IFAT Press Folder

- New effluent pumps at the IFAT (Hall A5, Stand 123/222)
- Own production of stators for eccentric screw pumps
- Contemporary use of pumps in sewage treatment plants

New ALLWEILER eccentric screw pump at the IFAT

(Radolfzell/Bottrop) In Hall A5, Stand 123/222 at the IFAT, Allweiler AG will be presenting a newly developed funnel pump that also conveys fluids with a very high proportion of solids. The focus is also on dry installed propeller pumps. These are especially economical when pumping large volumes.

With their new AENZ series, Allweiler AG has developed an eccentric screw pump that is specially suited for pumped fluids containing a high proportion of solids. The intake end consists of a funnel with integrated screw. The new pump replaces two previous construction series and provides several advantages for the industrial user: Its maximum solid content of 38 percent is almost double that of its precursors. The new pump offers the user economic advantages in price and in operation because it is constructed of standardised components. This means that spares are more rapidly available and thus requiring less extensive storage. For fluids containing an even higher proportion of solids Allweiler AG also offers a pump with a double screw ("…RG" series).

The company has been manufacturing dry installation propeller pumps under the „PT" name for years. Built specially for high pumping volumes in sewage basins, they are driven with tried and trusted, economical standard motors. Because the motor is dry installed, there is no need for a shaft seal. The result is low maintenance costs, simpler and faster service. These pumps are typically used as recirculation pumps.

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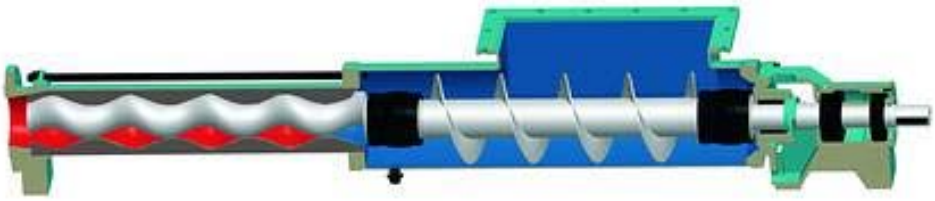
Allweiler AG is the oldest German pump manufacturer (since 1860) and is the European market leader for rotary, propeller, screw, eccentric screw and lobe pumps and macerators as well as peristatic pumps. Allweiler AG has its own foundry and produces ready-to-use fuel and waste water units. Allweiler AG's German headquarters are in Radolfzell on Lake Constance and they have a major branch in Bottrop. Since 1998 Allweiler AG has been part of the Colfax Pump Group, the worldwide leading pump manufacturer. With 900 employees Allweiler AG achieved a turnover of 144 million EUR in 2003.



Picture caption:

The new AE.N.ZD Series pumps convey high viscosity or barely fluid, neutral or aggressive, pure, abrasive or gaseous fluids, also with fibre and solid proportions of up to 38 percent. Q up to 1,700 l/min, p_d up to 12 bar, η to 1,000,000 mPas and t up to 150 °C.

Works image: Allweiler AG, Radolfzell

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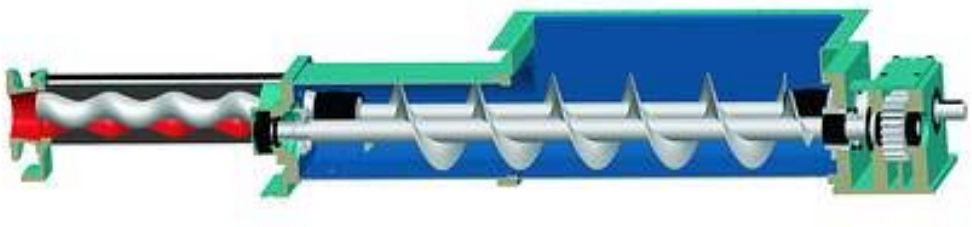

Picture caption:

The Series AE…RG pumps are specially used to convey drained sludge with a max. 45 percent dry solids content share in sewage treatment plants. Two intake or mixing screws are integrated in the intake funnel. Q up to 500 l/min, p_d up to 20 bar, η up to 1,000,000 mPas and t up to 150 °C.

