

## Glycerin Plant #125



**Contact**  
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## 1. Executive Summary

### 1.1 Plant History

- Plant commissioned in 2002
- Plant shut down 2008

1.2 Production Capacity: 50 tons per day of pharmaceutical grade glycerin

1.3 Process Technology Provide: Lurgi

### 1.4 Current Condition

The plant has been dismantled. The equipment is packed in storage and can be shipped quickly.

## 2. Process Description

The raw glycerin is preheated by exchange with hot glycerin product and then flashed at a pressure of around 100 mbar to degas and evaporate some of the moisture present in the raw glycerin. The resultant more concentrated glycerin is then fed to specially designed 4 barg steam injectors at the base of the glycerin column. Steam at 16 barg is used to reboil the column. Typically, the column operates as low as 13 mbar pressure with the live steam promoting the fractionation process.

The majority of the glycerin (~97%) is collected as the primary distillate from the centre section of the column. It is then bleached to remove the final colourants by passing it through a bed of activated carbon, followed by a polishing filter to catch any entrained activated carbon.

After passing through the bleachers, the bleached glycerin is freed from any existent activated-carbon fines in a polishing filter, being cooled and pumped to the storage tank to be provided by Customer.

The vapours flowing from the top of the distillation column to the overhead condenser still contain the remaining glycerin (~3%) and virtually all the low boiling impurities, as well as much of the water vapour. After condensing, this stream is discharged as the secondary distillate with a glycerin concentration of around 90%. It is of inferior quality and thus used for industrial purposes.

Over time the non-distilling components (salts, soaps etc.) increase in concentration in base of the still. This residue is periodically bled off to a secondary still where any incumbent glycerin is recovered and the residue is dispensed batchwise into drums. The recovered glycerin is returned to the main still.

Any remaining vapours and the non-condensable gases which enter with the crude glycerin are drawn off by the steam ejectors, compressed to reduce the negative pressure to an intermediate stage and condensed in the first condenser together with the driving steam. A water ring seal pump will compress the non-condensable gases to atmospheric pressure.

A metering pump serves to add NaOH to the raw glycerin in order to adjust the pH of the feed if necessary.

## 3. Consumption Data

|                       |                               |
|-----------------------|-------------------------------|
| <b>225 lb steam</b>   | 2200 lbs per metric ton USP   |
| <b>150 lb steam</b>   | 3600 lbs per metric ton USP   |
| <b>45 lb steam</b>    | 860 lbs per metric ton USP    |
| <b>Cooling Water</b>  | 87,000 gal per metric ton USP |
| <b>45 % NaOH soln</b> | 7.5 lbs per metric ton USP    |
| <b>Electricity</b>    | 30 kWh per metric ton USP     |

|                         |                                |
|-------------------------|--------------------------------|
| <b>Activated Carbon</b> | 8 to 10 lbs per metric ton USP |
| <b>Residue</b>          | 310 lbs per metric ton USP     |
| <b>Wastewater</b>       | 390 gal per metric ton USP     |
| <b>Demin. Water</b>     | 6000 gal per carbon bed change |

