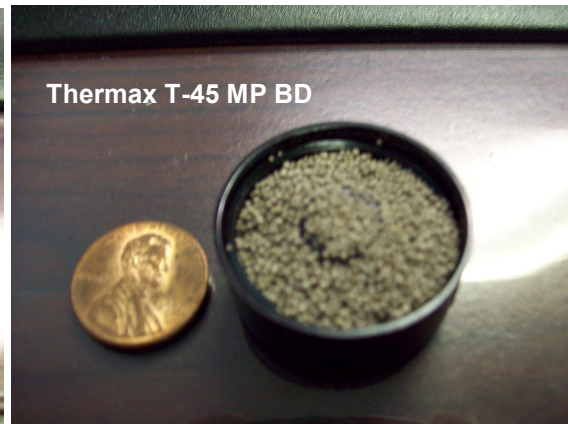
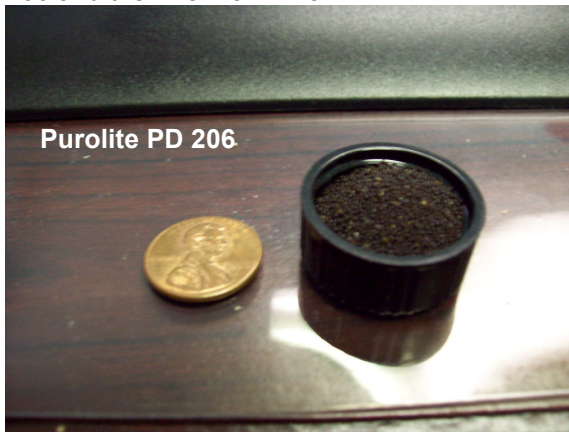


## Dry Washing Biodiesel Using Ion Exchange Resin

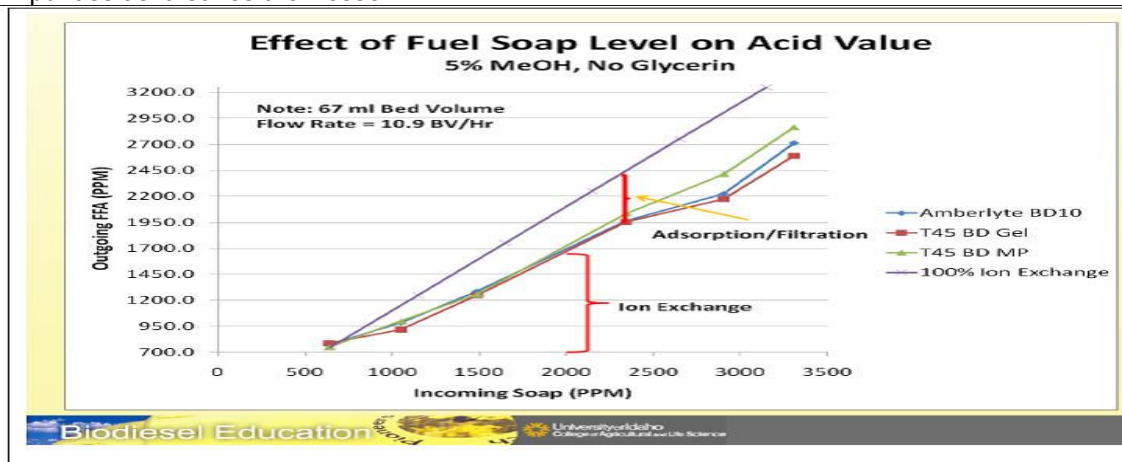
### What is Dry Washing?

Dry Washing is a method used to remove the impurities from biodiesel such as free glycerin, soap, catalyst and other trace impurities without the use of water. There are several different products available for the Dry Wash method and are available at our various websites listed below. However, this FAQ will include information on Ion Exchange Resins like the Purolite PD 206 and the Thermax T-45 MP BD.



### What is an Ion Exchange Resin?

The resin beads work with a combination of Ion Exchange (+Positive and -Negative Ions) "sites" located on the beads and absorption. In layman's terms they will attract ions like Na or K (from your catalyst) and absorb or coat them-selves in glycerin. These leave the Biodiesel free from impurities as it leaves the Vessel.



## How do I use Purolite or Thermax to purify my Biodiesel?

It is common practice to load the Ion Resin into a vessel to create what is called a "Resin Bed". This simply means that the ion resins have been poured into a vessel and are resting at the bottom. Most vessels are made from Steel Pipe or rolled steel to form a cylinder. Some people may want to use PVC pipe, however the PVC will crack after extended use.

Purolite Suggest a minimum of 24" bed depth – (How tall the Resin Bed is)  
Thermax recommends a 36" minimum.

Both Manufacturers suggests a 3-1 ratio of Resin Bed depth (BD) to Diameter.  
(EX: 24" BD = 8" diameter, or 36in BD=12" diameter).

The Manufacturers also suggest that you should allow for at least a 50% expansion of the resin during the course of its life.