Works image: Allweiler AG, Radolfzell

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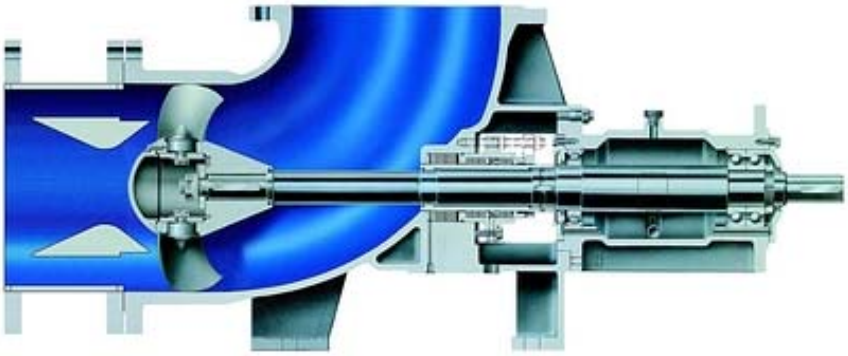

Picture caption:

The dry installation motor of the ALLPRO® Series pumps are economical both with regard to their original purchase price priced and where maintenance is concerned. They have been specially constructed for use in wastewater and sewage treatment as recirculation pumps and for pumping return sludge or rainwater. Q up to 35,000 m^3/h, H up to 1.5 m, and t up to 200 °C.

Works image: Allweiler AG, Radolfzell

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Allweiler produces its own stators

(Radolfzell/Bottrop, Germany) Since mid-March 2005, ALLWEILER AG has been producing all of the stators for its progressing cavity pumps at its own plant. Allweiler acquired this capability by taking over parts of the company *New-York Hamburger Gummi-Waaren Compagnie AG.* With its own stator production, it can make sure that even uncommon elastomers and dimensions will be available quickly and in original quality.

Only very few manufacturers of progressing cavity pumps can assure their customers and users that their products contain stators from their own production. In most cases, stators are procured from external suppliers who work for several different pump manufacturers. Manufacturers need special machines and knowledge to process elastomers properly and they must also have the ability to adjust the properties of various elastomer grades to the respective pumping task. Although five different grades of elastomer can cover about 70 to 80 percent of all applications, another fourteen elastomer types are needed to provide the best possible solutions for the remaining applications.

Allweiler produces about 10,000 progressing cavity pumps every year and delivers these products around the world. Allweiler AG purchased the machines and know-how from its long-time supplier *New-York Hamburger Gummi-Waaren Compagnie AG* in order to gain independence from external suppliers and also facilitate delivery of less common elastomer types and sizes. All of the *New-York Hamburger* employees working in this area have become employees of “Allweiler Stator Production” in Hamburg, Germany.

“This development will bring several benefits for Allweiler customers and the operators of progressing cavity pumps,” according to Board Speaker Klaus Stahlmann. “The original quality will be guaranteed for all elastomers, delivery will be fast and economical, and we will be able to fulfill special needs on a short-term basis.” In addition, Allweiler plans to increase its investments in the research and development of materials and processing methods.

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Modern pump engineering in sewage plants

Pumps in sewage plants move the arriving raw sewage, the cleaned sewage, or the resulting clarification sludges. Special pumps are used to precisely meter additives, such as during chemical sewage treatment and clarification sludge conditioning.

The type of pumped liquid determines the type of pump that will be most ideal. The pumps in the sewage plant's inlet must first lift the arriving raw sewage from the lower-lying channel up to the operational level. This liquid still contains a high level of solids, so the most important thing for the pump units is to resist clogging and abrasion. The flow rate must be able to adjust to fluctuations in the sewage. Achieving high pump pressure, on the other hand, is secondary in importance. Multi-flighted pumping screws fulfill these requirements reliably and usually at a favorable price/performance ratio.

The subsequent cleaning stages are concerned with transporting the resulting clarification sludges, most of which have a low viscosity, but which also tend to generate gases due to the digestion process that begins at this time. As a result, the pumps must be able to both pump thin sludges and be insensitive against the liquid’s evolution of gas. Self-aerating centrifugal pumps are equally likely choices as progressive cavity or piston diaphragm pumps, for example.