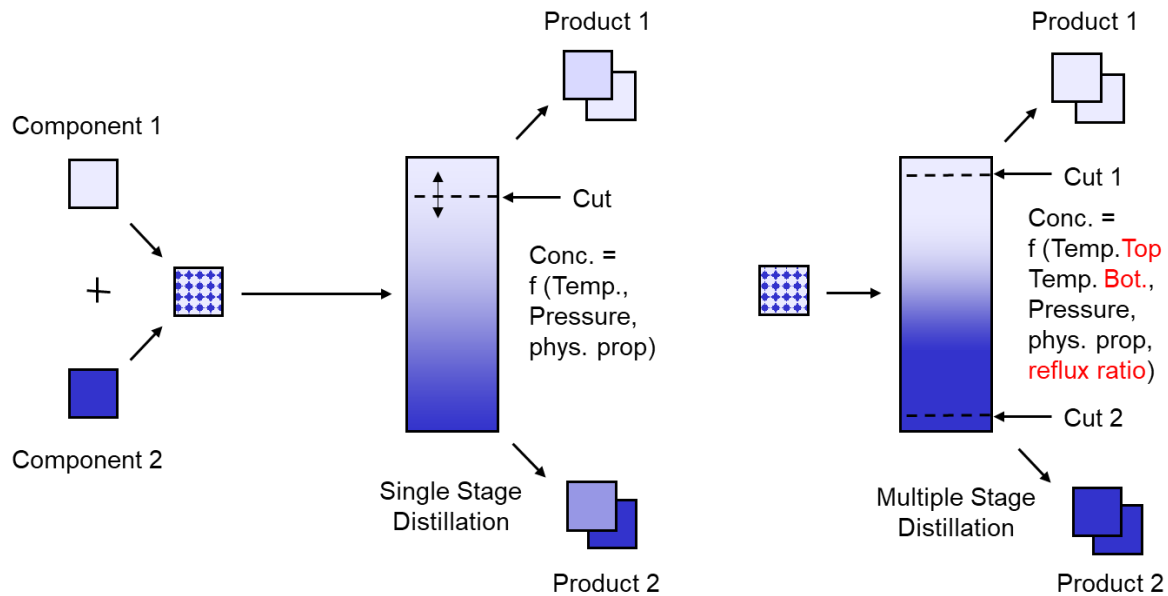
#### 4. Major Equipment

Distillation Column (15/FV PSI @428 deg. F, 521" T/T X 94.6" OD)  
 Distillation Still (118" OD X 94.6" T/T 15/FV PSI @ 446 deg. F)  
 Post Distillation Still 1 & 2 (64" T/T)  
 Bleaching Vessels 1 & 2 & 3 (316 SS, 130/FV PSI @ 302 deg. F, 60" OD X 213" T/T)  
 Dryer Vessel, (56" OD X 84" T/T, packing 26 cu. ft. of 1" pall rings)  
 Receivers for Distillate 1 and 2 (304 SS, 28" OD X 40" T/T)  
 Finished Product Receiver (316 SS, 28" OD X 42" T/T, 100/FV PSI @ 350 deg. F)  
 Netzsch Glycerin Residue Pump (316 SS, 6 GPM, 1.5 HP)  
 Durco Pump (8 GPM, 202 ft. hd., alloy D4, 10 HP)  
 Tranter Heat Exchanger  
 Rosedale Polish Filters (2)  
 Dewatering Screen

#### 5. Flow Diagrams

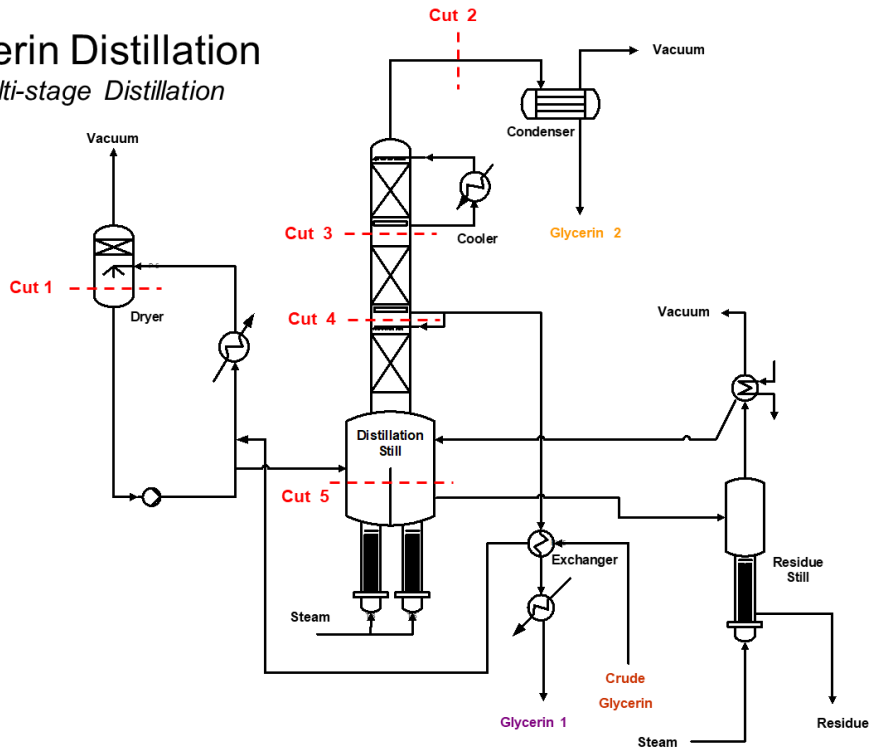
### Thermal Separation of Two Components

