November 2, 2010

BIODIESEL DISTILLATION: APPLICATION OF SHORT STEP TECHNOLOGY

Zean has installed high-vacuum distillation lab for testing.

The use of reusable energy allows a society with high energy demands the possibility to resolve depletion problems that fossil fuels are facing while also avoiding the large amount of pollution oil wells and refineries produce.

The production of biodiesel and the end result are linked to the source of raw materials with which one starts, currently being oil blends whichpredominate the sector which are being supplied to factories: soy, palm, rapeseed and sunflower oil in different proportions. A special note must be made to the biodiesel producers whose raw materials are wastes (reused oils or fats), such that a combustible is made from waste. The majority of producers in the sector supply factories with: used vegetable oils, highly acidic animal fats or oils.

As a result of the broad range of raw materials, technologies that permit a wide range of entries or inputs in the factory are prevailing over the more restrictive ones in the wide range of usable materials; it's logical to think that the same treatment is not done on a sunflower oil whose degumming process creates a large amount of wax in comparison to palm oil, which, at low temperatures, can be found in a solid state or in comparison to used vegetable oil which contains solids that require elimination befare entering production, etc.

The regulation affecting biofuels is EN-14214, which also regulates the fundamental parameters like: the final ester content in biodiesel (> 96.5%), as well as the content of mono-, di- and triglycerides, free and total glycerin, water and methanol, etc. The processes that make use of used raw materials: such as frying oils, animal fats, or oils with high acidity have the disadvantage that the compliance of the EN-14214 regulation become a very complicated task and are forced to use final production biodiesel processes.

Biodiesel production and the end result is linked to the source of raw materials, such as sunflower.

There are **2 purification processes for biodiesel: Cold filtration and Vacuum distillation.**

The most commonly used purification process for biodiesel is distillation since it allows the increase in ester content, eliminating color and smells in it, improve the filterability test and furthermore reduce the content of mono-, di- and triglycerides.

On the other hand it has an increase of energy consumption as it's a process that involves the transfer of heat which therefore requires energy.

Distillation System

Zean technology permits high vacuum distillation combined with thin film technology to increase final product quality avoiding thermal degradation with the use of high temperatures.

The system also includes the use of **enhancements to increase energy efficiency** in factories, this way the system can be designed with:

a. The use of economizers to reduce heating costs of the raw materials prior to distillation.

b. The use of low pressure steam generation (3-4 barg) to either use in vacuum group or in other consumers in the system.

Zean technology permits high vacuum distillation.

KEY BENEFITS

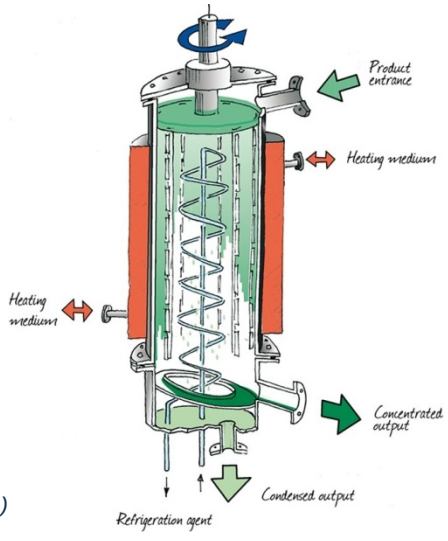
- The use of high vacuum technology to lower operating temperatures.
- Low residence time.
- Equipment for high evaporation rate > 90%.
- Extensive knowledge about vacuum systems.
- The system is designed for continuous and automated work.

The use of Short Path technology in the biodiesel distillation system

The short path technology, or short path, involves the operation of a thin film system with an interna! condenser. The primary key benefit is the minimum distance between the unit's hot wall and the interna! condensers. This low pressure drop effect of vapors allows for continuous high vacuum operation, 0.001 mbar in operation.

The key benefits of these units are:

a. High vacuum operation.
b. Low residence time.
c. The possibility of stripping without excessively increasing the temperature.



BENEFITS OF USING SHORT PATH EQUIPMENT

The short path evaporator allows for the reduction of biodiesel content in heavy fractions of distillation without increasing the distillation temperature.

The primary benefits are: increasing the distillation product and avoiding the presence of color in the final product.

Preliminary testing

Zean has a 1 lt. high vacuum laboratory distillation system for testing; do not hesitate in contacting us to run tests.

The new systems include:

a. Evaporator.
b. Heat exchangers.
c. Control panel and instrumentation.
d. Equipment assembly
e. Structure...etc.

And allows biodiesel producers to meet EN-14214 final product specifications.

Pilot plant distil/ation under high vacuum.