

CASE STUDY

Proven performance of Scaba bottom-mounted agitator in PVC emulsion polymerization reactors

Leading PVC resin producer recently modernized its VCM stripping process at the emulsion plant by installing a Sulzer bottom-mounted agitator. The upgrade formed part of a broader program to enhance process reliability, product quality, and energy efficiency in the stripping processes.



The challenge

Stripping processes for PVC emulsion present several critical mixing challenges like shear sensitivity, energy efficiency, and thermal control. Excess shear can destabilize the emulsion and increase scrap rates. Stripping takes place at temperatures up to 60°C in volumes of 30 m³, requiring efficient but gentle circulation to maintain uniform heat distribution. Continuous stripping cycles demand solutions that consume minimal power without compromising performance.

Additionally, the equipment must operate under ATEX zone 1 requirements while maintaining mechanical integrity and preventing leakage. These issues set high demands on safety and compliance.

The solution

Sulzer engineered and supplied a Scaba 40VV40T-M2a bottom-mounted agitator, designed specifically for low-shear mixing processes. Its configuration provides effective axial flow from the tank bottom, ensuring homogeneous conditions throughout the vessels.

Key features

- Impeller: 3-bladed SHP hydrofoil upward-pumping propeller, diameter of 1050 mm delivers uniform axial circulation while limiting shear stress.
- Materials of construction: Propeller and solid shaft are in duplex stainless steel EN 1.4462 for high strength and resistance to chloride-containing media, typical in vinyl chloride polymerization processes.
- Sealing system: Double cartridge mechanical seal with external barrier fluid was selected for the agitator with the following seal faces: TC/TC // CB/TC, as well as Kalrez elastomers for excellent chemical resistance and extended service life.
- Motor and drive: The agitator uses ABB M3KP flameproof motor of IE3 efficiency. The variable frequency drive enables speed adjustment according to process requirements. Also, SEW helical-bevel gearbox ensures smooth torque transfer and long-term reliability in addition to compact and service-friendly installation.
- Compliance and safety are ensured with ATEX Zone 1 certified installation, and the IP65 protection rating of the motor suits operation in demanding environments.

PVC emulsion stripping is highly sensitive to the mixing conditions, which is why the agitator design has a direct impact on the stability of the latex (and consequently avoidance of coagulation) and the efficient removal of unreacted monomer. The client needed a robust, low-shear, and ATEX-compliant agitator solution that could guarantee consistent polymer quality while reducing operational costs.



Scaba 40VV40T-M2a bottom-mounted agitator

Customer benefits

Since commissioning, the agitator has enabled the client to achieve significant improvements in its PVC emulsion stripping process. Process stability is reached with consistent low-shear mixing of latex, ensuring a uniform heat distribution in addition to effective monomer removal with lower stripping gas consumption.

The customer demand for low power consumption is achieved with an average consumption of only 1.2 kW, which is significantly below the rated motor power, reducing operating costs. The VFD control allows operators to fine tune agitation intensity depending on process parameters offering operational flexibility.

With Sulzer's expertise, the customer benefits from safe operations at reduced lifecycle costs. The duplex shaft and robust seal design minimize downtime while full ATEX compliance ensures safe operation in hazardous environments. Reduced maintenance frequency and improved energy efficiency lower the total cost of ownership.

Conclusion

By installing a bottom-mounted Scaba 40VV40T-M2a agitator, the customer secured stable, safe, and energy-efficient stripping in its PVC emulsion plant. The installation demonstrates Sulzer's ability to provide customized mixing solutions for polymer production, enabling producers to optimize quality, reduce energy consumption, and ensure long-term operational reliability.

Technical data summary

| Parameter | Specification |
|-----------------------|--|
| Application | Emulsion PVC stripping |
| Agitator model | Scaba 40VV40T-M2a bottom-mounted |
| Propeller type | 3SHP18 upward pumping |
| Propeller diameter | Ø 1050 mm |
| Rotational speed | 62 rpm |
| Shaft material | Duplex stainless steel EN 1.4462 |
| Shaft length | 600 mm |
| Seal type | Cartridge, TC/TC // CB/TC, Kalrez elastomers |
| Motor | ABB M3KP, 1.5 kW, Ex de, IE3 |
| Gearbox | SEW helical-bevel KAF57 gearbox |
| Power consumption | 1.2 kW (average) |
| Tank volume | 30 m ³ |
| Operating temperature | Up to 60°C |
| Compliance | ATEX Zone 1, IP65 motor |

For more information please visit

[sulzer.com/chemical-processing](https://www.sulzer.com/chemical-processing)

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