#### *Single Stage / Multi Stage*



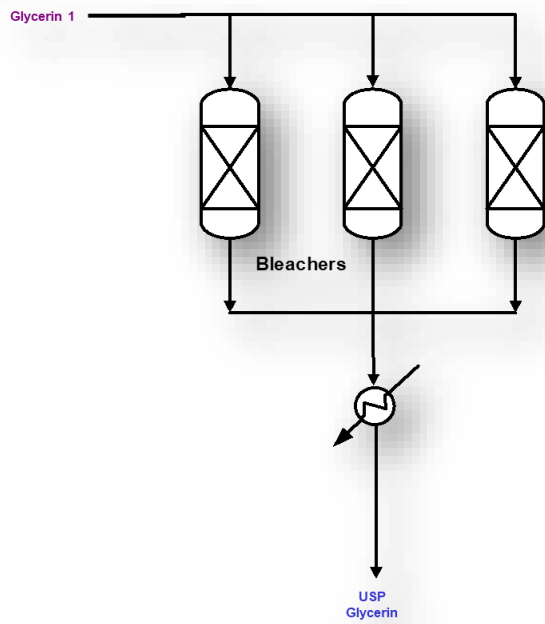
# Glycerin Distillation

... a multi-stage Distillation

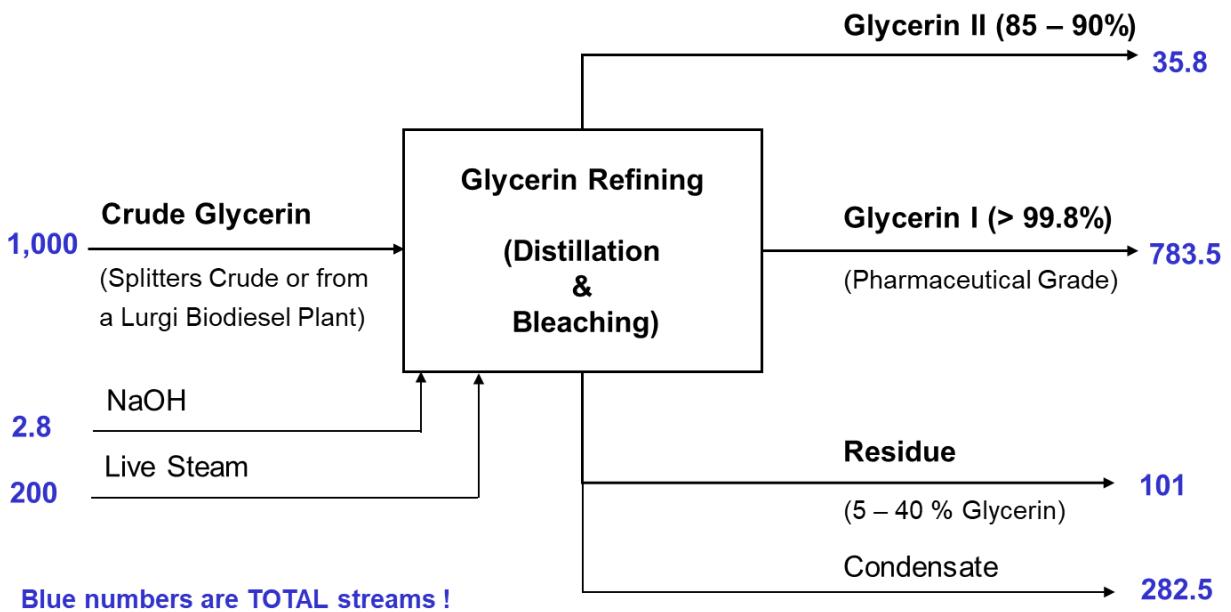


# Glycerin Bleaching

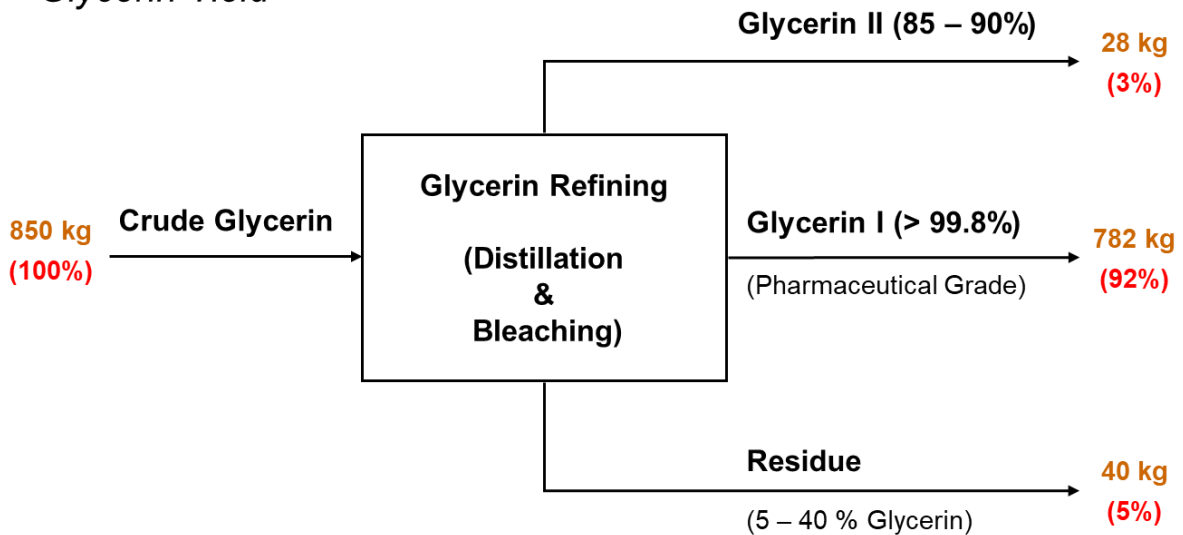
... a multiple bed design



## Block Diagram Overall Material Balance



## Block Diagram Glycerin Yield



Net streams of Glycerin

***For more details or to discuss this plant, contact:***

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