

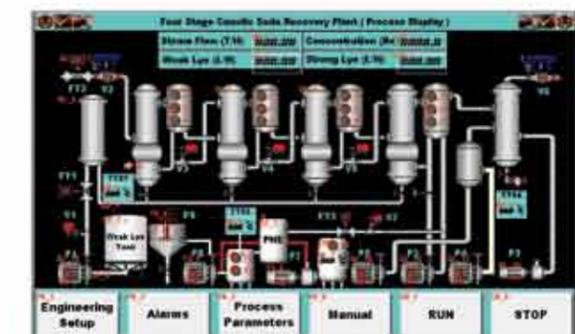
PIPE LINE COLOUR CODING DETAILS

- Condensate
- Chilled water
- Hot water
- Hot water from Condensate
- Raw water
- Product
- Vapour
- Manual Feed

- Steam
- Manual Feed
- Pneumatic signal
- Interlockings
- Indication & Control signals
- Electric signals

NOMENCLATURES

- Equipment E
- Pumps/Motors P
- Pipelines PI
- Instruments I
- Valves V
- Solenoid Valves Soy
- Signals S



  
**RAF AE Engineering**  
*Caustic Recovery System*

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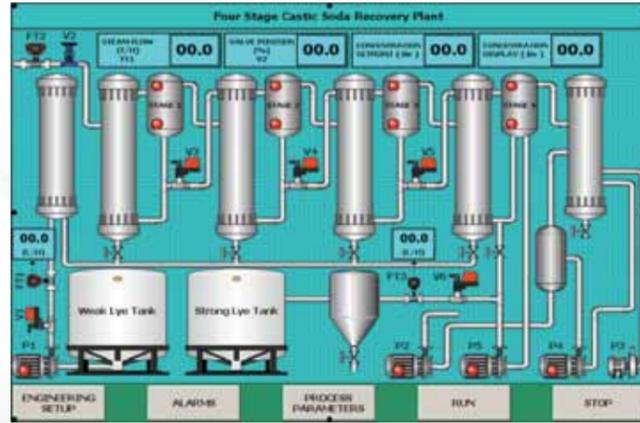
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# RAFAE Engineering

## Caustic Soda Recovery System



### Company

**Rafae Engineering** is a team of professional engineers having intensive technical experience and great integrative capability. The company's activities are diversified but main focus is on conservation technologies. A comprehensive conservation plan for textile processing industry was launched and awareness is being created regarding recycling in house water and chemicals instead of treating effluents. In this regards technical collaborations are being established with international companies to manufacture low capital cost plants without compromising engineering standards.

### Products

- Caustic soda recovery system
- MVR/ZLD waste water treatment system
- Membrane filtration system UF, MF, RO
- Comprehensive conservation plan
- Research plant/experimental rigs/pilot plant for educational institutes

### Caustic Soda Recovery System

During mercerizing process of cotton woven, knit or yarn, in textile processing industry, large quantities of caustic soda are utilized. Every 1 kg of cotton requires 240 gms 100% NaOH to be mercerized. 80% of this is washed out during stabilizing leaving 5% concentration weak lye. This is drained to sewer or sent effluent treatment plant to be neutralized before drain. **Rafae engineering** caustic recovery system economically concentrates the filtered weak lye thus recycling caustic soda and hot distilled water to the mercerizing. The system is lined up with mercerizing machine by installing the weak lye concentration control system which assures optimized operation of caustic recovery system.

