FROTH HANDLING

K & Kpro® Slurry Pumps

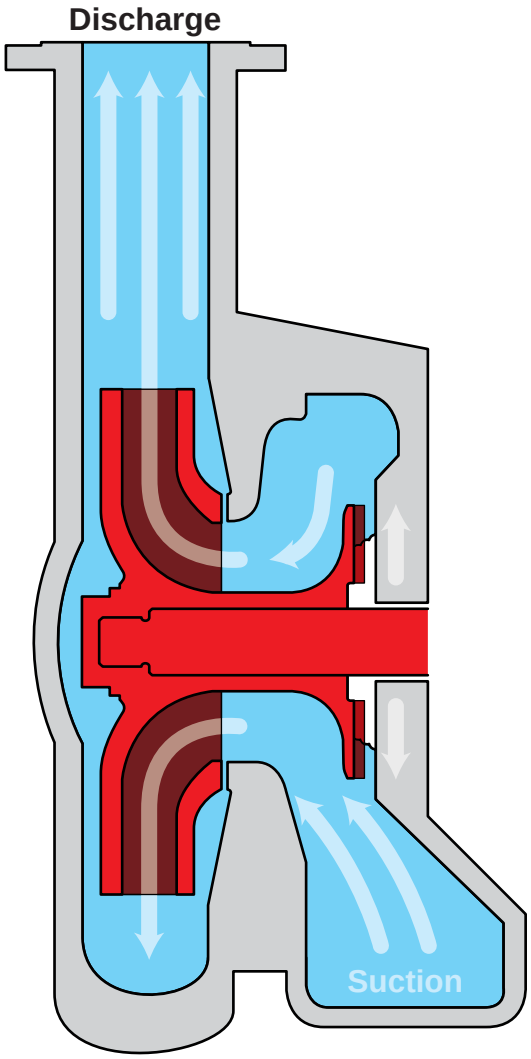
WILFLEY®
INNOVATIVE DYNAMICALLY SEALED PUMPS SINCE 1919

A key design requirement for good froth handling is low fluid velocity into the impeller. As fluid enters the impeller, it is accelerated by the impeller; as the velocity increases, the static pressure of the fluid decreases. This lower pressure allows the air in the froth to expand as it enters the impeller; it becomes a larger fraction of the total flow and acts to choke the impeller eye. This causes decreased pump performance and can also result in air pockets within the case, leading to loss of prime.

The side-suction design of the Kpro® addresses inlet velocity in two ways:

- The large volume of the side-suction inlet provides a high inlet area to discharge ratio. This reduces velocity through the inlet, keeping the gas entrained within the froth as it flows through the pump.

- The side-suction design brings the fluid into the pump in close proximity to the dynamic seal, which, being open to atmosphere, prevents the pump from building suction pressure. This minimizes the pressure differential between the inlet and the impeller, further keeping the gas entrained in the froth.



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The impeller design also helps contain the gas within the liquid

The Kpro® impeller features a wide impeller eye and large impeller vane passages. Velocities through the impeller vanes themselves are minimized, due to the high volume available for the fluid to pass through. Therefore, the entrained gasses are less likely to expand as they flow through the impeller and out of the pump.

Because of the impeller diameter and volume, Kpro® pump running speeds are typically low. At the eye of every impeller, there is a vortex which tends to separate air from fluid. The higher the speed, the greater the forces and the greater the vortex. By running slowly, the vortex is minimized, and the gas stays in solution as it passes the eye.

The Kpro® range features very flat pump curves. This is important because even slight variances in dissolved gas percentages result in significant de-rating of the flow characteristics of a pump. For instance, a 2% increase in entrained gas will reduce pump flow performance by 10-12%. A 4% increase in entrained gas will reduce performance by 44%. With the flatness of the Kpro® curves, the Kpro® is able to experience significant variations in flow rate, with only a correspondingly slight variation in discharge pressure, allowing the pump to keep up with demand as the percentage of froth varies.

Kpro® pumps contain features to help alleviate gas buildup in the pump:

Kpro® pumps come with a threaded port on the top of the intake chamber which is designed such that a vent pipe can be threaded into the intake chamber. This vent pipe allows gas pockets to vent out of the pump prior to them being pulled through the impeller.

The Kpro® pump has two suction flanges; one on each side of the case. The unused suction flange can be used as an additional vent or as an entry point for froth-reducing agent to be applied to the fluid within the pump.