

**Just one square metre each:
flexible rotary lobe pumps convey kaolin slurry quickly and reliably
despite reduced space**

Waldkraiburg, Germany, XX/XX/2011

"White gold" – this description of porcelain was also used in the past for paper, for a good reason. Both are based on kaolin, a special clay that gives the materials their radiant white. Kaolin is not only used as a coating in paper production, but as a filling as well. The demand in paper production for kaolin is therefore high so that, in large factories, the raw material is sometimes delivered in tankers by rail. Special pumps are required to empty the tanks quickly to save time and costs. One well-known paper producer, however, scarcely had any space for conveyors, so TORNADO[®] rotary lobe pumps from NETZSCH Mohnopumpen GmbH were used. The flexible and compact systems also work in unusual positions, so that just one square metre per pump is enough to convey the kaolin.

For cost reasons, the paper company decided to switch production processes to delivery by rail. In contrast to the lorries that had been used, rail would allow larger volumes to be transported, so purchasing would be more cost-effective. However, the standing times of the private rail company had to be kept as short as possible, so high conveyed volumes when pumping out the wagon were the precondition for the new means of transport. At the same time, there were only a few square metres available in the pump room. The progressing cavity pumps used in the past could not have been installed in the quantity required.

Kaolin transportation requires robust, high-performance pumps

The special properties of the conveyor medium were also an important consideration. The basic raw material for white porcelain clay is feldspar. When it decomposes, kaolinite forms, which then combines with smaller proportions of undecomposed feldspar and quartz to make the actual kaolin. The individual particles have a layered structure and are generally just a few µm in size. Kaolinite itself is quite soft at 2.5 on the Mohs scale. However, the additional proportions of feldspar and quartz can make the clay - which is mainly softened to a slurry for processing - quite abrasive. The pump therefore

had to be designed to withstand more challenging media during everyday use as well, and to deliver consistent performance. Centrifugal pumps would not have been suitable for the task because of the anticipated issues with low pressure and counterpressure.

The decision ultimately was to use the TORNADO[®] rotary lobe pump system, as it delivers exceptional flexibility. The self-priming pump system operates via displacement, transporting the conveyor medium continuously from the suction to the pressure side using two intermeshing rotors. Almost all types of media can be transported smoothly in this way, from low-viscosity and high-viscosity materials such as thixotropic or dilatant substances to sticky and non-sticky or shear-sensitive materials. The pump also handles particle sizes of up to 70 mm with ease. The transported volume can be regulated easily via the rotation speed. Volumes of up to 1,000 m³/h can be achieved depending on size.

Excellent resistance and wear protection thanks to special materials and design

A total of five pumps were installed for the paper manufacturer. They convey around 70 m³ of the kaolin slurry at a viscosity of between 100 and 500 mPas. The pumps were made from a highly corrosion-resistant CrNiMo steel to maximise running times and minimise maintenance workload. Axially and radially abrasion-resistant wear protection plates are also attached and can be easily replaced if necessary. The outer body of the multiple-bladed lobes is made of hard-wearing sodium butadiene rubber with low shore hardness and specially suited to abrasive products. If cleaning and repair is required nonetheless, the front of the pump chamber can be removed in just a few steps. The entire conveyor area is therefore easily accessible so that the individual components can be serviced or replaced without having to remove the housing.

A further significant contributor to the robustness of the TORNADO[®] is the Gearbox Security System (GSS) which physically separates the pump and gear chambers. The sensitive gear box is thereby completely protected against the ingress of fine slurry. The springs of the mechanical seal on the shaft have also been encapsulated to prevent damage to the components.

Lateral position reduces the space required to 1 m²

The pumps, which traditionally convey horizontally, have been rotated 90° to the right to fit into the limited space. The infeed and outfeed ports are now at 12 and 6 o'clock. The pipe work, which would have had to have been laid flat in a progressing cavity pump, for example, and which would have taken up a lot of space, could then be fitted vertically between the floor and ceiling. Each TORNADO® now takes up just 1 m² of the small pump room. The lateral positioning has no affect on the performance and function of the system. The kaolin from the goods wagon is drawn easily thanks to a rotary lobe pump suction capacity of up to 8 mWS and is then pumped upwards at an average of 4 bar pressure. The conveyor systems are driven by a 22 kW SEW motor. The total unloading procedure lasts just a few hours despite the large volumes supplied – and the rental periods for the rail transport are shorter as a result.

[5.866 Zeichen inkl. Leerzeichen]

For over five decades, NETZSCH Mohnopumpen GmbH has served markets worldwide with its NEMO® progressing cavity pumps, TORNADO® rotary lobe pumps, grinding machines, dosing systems and accessories, providing customized, sophisticated solutions for applications in every type of industry. With a workforce of more than 1,400, "Pumps & Systems" is the largest business unit with the highest turnover in the NETZSCH Group, alongside "Analyzing & Testing" and "Grinding & Dispersing".

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Photos:

	<p>The aluminium silicate, kaolin, has earned the name "porcelain clay" thanks to its significance in porcelain manufacturing. In paper production, the mineral is used both as a shiny white coating and as filling.</p> <p>Source: US Geological Survey, public</p>
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The TORNADO® pumps have been turned onto their sides to empty the wagon. They now can pump the kaolin slurry vertically from bottom to top. The positioning has no effect on the pump performance.

Source: NETZSCH Mohnopumpen GmbH



A total of five pumps with a pumping capacity of 70 to 75 m³/h are used by the paper manufacturer. Each pump requires a surface area of just 1 m² thanks to their compact design and flexible positioning.

Source: NETZSCH Mohnopumpen GmbH