In chemical cleaning processes, special metering pumps move additives like acids, lyes, lime, or polymers that are used as precipitation and flocculant aids for phosphate elimination and drainage. Precise metering is important for two reasons: to achieve the best possible reaction and to ensure that the plant runs economically. The addition of chemical substances is also important at this time, so the pumps must be sealed as hermetically as possible against leaks. Special gaskets and gasketless peristaltic pumps fulfill these requirements.

Once the sewage has passed all of the clarification stages, it will have been cleaned well enough that even "normal" water pumps, like those used to move freshwater, can perform the remaining pumping tasks.

The clarification sludge produced by the cleaning process must be subsequently concentrated, digested, and then drained. The sludge pumps used in this area of the plant must sometimes generate high pumping pressures and also deal with the increasing viscosity of the clarification sludge. Mechanically drained clarification sludge normally exhibits a dry-substance proportion of 18 to 45 percent. At these concentrations, the pumped liquid can be very "compact". Only pumps that are specially designed for these materials ("thick sludge pumps") will work reliably under these conditions. Depending on the configuration of the clarification plant and the composition of the sewage, the digestion may be supported by biological material added separately in the digestion

tower; or, the sludge may contain chunks and cakes. In both cases, macerators will be needed to chop up the material. These smaller solid pieces increase the surface area, thereby significantly shortening the digestion time.

Operators of clarification plants are well advised to consider more factors than just the initial purchase price when trying to select the best pump unit. Other factors like the pump's suitability, material endurance, reliability, ease of maintenance, operational costs, and long maintenance intervals are more important. The difference between replacing gaskets in a pump unit every 1000 hours instead of every 8000 hours, for example, will easily cost several thousand euros in maintenance every year. A major factor in having a reliable and economical pump is a constant level of efficiency during continuous operation. Inefficient designs, on the other hand, will lose performance as deposits build up over time. Poorly constructed bearings will be susceptible to wear. The following additional technical and design details of the pump should also be investigated closely: Are the impellers and mouth openings "immune" to deposits and clogging? Which design characteristics avoid bearing wear? Optimized impellers, retainers, anti-vortex ribs and flushing channels on the bearing are characteristics of innovative designs that will pay big dividends throughout the pump's service life. While various pump units may appear to be similar from a technical perspective and in terms of their performance, the maintenance costs and the level of service provided by the manufacturer will vary greatly. Furthermore, when pumps stay in service for a long period of time, the costs associated with operating that pump over its entire service life will be of central importance. The tight finances of the municipalities that usually operate such plants will place the operational managers under additional pressure. It is expected that investments and repairs be completed as economically as possible while simultaneously ensuring the longest possible service life for the pumps.

The clarification plant for the German city of Trossingen (about 22,000 people) offers a good example of how to meet these requirements. Ewald Griesshaber, the Operations Manager at the plant, follows a very straightforward strategy: “We repair and maintain our pumps ourselves, but we use only original replacement parts and when it’s time to purchase a new pump, we make sure we get it from a supplier that has already provided us with similar units.” According to his experience, three conditions must be met for this strategy to work: The quality and therefore the service lives of the pumps must be high, the manufacturer must produce its pump units according to a modular system and it must provide rapid, uncomplicated, and competent on-site assistance when there are problems.

Allweiler AG meets all three requirements, and it is for this reason that Allweiler, with factories in the German cities of Radolfzell am Bodensee

and in Bottrop, has been delivering pumps to Trossingen for decades. When the customer modernized their plant in 2002 and 2003, they once again purchased new pumps from this manufacturer. The original pumps had been in service for more than 20 years, but were still operating well enough to replace even older pump units in Romanian plants. The "Trossingen sewage removal" plant is currently using four Allweiler progressive cavity pumps of the series SEBP 200.1 and SEDBP 300.1 for pumping primary low-viscosity and thick sludge and one ANBP 6.2 progressive cavity pump for precipitation and flocculent aids. The existing propeller pumps are not active in the new process because the plant now works without recirculation. In most cases, propeller pumps move the nitrate-laden sewage and activated sludge from the nitrification basin into the denitrification basin. However, Trossingen is employing an unusual but effective method: The plant performs its clarification task by means of a downstream denitrification stage. It is designed for a maximum dry-weather inlet of 85 liters/second and a maximum mix-water inlet of 150 liters/second.

