

Special centrifugal



Fig. 1 Sadko Meusel

Typical cases of damage when using centrifugal pumps include the dry running of the seal and bearing unit. Other malfunctions through operating error, cavitation, vibrations or difficult pumping media may cause unplanned stoppages and production loss. In order to prevent such malfunctions, diagnosis and early detection systems are used. Bungartz has proven for years that no additional expenditure is required with their special centrifugal pumps.

A wrongly designed pump, a performance outside of the working point, which can also lead to cavitation formation – causes for failures

of centrifugal pumps are diverse. Often, the malfunctions are already set in stone due to the pump selection. Other than selection and alignment

errors, such as damaging vibrations, operating errors can also be identified as a cause. For example, these may be insufficient ventilation, wrong directional rotation of the pump, spout drag or closed sealing systems.

Avoidance of expensive securing and monitoring equipment

In practice, there are various approaches for minimising the risk of centrifugal pumps failing. These include a redundant design and sufficient stockpiling of spare parts. In addition, companies invest in comprehensive operating manuals and ongoing personnel training. Recent times have seen an increase in measuring and control technology with (remote) monitoring, protecting and controlling components. Measuring points are installed, gas sensors or dry-running protection signals are used and additional components such as filters, check valves or vortex breakers are installed. However, this does not take into consideration that the additional protection, intended for reducing the failure rate, can itself easily contribute to malfunctions and failures. Experts estimate this to be the cause of up to 50 % of the problems. At the same time, an increased expenditure has to be taken into consideration during the

planning process: Depending on the size, up to 10,000 Euros per signal have to be taken into account for the calculation. (costs for procurement, integration, repair, maintenance and documentation, etc.)

Safe, even under difficult conditions

Solid, gaseous and corrosive media is processed under difficult conditions in the petrochemical and chemical industry. The given provisions and legal regulations (e.g. Germany's Technical Instructions on Air Quality Control (TA Luft)) have to be complied with. The pump manufacturer Bungartz is a specialist in these areas. These robust centrifugal pumps with high intrinsic safety are used for pumping extreme media such as hot sulphuric acid, fertiliser solid mixtures, mineral oil concentrates or materials such as titanium tetrachloride and ammonium nitrate. "The term 'intrinsic safety' originates from the field of electrical equipment," explains Dipl.-Ing. Sadko Meusel, Sales Engineer at Bungartz. (→ Fig. 1) Even the design has to ensure that no hazardous situations can arise even in the case of operating errors. Applied to pumps, the design again serves as prerequisite for making external monitoring systems obsolete. During his technical presentations, Meusel explains the use of the special cen-

pump with high

Fig. 2 The chemical pump
MPCHDryRun

intrinsic safety

trifugal pumps and reports on the experiences which plant managers and pump experts have with the intrinsically safe pumps. “Install and forget,” was a comment made by an experienced professional. One of many statements, which times and times again surprise seminar participants, due to the long maintenance intervals and long service lives of the special pumps.

Increasing availability, saving control technology, reducing costs

Since the company was founded, intrinsic safety of the Bungartz pumps has always been based on the intelligent application of physical principles. One of those is the hydrodynamic shaft seal originally developed by Bungartz, which is iconic

for the proven horizontal pumps. Basically, this seal consists of distinctive vanes on the impeller rear side. Thus, the pumping medium is carried away from the shaft gap transition protecting the downstream shaft seal system. The physical conditions guarantee a sealed pump, which is completely independent from the downstream sealing (mechanical seal, magnetic seal, lip seal, etc.).

The chemical pump MPCH-DryRun (→ Fig. 2) is also known for its high availability. In the case of this hermetically sealed magnet-coupled pump, bearing and magnetic drive do not come into contact with the pumping medium. This allows a liquid-independent utilisation. The labyrinth zone between the impeller rear side and the shaft bearing is free of product and filled with sealing gas, ensuring a thermal barrier with a high temperature

gradient and a low bearing temperature. The grease-lubricated rolling bearings with a minimum service life of 32,000 hours do not require any monitoring or maintenance over this period. Further advantages are that the system is ATEX-compliant, suitable for melting, safe against blockages and operating error (e.g. insufficient ventilation). The otherwise normal signals and controlled systems are omitted.

One unique property is the self-regulating behaviour, which is defined as special physics. The centrifugal pumps from the V-AN (AN stands for abnormal) series (→ Fig. 3) work without suction capacity. They automatically adapt to changing feed rates. Here is the principle in simplified terms: When a medium flows into a vessel, the liquid level rises until the inflow and outflow of the vessel balance out – without any

