

Technical Article Series

Vibratory screens help petroleum processor convert waste oil into fuel oil.

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CRANKCASE OIL CLEANED FOR FUEL

Vibratory screens help this processor to more than triple the rate at which petroleum wastes are converted into fuel oil

Elmer Baumgardner

Baumgardner Oil Co., Fayetteville, Pa.

More than 1/2 million gallons a year of waste petroleum products from seven states are reclaimed as commercial fuel oil by the Baumgardner Oil Co., Fayetteville, Pa. The plant's present capacity was made possible by adding a vibrating screen separator to more than triple thru put and to eliminate the manual cleaning required of the earlier basket strainers.

How the process works.

Compared to some methods used to reprocess used oil, the reclaiming process used here is simple. The waste oil is pumped from holding tanks directly through a recycle clarifier and then into three huge heating tanks where residual water is removed. The major portion of the water in the used oil (often as high as 15 to 20 percent) settles to the bottom of the tanks where it is drawn off. The smaller portion of water remaining is boiled out of the oil.

Once the solid particle contaminants and residual water have been removed, a chemical additive is mixed with the oil which aids in burning as fuel oil. The reclaiming process yields no waste product that must be dumped into the environment. The oil itself is burned by commercial users, and the sludge which is separated out by the recycle clarifier is sold to a smelter who recovers and sells the metals it contains. Therefore, the only waste byproduct from the entire process is the water which is removed.

Vibrating screen increases capacity.

Initially, the company used a 3-inch diameter duplex basket strainer to remove the solid contaminants from the waste oil. However, the strainers required manual cleaning at frequent intervals and their combined capacity was limited to approximately 1,500 gallons per hour .

As the demand for reprocessed oil for fuel purposes grew, the basket strainer was replaced with a 48-inch diameter single deck vibratory screen clarifier manufactured by Kason Corp. of Newark, N .1. The first, single-deck vibratory screen separator increased the company's volume capacity from 1,500 to 2,000 gallons per hour . It also eliminated the need for manual cleaning as was required with the basket strainers.

Later, when demands for reprocessed fuel oil continued to increase due to shortages of commercial fuel oil, a recycle deck was added to the single screen clarifier.

The multi-deck arrangement

increased the screening capacity from 2,000 gallons per hour to 6,000 gallons per hour without adding any new space requirements or added need for supervision or cleaning. Neither the single-deck vibratory screen clarifier installed over two years ago, nor the recycle deck conversion unit installed about a year ago has required any maintenance. Open inspection of the unit is made about every six weeks, but so far the screen has not needed to be replaced or cleaned following its installation.

The unit currently in operation at Baumgardner Oil Co. is a Kason 48-inch diameter multi-deck recycle clarifier which uses 80-mesh stainless steel screens capable of removing all solid particles larger than 0.0070 inches which is sufficient to prevent clogging of the nozzles in commercial oil burners. In fact, the reclaimed fuel oil product appears to burn more efficiently than "new" residual commercial fuel oils.

The screen separators

arc unitized machines built of modular components which impart adjustable multiplane inertial vibrations to the screening surface, thereby attaining high capacity drainage of incoming oil. Adjustability of the vector of the three dimensional vibrations is achieved by varying the mass of the upper and lower eccentrics mounted on a heavy duty double shafted vibrator and by setting the angle that the bottom eccentric leads

the upper eccentric. These simple adjustments are performed quickly and simply in the field with nothing more than a wrench.

The single deck clarifier originally installed was continuously fed petroleum waste at the center of the machine, and continuously discharged clarified oil from a spout located beneath the operating screen while continuously discharging heavy sludge from the spout above the operating screen. The modular construction of the separator allowed the addition of a second deck to increase capacity. Fig. 3 illustrates the flow pattern in the multi-deck recycle clarifier. It should be noted that the upper deck is deliberately flooded, causing a hydraulic gradient across the upper deck to achieve higher clarification capacity per square foot of screen than is achievable under single deck clarification conditions.

Conclusion:

Waste crankcase oil can be made suitable as a fuel for power generating plants, steel mills and other large commercial users. Vibrating screens improve the thru-put and makes low maintenance operation possible.