Less Waste and Better Working Solution

Process optimization with self-cleaning candle filters

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Sulphurnet Self-Cleaning Candle Filter

A producer of herbicides was investigating a plant optimization in which filtration played an important role. The process included a continuous reactor and the products were filtered on a belt filter to recover the product, which was a solid end product. The mother liquor was recirculated back into the process.

However, the very fine particles (< 8 micron) where passing the belt filter. Due to the characteristics of the solids, conglomerations of very fine particles were forming new larger crystals. Blockage in the piping, fouling of pumps and heat exchangers in the recirculation process caused production stops, and additional maintenance hours. All because of these large crystals. Installing a fine filter media on the belt filter caused blinding; the very fine particles were trapped in the small mesh openings.

The client decided to installed bag filters to trap these fine particles and keep the process going. The frequency of exchanging the bags and HSE matters forced them to find a better solution.

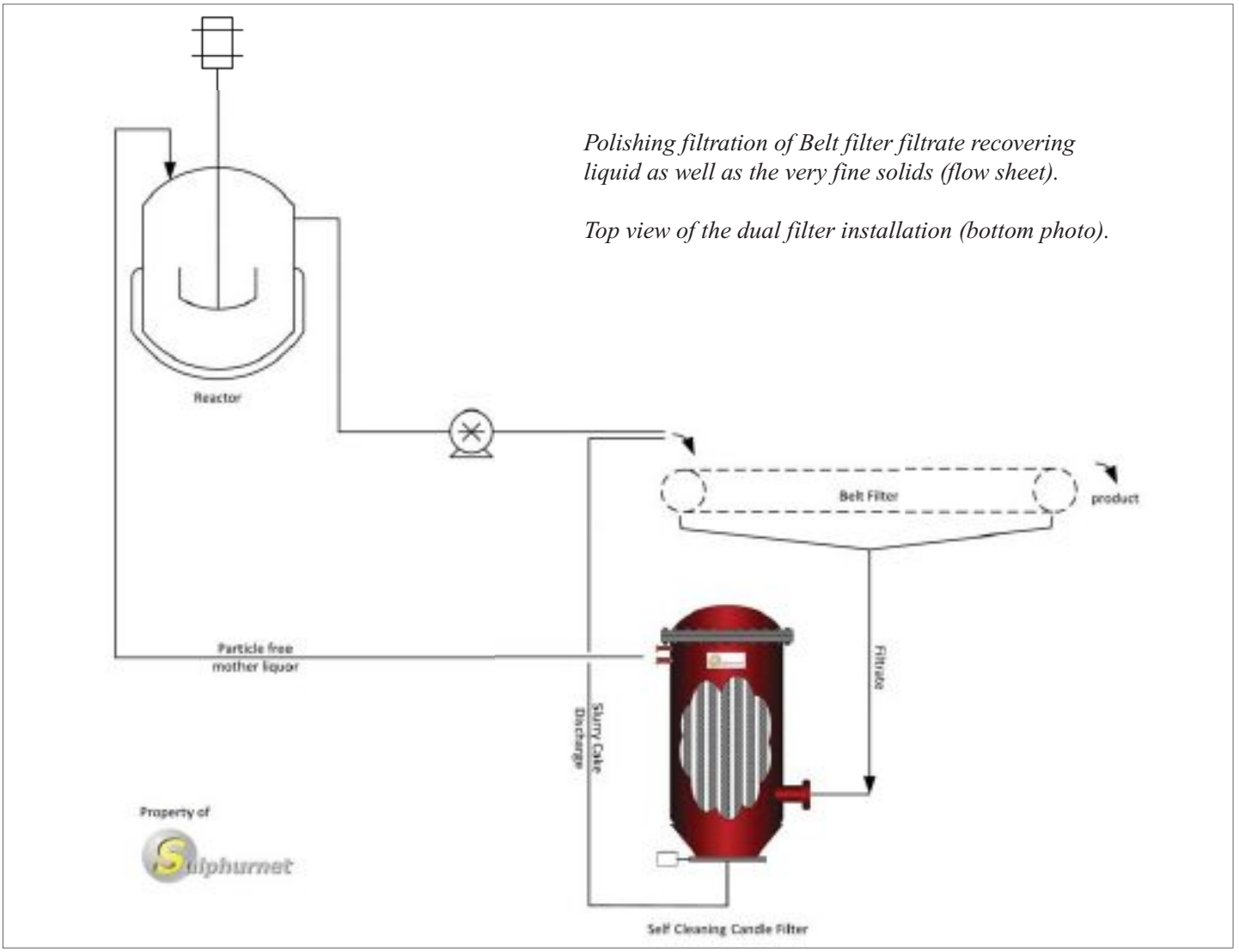
This solution was the installation of two self-cleaning candle filters. The application of a very fine filter cloth in the self-cleaning candle filter (0.5 micron) stopped the bypass of the particles so no conglomeration could take place. The result was less production stops, reduction of maintenance and an improvement of working conditions for operators.

Furthermore, the filters contributed to the product recovery since the solids could be recycled to the belt filter and recovered as valuable end product.

Dual Sulphurnet Self-Cleaning Candle Filter Installation

PRINCIPLE OF OPERATIONS

Self-cleaning candle filter is a high-tech filter system, consisting of vertically positioned filter candles in a vertical tank. The filter candles can be supplied in various materials: polypropylene, PVDF, PVC, stainless steel or titanium. The candles are installed in several manifolds having individual filtrate outlets. The filter medium that is used to cover the filter candles can be chosen such that a



Polishing filtration of Belt filter filtrate recovering liquid as well as the very fine solids (flow sheet).

Top view of the dual filter installation (bottom photo).

clear filtrate is instantly obtained.

FILTRATION

The liquid to be filtered enters the vessel and flows from the outside to the inside through the filter candle. The filtrate flows down to the bottom of the candle and rises through the central tube in the outlet manifold. The particles are collected on the outside of the filter cloth and form a regular filter cake.

CAKE DISCHARGE

After drying the filter cake, the cleaning is done by a back-wash or a back-pulse with air or inert gas. The backpressure blows up the filter cloth and brings the filter cloth in the original circumference. The pulsating backpressure opens the mesh of the cloth resulting in a very thorough cleaning. Because the filter candles are positioned on separate manifolds, they can be cleaned one manifold at a time. This decreases the quantity of air or inert gas required and assures that the filter cake is evenly discharged.

As an alternative, the filter cake can be discharged as slurry so it can be returned to the process or used for further processing.

The advantage of this filter is that the PLC automation enables repeatability and a reliable control of the filtration process. In addition, it is a totally enclosed operation that prevents evaporation, leakage and fumes from escaping, and no contamination by air. It allows for a clean and environmental friendly operation.

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