A Successful Trial for a High FFA Feedstock Biodiesel Polishing with MaxFlo®

Introduction

MaxFlo® filter aid is a porous silicate material with high filtration efficiency and pure chemical compositions. It is being used successfully in biodiesel dry wash process to improve filter press or leaf filter operation and to greatly reduce the adsorbent dosing and costs.

In a dry wash biodiesel process, adsorbents are used to mix with biodiesel to remove free glycerine, soap and other contaminants and then filtered out by filter press or leaf filters, for the final product to meet ASTM standards. The adsorbent materials are very effective for the contaminants removal, however they are difficult to be filtered due to their fine particle size causing serious problems such as filter media blinding, high cake liquid content, and difficult cake release. These adsorbents can also significantly contribute to operation costs.

Objectives of the trial at the biodiesel facility in central Louisiana was to 1) determine the efficiency of using MaxFlo® to reduce the consumption of an expensive adsorbent, and 2) improve filtration properties such as filtrate flow rate, filtration cycle, easiness of cake removal, and cake density. The trial biodiesel product was from a high free fatty acid (FFA) feed stock.

Results revealed with assistance of MaxFlo® filter aid, the high FFA feedstock biodiesel can be filtered at a much reduced adsorbent dosage, a significantly improved filtration flow rate, and filtrate quality passing free glycerine, soap, water and TSS standards.

MaxFlo® Filter Press Trial

The biodiesel feedstock was a mixture of a high FFA and RBD grade feedstock with 2000ppm soap contents. Total amount of biodiesel to be filtered was 4800 gallons.

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Normally, for the high soap content at 2000ppm, the adsorbent dosage requires at least 2.5wt%. In this trial, a 1.0wt% of the adsorbent and a 1.5wt% of MaxFlo® product was added to the 4800 gallons of biodiesel and mixed for 20 minutes. The mixture was then sent to filter press filtration. There was initial particle bleeding through in the filtrate. Circulation of filtrate was conducted to help initial cake layer formation inside the filter press to prevent further particle bleed through. After 5 minutes circulation, the filtrate became clear visually. A filtrate sample was sent to the lab after 20 minutes circulation for TSS, soap, free glycerine and water tests. All parameters passed ASTM standard test specifications.

Initial filtrate flow rate was 85 gpm through new filter cloth with pump discharge pressure at 45psi. Filtration completed after 37 minutes with 4373 gallon filtrate, at 82.5gpm flow rate, and 45psi pump discharge pressure.

Filtration Observations

- The initial filtration flow rate was 85gpm at a pump pressure at 45psi;
- Filtration completed after 37 minutes at 45psi with only a slight reduction of flow rate to 82.5 gpm at the end of filtration; Filtration flow rate increased by two fold after MaxFlo® addition;
- A drier cake was observed at the end of filtration;
- During filtration startup, low flow conditions initially through the filter press allowed the larger particles to fill in any voids and catch smaller particles. This improved the “precoating” and reduced the circulation time.

Results and Conclusions

The trial showed that MaxFlo® reduced 60% by weight of the expensive adsorbent dosage from 2.5% to 1.0%. The filtration flow rate was greatly improved. The soap, water, free glycerine and TSS of filtrate all passed ASTM standard. It was also demonstrated that MaxFlo does not increase water content, which is a problem with currently used adsorbent. The MaxFlo® filter aid also removes soap and a certain degree of free glycerine.