Back then, they were bought in competition with other pumps, yet when it came to this major new project, the present operator relied exclusively on cost-saving, long-lasting pumps made in Dusseldorf, which have proven their effectiveness over long periods.

Advantages of the robust slurry pumps

These solids-compatible, dry-running pumps do not require sealing liquid. Even in continuous operation, there is no risk of leakage. The use of silicon carbide material significantly extends the service life of the impeller and the areas of most intensive wear. Together with the high level of operating reliability and generous maintenance intervals, these key aspects and other special features add up to massive cost benefits. Despite their high performance, the pumps in the MOS/UMOS series are simple to operate. They are not susceptible to operator errors, so no highly specialised technicians are required on site. "It is important to us to ensure the efficiency of the pumps throughout a long service life. This also includes the availability of spare parts, which may still be needed after sixty years", Möllmann emphasises.

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Watch an animation that demonstrates the principle