(EX: 24"BD=36"H or 36"BD=54"H)

FYI -- Purolite is 52lbs per cubic foot and Thermax is 38lbs per cubic ft

What is the Recommended Flow Rate?

This can be factored by some simple math.

The following is a constant

2000lbs for a 15GPM (gallon per minute) Flow Rate.

Therefore:

2000lbs = 15GPM

EX: You purchase 20lbs of Purolite

$20\text{lbs}/2000 = 0.010$

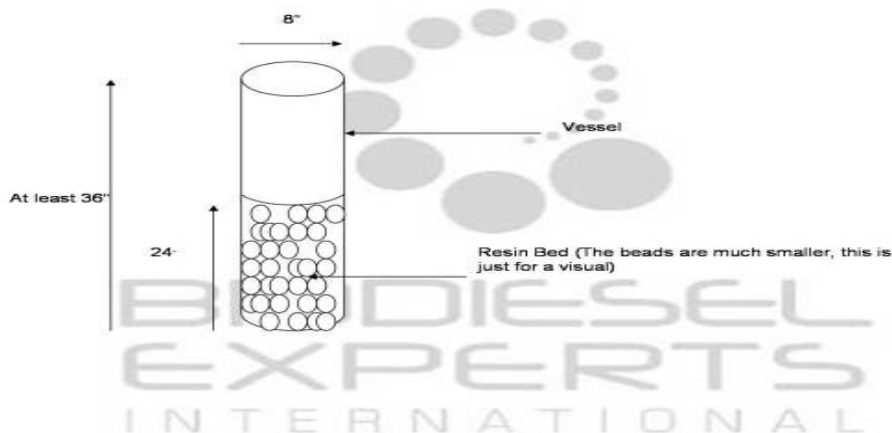
$0.010 * 15 = 0.150 \text{ GPM or } 9\text{GPH}$

X= Amount of Resin you have

Y= Flow Rate of X

$Y=(X/2000)*15$

There will also need to be a support screen at the bottom of the vessel to hold the beads in.  
Customers can purchase the Ion Exchange Towers at [www.biodieselexpertsintl.com/store](http://www.biodieselexpertsintl.com/store)





A diaphragm pump that is able to control the flow rate of your desired column is recommended. (These can be pricy, so look for a good used one as well). It is also possible to use a centrifugal pump and use a globe valve to regulate flow to the tower and recirculate that flow that does not go into the tower back to the original tank. Also, some customers will purchase an inexpensive centrifugal pump and use a ball valve to choke back on it to reach the desired flow rate.

### **How long does the Resin Last?**

This number is directly related to the quality of fuel that is being produced. The life of the resin typically is between 100 to 200 gallons per pound of Ion Resin. Therefore, we will use the 150 gallons per pound as an average. For example, 20lbs, this should last 3,000 gallons. (20lbs\*150 gallons = 3,000 gallons)

### **How do I know when the resin is exhausted (used up)?**

There are simple soap titrations to determine if the levels have reached an unacceptable point. If available, free glycerin tests can determine if the Resin Bed needs to be "washed". They also expand upward as they are used and some vessels will have a site glass.

### **What do you mean Washed?**

The Resin Beds are able to be cleaned out with methanol. This is a simple process of filling the vessel with methanol to above the Resin Bed over night and then perform this again about 3-4 more times (you don't have to let it sit overnight this time, only 20 min or so) until you see a clearer methanol. This methanol can be reused in the Base transesterification but we would recommend using about 60% more of the used methanol than you normally do.

The Beads will need to be dried of the excess methanol. Recommendations are:

1. Flush Resin Bed with Demthylated Biodiesel, however you will then need to water wash this biodiesel or remove the methanol in your own way.
2. Take the Ion Resin and spread them out in a safe area to air dry – DANGER -PLEASE DO THIS IN A SAFE AREA THERE WILL BE METHANOL VAPORS
3. Purge the tower with Nitrogen Gas until dry. (Some people do this with Air, BEI does not recommend this, however perform at your own risk)

### **Speaking of Methanol, should I remove it before the resin?**

The short answer is Yes. However, it is not a necessity, it will still work, however it may not "last as long". A reduction of 20-25% is commonly seen when used in this manner.

Some recommendations to remove the methanol before are:

1. 5% Water wash before the Resin- let it settle out, drain and continue to beads.
2. Evaporate the methanol out. This is commonly called methanol recovery by flash evaporation. NOTE- THIS IS VERY DANGEROUS SO PLEASE MAKE SURE YOU CONSULT A PROFESSIONAL. Heat and agitate the biodiesel to above 170F in a pressure vessel, pull the methanol vapors into a condenser to covert them back to liquid form. Continue until biodiesel is free of methanol.
3. Let settle for an extended period of time in ambient or above temperatures.
4. There is also a method called GL 1 Day Process.

**NEED TO KNOW MORE? CONTACT US AND WE WILL BE GLAD TO ASSIST!**

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