

## Methanol washing of Purolite<sup>®</sup> PD206 when used to remove glycerin in a dry biodiesel manufacturing facility.

Purolite<sup>®</sup> PD206 dry will exhaust in two capacities, one by dehydrating biodiesel removing glycerin through absorption which results in the media swelling. The other is by ion exchange of catalyst, salts and soaps exchanging primarily sodium (Na<sup>+</sup>) or potassium (K<sup>+</sup>) of the catalyst for hydrogen (H<sup>+</sup>) on the resin. This exchange also neutralizes sodium (potassium) methylate catalyst reverting it back to methanol. Soaps will be converted to fatty acids. Purolite<sup>®</sup> PD206 exhausts or loads first with glycerin well before exhausting on ion exchange. Recovering the ability to absorb glycerin will not recover ionic capacity. If Purolite<sup>®</sup> PD206 exhausts on ionic capacity it will continue to absorb glycerin but to a lesser capacity. If glycerin absorption is the limiting factor, removal of glycerin from the resin within the biodiesel plant may be practical. This process is better described as **METHANOL WASHING**. If the resin exhausts ionically, after several methanol washes, the resin will need to be returned to Purolite for a traditional **IONIC REGENERATION**. This consists of converting the resin to the H<sup>+</sup> form, drying then returning to the customer. Ionic regeneration of this resin can be done many times before the resin needs replacement

Polishing systems must consist of 2-3 vessels with at least 2 vessels online in series. This system is best located before demethylation. The lead vessel receives the greatest loading with the lag column polishing trace glycerin. Both columns should be monitored for glycerin and when free glycerin reaches 0.01% at the effluent of the second (lag) column, it should be moved to the lead position. The original lead column is taken offline for methanol washing. After washing or replacement of the resin, the cleaned column is put into the lag position or standby.

Washing of glycerin from Purolite<sup>®</sup> PD206 is done with the following procedure:

If the polishing system is located before demethylation, drying or removing the methanol from the resin is not required before placing the column into service. Methanol will move from this column with the biodiesel and removed in the demethylation system.

- A. Drain all biodiesel from the polishing column.
- B. Back-flush or fill column with methanol to above resin bed.
- C. From the top, flow 1 bed volumes (BV) of methanol through the bed at half design flow of the column. Let this second BV of methanol stand in the vessel for 30- 40 minutes.
- D. Pass a third BV of methanol through the resin at the same flow rate.
- E. Drain methanol from bed to a separate dirty methanol storage vessel. This glycerin loaded methanol can be used in the transesterification process. Be sure to adjust methanol levels in reactor to insure sufficient methanol to complete reaction.
- F. Back fill bed with clean biodiesel to above the resin and allow to settle, until air in the bed is completely removed.
- G. From top, finish filling the tank with biodiesel and begin processing.

Glycerin can be washed from the Purolite<sup>®</sup> PD206 multiple times. After each wash, throughput will drop as the resin removes catalyst, until runs are approximately half that of new resin. Purolite<sup>®</sup> PD206 will continue to remove glycerin after it is ionically exhausted, although not as efficiently. Biodiesel can be monitored for elevated pH or sodium. When resin no longer removes sodium (ionically exhausted) the resin should be removed from the column and returned to Purolite for ionic regeneration. Purolite<sup>®</sup> PD206 can be regenerated many times with a service life of 5 or more years. Please contact Purolite for availability of offsite regeneration in your region and for procedures to prepare and return Purolite<sup>®</sup> PD206.

### USA

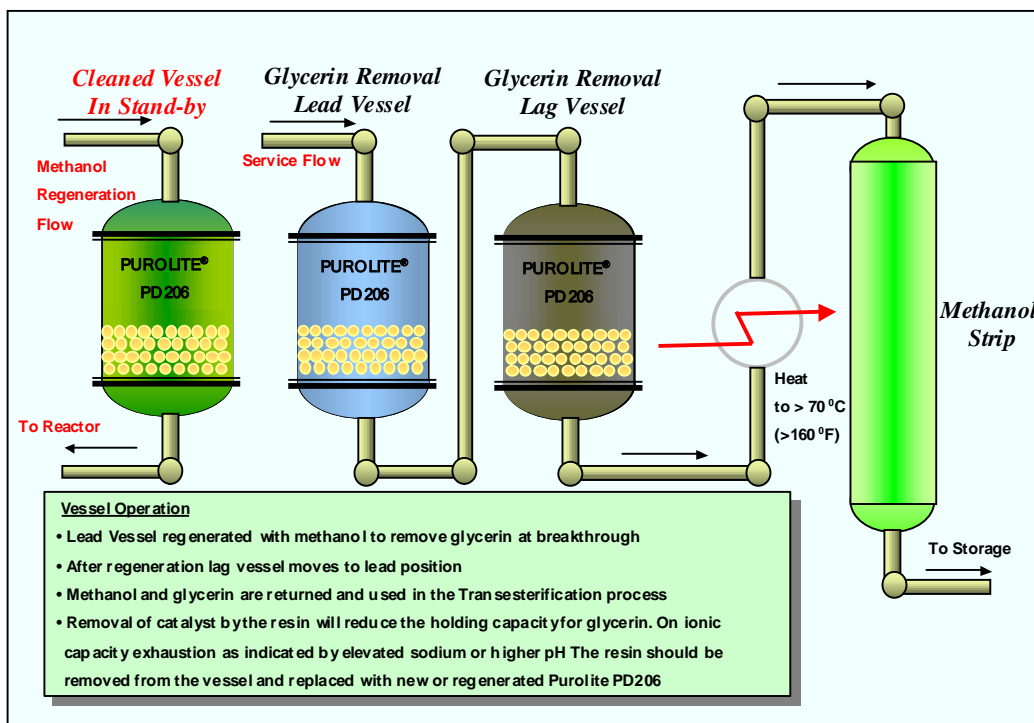
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### Methanol wash to remove glycerin



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