SALOMIX® Vertical Agitator, the Perfect Choice for a Storage Tank in Phosphoric Acid Production

Project Highlights
In the phosphoric acid manufacturing process, storage tanks are used in every mill. After reaction and filtration, phosphoric acid is pumped into the storage. Phosphoric acid also contains some sulphuric acid and fluorine. It is quite aggressive. In addition, without agitation, the gypsum (partly dissolved) settles and crystallizes. This is why good mixing is needed. After storage, phosphoric acid goes to fertilizer production. Usually there are several storages operating continuously, and often the storage level is not constant. The agitator in the storage tank aims to prevent the sedimentation of gypsum particles; otherwise the particles settle on the bottom, requiring the cleaning of walls and tanks.

The Challenge
The agitator in the phosphoric acid storage tank is required to perform effective mixing, preventing sedimentation. Simultaneously, the agitator with a long shaft (approximately 10 m and longer) should not have a bottom bearing, it should be efficient (low power consumption), and have low speed. The construction of the wetted parts is important, too. Depending on the process type, the agitator material of the wetted parts is 4T or 4U (or similar).

The Solution
SALOMIX® LV agitator with paddles of AF type on one level meets the customer’s all requirements. The paddles are quite large (up to 3.8 m in diameter), while the agitator speed is low. The low speed minimizes radial forces. The paddles are located low at the tank bottom, so the customer can pump out all acid with agitation if needed.

Customer Benefits
Sulzer SALOMIX® LV agitator with AF paddles can operate very long without any problems, and without needing frequent maintenance. The shaft construction (not heavy pipe - large diameter) provides straightness. The agitation arrangement makes it possible to unload the gear and minimizes the absorbed power. The combination of all correct design solutions together with the correct material selection of the wetted parts gives a reliable and long-lasting product. As an option, the agitators can have a cone with windows between the gear foot and tank (or frame) to observe the condition of the connection between the coupling half and the shaft flange.

Agitator Data
- Agitator: SALOMIX® LV-11/71 vertical agitator, ser. no. 100026055
- Material: Avesta 654 SMO
- Propeller: AF, 1 level, D=3200 mm
- Speed: 21 rpm
- Motor: 11 kW, Kumera gear

Process Data
- Phosphoric acid slurry
- P_2O_5: 37-39% (H_3PO_4)
- SO_3: 2% (H_2SO_4)
- F: 2% (HF, H_2SiF_6)
- Temperature: 90 °C
- Solids: 1.5%
- Specific gravity: 1430 kg/m^3