

AHLSTAR WPP pump provides reliable service in important process step

In every phosphoric fertilizer production process, waste removal is required. The waste (tails) contains mostly gypsum. The tails should usually be pumped quite far away. The pump in this application should be wear resistant, have low speed and high enough head, and be able to solve several tasks.

The solids are gypsum ($\text{CaSO}_4 \times 2\text{H}_2\text{O}$), and the particle size is about 0.3 mm. Gypsum is quite soft and not too abrasive, but because of its large amount and high speed, it becomes abrasive. This is why the hardness of the pump material is important.



The challenge

Originally the customer had its own pump with a poorly working gland packing. The pump needed frequent repairs because of wear and frequent maintenance of the gland packing. The pH value of the pumped slurry is 4, so the pump material should be both corrosion resistant and abrasion resistant. Pump seals should be reliable with minimum maintenance.

The solution

To solve all requirements, Sulzer selected the AHLSTAR WPP wear resistant pump with open impeller. After the first trial, material 5B failed because of a possibly low pH value.

The gland packing seal in the second attempt was changed to a dynamic seal. Finally the best result was achieved with 4E material (hard enough) and dynamic seal. The pump operates constantly, so the dynamic seal can operate even with this high amount of solids.

The selected dynamic seal gave reliability and reduced maintenance related to the seal. Because of its long discharge pipe (2.5 km) and necessary flexibility in pump flow, VFD was used. This resulted in good and reliable operation.

Customer benefits

The AHLSTAR WPP wear resistant pump was selected because Sulzer could propose a proper pump type, pump material, pump seal, and pump parameters such as head and flow. The pump does not need much maintenance and attention. In this difficult application the combination of pump type (wear resistant W hydraulics), pump material (hard martensitic steel 4E) and dynamic seal (no maintenance) gave a solution that satisfied the customer.

The Sulzer difference

For these kinds of chemical slurries, Sulzer has a wide range of AHLSTAR wear resistant pumps. The wetted parts can be made from both abrasion resistant and corrosion resistant material. The pump and seal selection can be done in accordance with the pumped slurry type and customer requirements. As a result, the customer ordered more pumps with a similar application (another line).

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Pump data

Pump	AHLSTAR WPP44-150, open impeller, dynamic seal
Original ser. no	100026398
Later delivered ser. no	100094570
Material	4E
Capacity	250 m ³ /h
Head	50 m
Speed	1'500 rpm
Motor	90 kW, 0.4 kV, VFD

Process data

Gypsum slurry	
Temperature	40°C
pH	4
Solids	300 g/l
Solids size	300 mkm
Specific gravity	1'200 kg/m ³

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