

Long-term successful collaboration with major fertilizer producer

28th November 2022

One of the world's top fertilizer producers operates a big fertilizer complex in South America. A few years ago, the company started an expansion project that includes three additional phosphoric acid concentration lines. Sulzer was selected to supply the critical evaporator circulation pumps.

“The circulation of the phosphoric acid in the concentration loop is a critical application, where state-of-the-art practices have to be applied. Our successful cooperation started in 2004 with the supply of two axial flow pumps, and the customer recently ordered the seventh pump. The close technical collaboration is valuable.”

Henrique Botura, Sales Manager at Sulzer

The challenge

For this application, the technical challenge was to select the right hydraulics to match the duty point while allowing a certain flexibility due to crystallization and scaling that will take place in the loop.

The constraints of the evaporator circulator are:

- 50-52% P₂O₅ acid with contaminants (sulfates, chloride, fluorine, ≈ 4-5% solids)

- Maximum operating temperature of 90°C
- High flow and low head
- Margin on minimum flow for flexibility in operation
- Fixed speed

The Solution:

Sulzer selected the best pump size and propeller design for optimal benefits:

- Size of the casing for an acceptable linear velocity.
- Propeller design allowing a sufficient margin on the minimum flow with an operating point close to the BEP.
- Adapted mechanism guaranteeing perfect performance and lifetime of the mechanical seals as well as trouble-free bearing operation.

The material of construction is SS904L, which is a common material for this kind of application. Its asset is a good corrosion resistance in most P2O5 applications. The higher-grade alloy 28 selected for the wear ring and the propeller will prolong the lifetime of these parts that are subject to higher wear. Finally, the shaft made of Super Duplex SS is the best option in terms of mechanical properties.

Customer benefit

The evaporator circulation pump is the key rotating equipment of the concentration unit. A failure of this equipment will stop the production process. That is why long-term successful experience with specific equipment is so important. It brings comfort and eases the life of the operators.

In this specific pump design, the pump casing is welded. It is more expensive than a cast casing, but the undeniable advantage is the inherent higher quality of the

surface and the homogeneity of the laminated materials. This has a significant impact on the corrosion resistance of the equipment. In this application, the corrosivity of the product is an important criterion for the lifetime of the pump. The original construction includes a replaceable wear ring. Also here, the investment is a bit more expensive. The advantage, however, is that this solution avoids heavy and costly maintenance, as the area of the casing located at the propeller will inevitably be worn. Because the efficiency of the pump is directly affected by the clearance between the tip blades and the casing, this is a parameter that cannot be disregarded.

Long-term technical collaboration with an experienced supplier is a real advantage for the plant operators. They know that the equipment is working well under similar conditions, and the maintenance teams are familiar with it. The support from the equipment supplier is valuable, and the operators can feel comfortable even if the operating parameters would be changed for new orders.

Item	Description
Application	Evaporator circulation pump
Liquid	50% phosphoric acid @ 86 (°C)
Flow	< 12'000 (m³/h)
Pump type	CAHRM1000F
Material of construction	Casing in EN-WN 1.4539 Propeller and wear ring in EN-WN 1.4563 Shaft in Super Duplex SS (PRE40)
Nominal speed	430 (RPM)
Lubrication	Grease
Motor	590 (kW) – 4'000 V – 60 Hz (WEG)
Transmission	Gearbox (SEW)
Sealing system	Dual mechanical seal (John Crane P32+R33) with safe unit
Accessories	Sulzer Sense with Gateway (instrumentation)

Image captions:



Image 1: Axial flow pump type CAHR1000F running at the site.

The image(s) distributed with this press release are for Editorial use only and are subject to copyright. The image(s) may only be used to accompany the press release mentioned here, no other use is permitted

About Sulzer

Sulzer is a global leader in fluid engineering. We specialize in pumping, agitation, mixing, separation and purification technologies for fluids of all types. Our customers benefit from our commitment to innovation, performance and quality and from our responsive network of 180 world-class production facilities and service centers across the globe. Sulzer has been headquartered in Winterthur, Switzerland, since 1834. In 2021, our 13'800 employees delivered revenues of CHF 3.2 billion. Our shares are traded on the SIX Swiss Exchange (SIX: SUN).

For more information, visit www.sulzer.com

Press contact:**Sulzer Pumps**

Finland Oy: Pekka Salmi, Head Business Development Customer Support Services

Tel: +358 50 555 0296 Fax:

Web: www.sulzer.com

Email: saku.vanhala@sulzer.com

Address:

PR agency:**DMA Europa Group****Brittany Kennan**

Tel: +44 (0) 1905 91747

Web: www.dmaeuropa.com

Email: brittany@dmaeuropa.com

Address: Progress House, Great Western Avenue Worcester, Worcestershire, WR5 1AQ, UK