

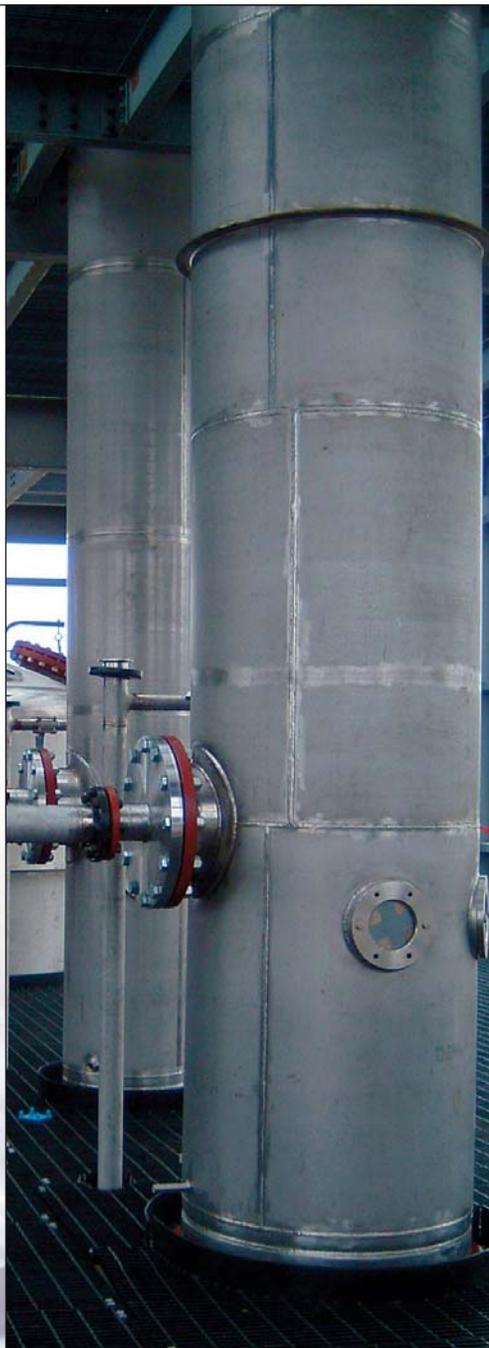
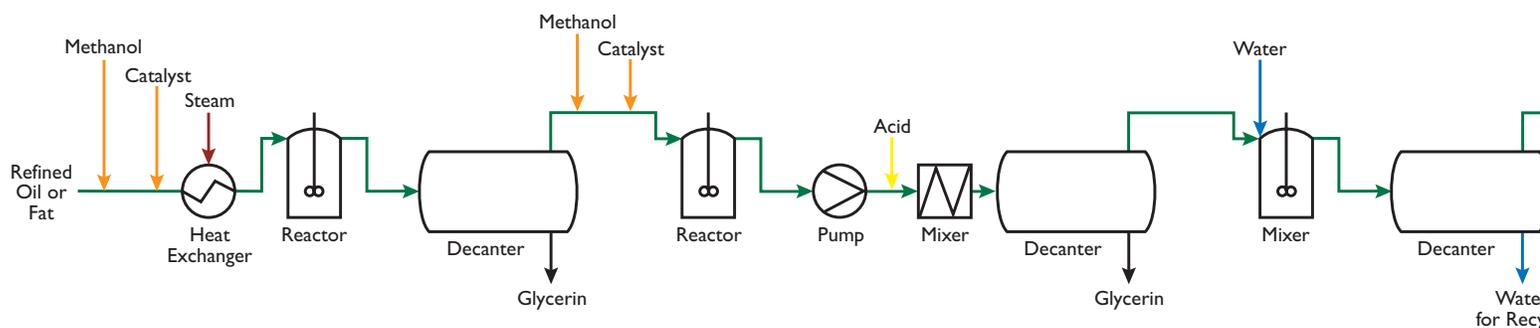


# Biodiesel

Crown Iron Works Company



## Crown Standard Biodiesel Flow Diagram



## CONTINUOUS TRANSESTERIFICATION PROCESS

### TRANSESTERIFICATION

The Crown biodiesel process uses a two-step transesterification reaction followed by neutralizing and washing steps. The two-step transesterification reaction converts nearly 100 percent of the triglycerides in the oil or fat to biodiesel (methyl ester). The excess methanol is recovered, and the biodiesel dried in the same step. Finally, the biodiesel is chilled and filtered to remove potential impurities formed below the process temperature.