Their decision to use original replacement parts applies mostly to the rotors, stators, and mechanical seals. Mineral content in the sewage causes wear that necessitates regular replacement of these parts. It is sometimes tempting to resort to replacement parts produced by third-party manufacturers, since at first glance they appear to be less costly. When non-technical people at a plant, in a municipal government, or in a municipal committee are charged with selecting parts, they often choose the cheaper product. But Ewald Griesshaber knows from experience what can happen and what the ultimate costs can be: the service life and the tolerances of the third-party parts are substandard. According to his experience, turning over maintenance to a third-party company that converts the pump to fit its parts can cause major problems. "Once you do that, you are at the complete mercy of that company because only their parts will fit." His advice to anyone considering a similar move is to first request a complete cost evaluation and to take all secondary costs into consideration. It is also very common that a new pump, when calculated across its entire service life, will be more economical than a repair. When the Trossingen plant needs to buy new pumps, they follow this simple philosophy: "product quality and service quality over purchase price". A good way to check both of these characteristics independently of the respective suppliers is to learn about the experiences of neighboring plants. On the other hand, there can also be undesirable results when the decision is left solely to an external engineering company. In these cases, the customer runs the danger that they will get whichever pumps those particular engineers know or from a manufacturer at which the office has good contacts. Neither case will necessarily mean that the customer gets the best pump for his plant. In general, it is very important that technical personnel employed at the plant be deeply

involved in every call for bids and every purchase decision. Otherwise, there is a danger that the decision will be based solely on the initial purchase price, especially when municipal committees are making the decision.

For Mr. Griesshaber, four points are important when making new purchase decisions. First, the pump must be constructed of materials that are appropriate for the pumped liquid. It is easy to find pumps made of the least costly materials. They will typically survive their warranty period but then incur unexpected costs and ultimately lead to an expensive pump replacement. Secondly, he considers his own experience and the experience of his colleagues with regards to durability and the manufacturer's service. Important points in this area are the manufacturer's ability to deliver on-time, smooth warranty procedures, and simple ordering of replacement parts. "When we call Allweiler, we usually only have to say the pump type and the part we need. We don't have to dig around for parts numbers or anything like that." Thirdly, he looks for a broad product line. This makes it easy to get just the right size for every pumping task while still getting all pumps from the same manufacturer. Finally, it is important that all pumps reflect a modular design that uses the highest possible number of standardized parts so that his replacement parts stock stays low. The Trossingen sewage plant has had good experiences with Allweiler in all four areas. They are now taking steps to convert their pumps to frequency-converter drives in order to reduce the number of mechanical wearing parts.

For decades, progressive cavity, peristaltic, propeller pumps, and macerators for sewage treatment have been core competencies of Allweiler AG, Germany's oldest industrial pump manufacturer (founded in 1860). This manufacturer will be at the IFAT trade fair (hall A5, booth 123/222) to exhibit its current product line for treating and moving drinking water and for sewage handling and clarification engineering. These products include the newly developed "AE…ZD" series. Progressive cavity pumps are especially well-suited to moving liquids with a high proportion of solids. The material is fed into the pump by means of a hopper and a screw. The new pump replaces two previous series and gives users a number of new advantages. For instance, the maximum level of solids is now 38 percent, nearly twice as high as its predecessor. Since it is constructed with standardized components, the new pump also lowers the cost of procurement and operation. Replacement parts and parts subject to wear are therefore available more rapidly and the number of parts that must be kept in stock is reduced. For pumping liquids with even a greater proportion of solids, Allweiler offers a double-screw model (type "…RG"). Another new product is a "small" peristaltic pump of the type "ASH". This product expands the selection of peristaltic pumps to include models with capacities of about 10 liters/hour and

delivery pressures up to 7.5 bar. It is especially well suited for corrosive liquids like iron-3-chloride (used in clarification engineering).