
CASE STUDY

A EUROPEAN REFINERY PROCESSING APPROXIMATELY 13.5 MILLION TON/A OF CRUDE OIL RELIES ON JONELL SYSTEMS' HIGH FLOW FILTERS TO REDUCE THE OVERALL COSTS OF COALESCING ELEMENTS BY 50% BY DECREASING THE CHANGE OUT FREQUENCY.



CASE STUDY

Refinery Solutions

BACKGROUND

Our customer is a European refinery with a processing capacity of approximately 13.5 million ton/a of crude oil and other feedstocks. The refinery produces both fossil and renewable products including traffic fuels (diesel, gasoline), marine fuels and base oil.

The biodiesel fuel process in the refinery was originally built by an EPC company who had been partnering with Pall.

The filter installation was utilizing High Flow elements with Liquid/Liquid Coalescers & Separators installed downstream.

The pre filters (two pieces) were located in a train with two vessels followed by one vessel with both one Liquid/Liquid Coalescer & Separator. There are currently four trains running in this process.

THE CHALLENGE

After two years of operating the system, the customer saw the changeout frequency of filter elements go up without any change in the feed or the process parameters.

The filter lifetime of the coalescers and separators was suddenly 30% less than when the solution was first put in place and filters had to be replaced every six weeks instead of every nine weeks. In a year a total of twelve elements of both series needed to be purchased extra. The cost of changing out these expensive high-end cartridges was adding up in addition to the additional maintenance costs.

When changing out the elements the operators established that these were not being clogged by solids because the High Flow pre-filters did capture all solids from the stream.

Jonell Systems was brought in, to trouble shoot the issue to help optimize the filtration costs. Based on our experience, expertise and spent filter analysis, we determined the problem in this case were the asphaltenes. These “semi-solids” did pass through the pre-filters into the coalescers and separators, making them clog faster than they were supposed to.

THE SOLUTION

Based on Jonell Systems philosophy of ‘the contaminant driving the method of filtration’, we worked on how to filter the semi-solids clogging the high end coalescers and separators during the pre-filtration phase so the pre-filters remove majority of not only the solids, but also these asphaltenes.

Semi-solids can deform easily under differential pressure making this a challenging application. In this application, the asphaltenes are simply being pushed through the filters when differential pressure built up.

Based on our experience with semi-solids filtration and application needs,

- Jonell Systems engineered some depth in our filter media to create the necessary filter surface and depth to both build-up and hold on to the semi-solid contaminants, without losing performance removing the regular solids out.
- The change out of the pre-filters needs to be executed at a lower differential pressure than regular (8-10 psid instead of 16-18 psid) to avoid the semi-solids being deformed and pushed through the filter media

A multi layered cartridge was engineered with multiple media at various micron ratings with depth layers in-between the pleat pack to create a sophisticated upgrade for the existing high flow elements.

Our tests indicated these elements could match the lifetime of the original elements even when considering the lower recommend change out pressure.

BENEFITS

With the new Jonell Systems filters, the change out frequency of the liquid/liquid coalescer filters went from every 6 weeks to once in 12 weeks.

Thereby reducing the overall cost of the coalescing filters by 50% and netting the customer an annual savings of € 32,000.