### GLYCERIN RECOVERY

Glycerin generated in the two-step transesterification reaction is recovered and neutralized. The excess methanol is recovered and the glycerin dried in the same step.

The glycerin is considered a crude glycerin because it contains greater than the maximum 0.01 percent salts allowed in technical grades and is less than 99 percent pure.

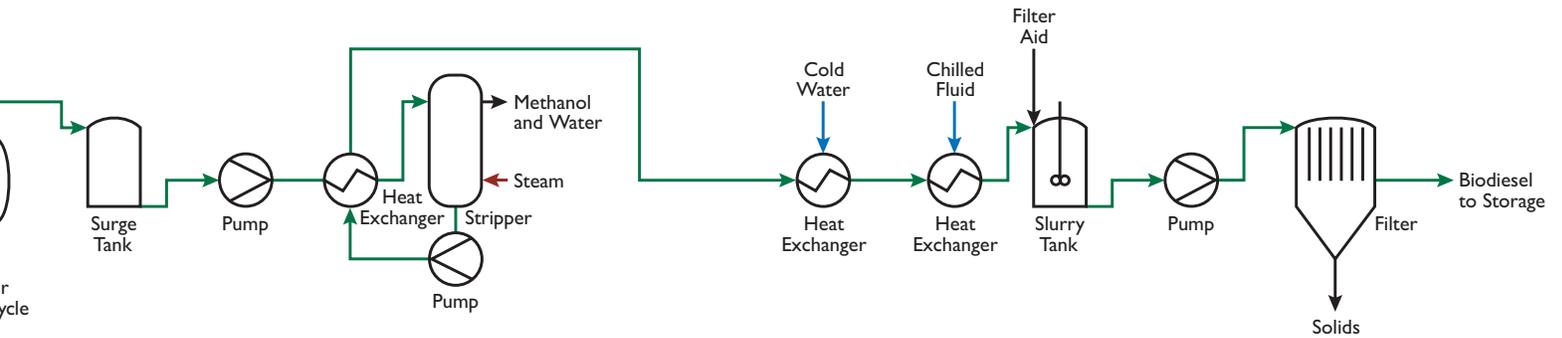
The salts are formed from the reaction of the caustic and acid used in most transesterification processes. The salts are removed when the glycerin is distilled or refined to a technical grade or higher quality.

### WATER RECOVERY

Water recovered from the water wash decanter, strippers, and methanol distillation is reused for washing the biodiesel and diluting the acid and caustic.

### METHANOL RECOVERY

The excess methanol is recovered from the biodiesel, glycerin, and fatty matter, dried and reused in the two-step transesterification reaction.



## FATTY MATTER RECOVERY

A small amount of fatty matter, typically mono- and di-glycerides, is generated in the transesterification reaction. This fatty matter does not require a separate recovery system due to the small quantity generated, and can be skimmed or decanted from the glycerin storage tank.

If the transesterification process feedstock has a high amount of free fatty acid (FFA), then a separate fatty matter recovery step may be required.

## ENERGY

The Crown design minimizes the energy required by using gravity both for separation and flow from vessel to vessel. The design incorporates heat economizers to cool one stream while heating the other.

## FEEDSTOCK

The transesterification process is most efficient when the feedstock quality of the phosphorus and fatty acid is at least equivalent to refined and bleached (RB).

Removing the phosphorus and fatty acids is critical to producing the highest quality biodiesel for the lowest cost. Phosphorus and fatty acids form a pasty substance that inhibits the reaction rate and increases the processing cost.

## OTHER CROWN PROCESSES

For your entire Biodiesel needs, Crown designs and supplies equipment for:

Preparation

Extraction (Pressing or Solvent)

Refining

- Degumming
- Neutralizing
- Silica Adsorption and Bleaching
- Stripping and Deodorizing

Methyl Ester (Biodiesel) Transesterification

Glycerin Refining





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