### Technology

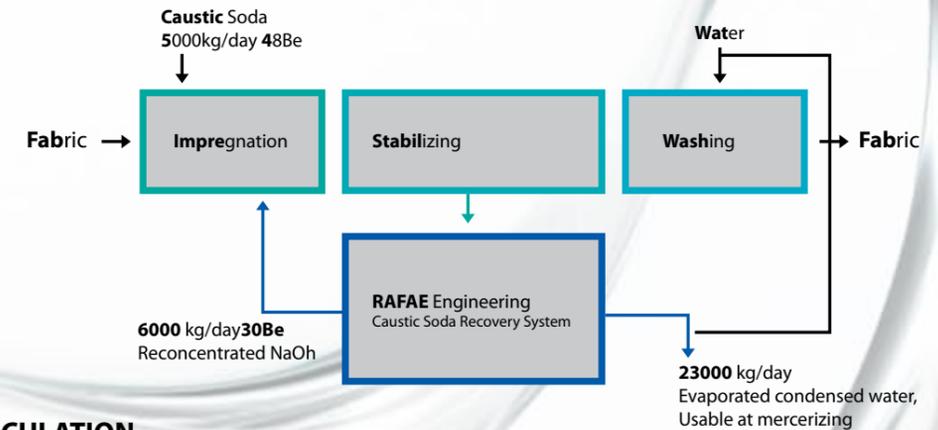
**Rafae engineering** design multistage evaporation plant as per customers requirements of hot water, heat source available. The difference is in the consumption of cooling water produced. The 2 stage plant needs more steam and produce more cooling water than 4 stage plant, but the investment cost are lower. The main issue is the cooling water. If you are able to use the cooling water later in the process, the 2 stage plant is better choice, if you have already enough warm water and this is often the case by new machines, so you should consider 3 or 4 stage plant.

The caustic recovery plant is a multistage evaporating process with natural circulation and with steam saving; i.e. Only first stage is heated up with steam. The condensate is sent back to boiler. The weak lye is preheated with waste vapours of the last stage. Boiling takes place in the tubes and vapor liquor mixers enters the separator where efficient separation takes place and vapors enter the shell of next stage. There is pressure and temperature gradient from the first to last stage produced by condenser and vacuum pump due to which pumpless transfer of liquor is possible in successive stages. The vapors from the last stage are condensed in surface condenser. The distillate is continuously fed to mercerizing through weak lye concentration control system. Condenser cooling water is fed to boiler house or production house. The recovered caustic upon reaching desired concentration setpoint is automatically discharged to a lye purification system

### Characteristics of our Caustic Soda Recovery System

The material used in our recovery plants can withstand the temperatures and caustic concentration. There are separate heads and bottom flanged to our evaporators for ease of cleaning and maintenance. The evaporators are equipped with expansion bellows which allows thermal expansion and contraction. The heating tubes are SS seamless 316 L and imported from Europe. We use SS sealless pumps for concentrated caustic soda.

The control includes fully automatically controlled processing steps by a process control system with touch screen on the plant site and operator work station in a office room connected by LAN-network. Data logging is provided for cost benefit analysis.



### SAVING CALCULATION

If your Caustic Soda consumption is 5000kg/day(48 Be)  
 Then weak lye feed to Recovery plant 29000kg/day(8 Be)  
 Recovered caustic soda 6000kg/day (30 Be)  
 Hot water recovered 23000kg/day 80 C  
 Warm water recovered 128 ton/day 50-60 C  
 Steam consumption 7-8 ton/day

### REFERENCE PLANTS LIST

AHMAD JAMAL TEXTILE	5 T/H	4-STAGE	FAISALABAD
AL KARAM TEXTILE	4 T/H	4-STAGE	KARACHI
MASTER TEXTILE	8 T/H	4-STAGE	LAHORE
FAISAL FABRICS	4 T/H	2-STAGE	FAISALABAD
AFTAB TEXTILE	4 T/H	2-STAGE	FAISALABAD
HILAL TEXTILE	4 T/H	2-STAGE	FAISALABAD
AHK TEXTILE	4 T/H	2-STAGE	FAISALABAD
CHENAB TEXTILE	12 T/H	4-STAGE	FAISALABAD (ON GOING)

### Advantages:

- Can save millions of rupees by recycling caustic soda
- Can reduce size and space required for wastewater treatment plant thus drastically reducing capital cost of wastewater treatment plant.
- Can reduce the running cost of wastewater treatment plant. High cost involved in neutralizing large quantity of caustic soda is saved. (1g NaOH requires 1.225g H<sub>2</sub>SO<sub>4</sub> for neutralization)
- Can reduce management cost of solid waste disposal.
- Hot water is generated as by product from its waste heat, which is used in other process needs.