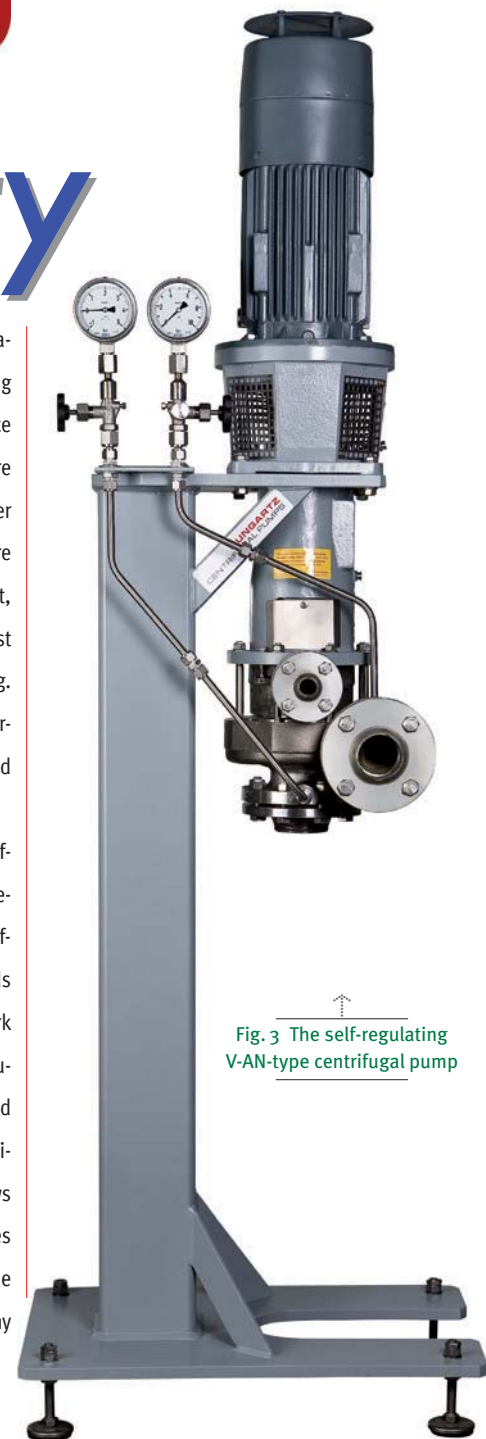


Fig. 3 The self-regulating
V-AN-type centrifugal pump

type of mechanical or electrical regulation equipment. All pumps are self-ventilating as well as safe to run dry and reliable. They do not require any kind of controlling (see Δp Info-Plus)

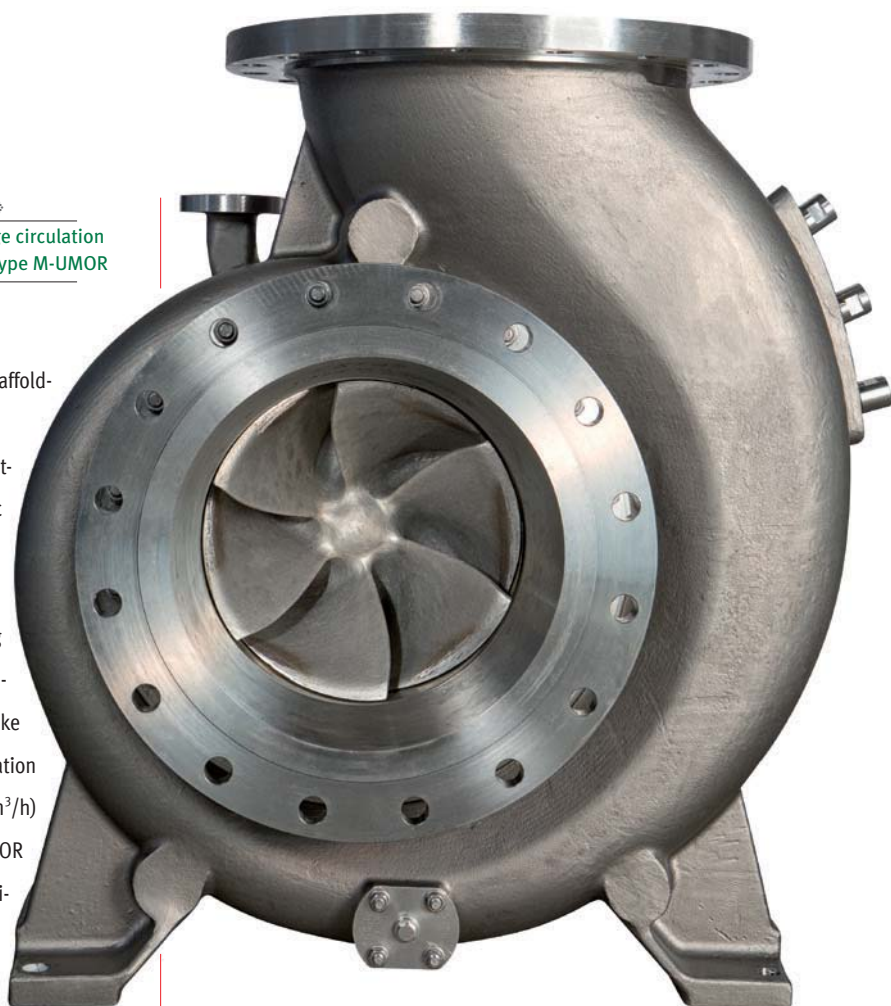
The self-regulating pumps are often used for emptying tankers. They ensure a complete emptying without applying additional pressure. When emptying from the top, this can even be used for heavy media up to a density of 2.4 kg/dm³. The V-AN series is also in demand for usage with gaseous or boiling media. They are ideal for separation processes with fluctuating feed rates, because the pumps independently adapt to changing volume flows. The otherwise normal additional equipment, such as Min/Max switching system, rotation speed control through frequency converter or volume flow measurement, can be foregone completely. Significant investment costs can be saved, if the pumps were taken into consideration early enough in the planning

→
Fig. 4 The large circulation pumps of the type M-UMOR

phase (no pits, scaffolding, buffer tanks).

The contact-free hydrodynamic shaft seal with seal expeller and the idle state sealing controlled by centrifugal force make the large circulation pumps (1,200 m³/h) of the type M-UMOR (→ **Fig. 4**) intrinsically safe in their entirety. These pumps (one pump has been running since 1948!) are particularly suitable for solids and are utilised worldwide, e.g. for pumping ammonium nitrate.

- www.bungartz.de
- *Achema: Hall 8.0, C1*



Δp INFO-PLUS

This animation demonstrates the principle of self-ventilating pumps.



Since the Pump is
the Heart



ACHEMA
2015

Visit us
Hall 8 • booth E38

High Pressure Technology



High pressure plunger pumps for process technology, drinking water supply and high pressure cleaning. Trust in leading URACA quality.