Removal of Emulsified Oil with Bio-Skirt™ Media

Stubborn emulsions where oil has become dispersed are one of the most challenging filtration problems for industrial wastewater. In an emulsion, oil is partially dissolved. Consequently, most sorbents and filtration products are completely ineffective.

Method

Testing was performed using a laboratory prepared stock solution of 5 ml of motor oil and 5 ml of diesel fuel to 200 ml of water. 10 ml of a citrus-based degreaser was added to the solution and vigorously agitated creating a known emulsion.

Three separate concentrations of stock solution were created and tested:

Low - 1.0 ml of stock solution to 1.0 liter of water
Medium - 10 ml of stock solution to 1.0 liter of water
High - 100 ml of stock solution to 1.0 liter of water

A 15 cm by 6 cm filter housing was used and filled with 20 grams of the bulk filtration Bio-Skirt media. The Bio-Skirt was wetted prior to the commencement of the test. The test solution was run through the Bio-Skirt at a rate of 500 ml per minute and the first filtrate was discarded. An additional portion of the test solution was run through the Bio-Skirt and collected for analysis. Filtered and unfiltered test solutions were sampled by USEPA Method 418 (USEPA Method 418 measures petroleum hydrocarbons as well as fats in soaps).

The samples were extracted and a silica gel cleanup was performed to remove the fatty acids and soaps from the samples allowing accurate measurement of the motor oil and diesel components.

Results of analytical chemistry are presented in the table below.

Results

Sample	Result (ppm) Unfiltered	Result (ppm) with Bio-Skirt	% Oil Removed
Low	**24**	**3.2**	**87%**
Med	**140**	**7**	**95%**
High	**960**	**24**	**97%**

Conclusions

At the medium and high levels Bio-Skirt™ media removed greater than 90 percent of the oil. Competing products that remove floating oil have generally proven ineffective with partially dissolved or emulsified oil. While this data should not be construed to predict performance in the field for any given SNOUT + Bio-Skirt application, it does give an accurate indication of the potential for oil removals of the Bio-Skirt media in a filtration application.