

DISTILLATION SYSTEMS

EXPERTISE AND SUPPLY

Batch Distillation Systems :

Batch distillation systems are extremely flexible in nature. A single unit can be designed to handle wide variety of feed mixtures. It is also possible to handle multi component feed mixtures in the same column. Feed containing residues, having tendency to foam can be handled with ease if particular attention is paid during design. Addition of a phase splitter/ Decanter allows complete drying of solvent mixtures forming Azeotropes like water-Ethanol/IPA etc. In case of aqueous systems option of direct steam injection can offer several benefits. Operating batch column in semi batch mode can be useful in several situations since it overcomes the disadvantage of batch column of having no stripping section.

Synergy has the expertise to offer wide range of solvent recovery systems ranging from single stage flash units (Evaporation) to handling most complex feed mixtures. We are prepared to understand the unique requirements, look at all possible alternatives and work in close association with you to arrive at the best possible solution. For this we utilize our own design software based on latest batch algorithms. We can under take Pilot plant trials to understand the peculiarity of the feed if required. We respect the value of information disclosed to us.

We offer some unique equipments' useful to batch distillation units. They include Internal Condensers directly mounted on column tops, Efficient Kettles without agitator, Phase splitter with very low hold up (patent applied for), Falling film product cooler cum condenser (patent applied for), and automatic reflux splitter. These components when used in conjunction with efficient structured packing that we supply through our business associates result in to several advantages like: extremely low liquid hold ups, giving sharper cuts or lower intermediate cuts while distilling multi component mixtures, quick start ups, lower

solvent losses due to operational disturbances, lowering the malfunctioning of system, and ultimately in lower pay back periods. A batch distillation is simple to control as there is no need to balance the feed and draw. Nevertheless the batch unit has unique requirements of instrumentation and control. We understand these and supply total PLC based instrumentation package.

Synergy can supply skid mounted batch distillation units in several materials up to 5000-liter capacity. We can also supply individual components if so desired. Structured packings are ideally suited to batch distillation columns because of their higher efficiencies and lower liquid hold up/ pressure drops. We can supply packed columns with quality, structured packings complete with associated internals.

Continuous Distillation Systems :

We have the expertise to handle, most of the complex engineering problems in these areas like Azeotropic, Extractive, Reactive and other Multicomponent distillations, Highly efficient distillation systems incorporating novel energy saving strategies and separation of close boiling isomers, Falling film reboiler system for heat sensitive materials etc.

Supply can be considered for Column diameters below 1000 mm and heights up to 25000 mm. Mostly for packed columns with structured/random packings.



COMPARISON OF COLUMN INTERNALS

Parameter	Trays	Random Packings	Structured Packings
NTS/m *	1 ~ 2.5	1 ~ 3.5	3 ~ 11
DP, mm Water /m*	50 ~ 200	20 ~ 150	4 ~ 20
Hold Up	High	Low	Very low
	Favoured when : <ul style="list-style-type: none"> High liquid rates Large diameter columns Liquids containing solids/Fouling type Complex columns Reactive distillation 	Favoured when : <ul style="list-style-type: none"> Corrosive systems - ceramic / plastic Small diameter column - low cost situations 	Favoured when : <ul style="list-style-type: none"> High Theoretical stages situations Low DP applications. Revamps Small diameter column

*Values given are indicative only.
Both to strongly depend on column diameter and system properties.

Skid Mounted Modular Units : for Distillation / Absorption/ Evaporation

For moderate Distillation, Absorption and Evaporation duties it is often economical to supply the process equipments like column, heat exchangers, tanks, pumps and other system components as a preassembled skid mounted units. This ensures faster project completion, minimum site work and is most often economical for smaller sizes.



Special Duty Heat Exchangers as Distillation Column Accessories or otherwise

- ♦ Tubular exchangers with twisted tape inserts for highly viscous fluids.
- ♦ Heat exchangers with Corrugated tubes for steam condensing outside tube and turbulent flow inside tube.
- ♦ Recirculating bed heat exchangers for liquids with severe fouling tendencies.
- ♦ Falling film product cooler cum condenser (patent applied for).
- ♦ Internal condensers mounted on column top.
- ♦ Low hold-up phase splitter (patent applied for).

Instrumentation and Control systems

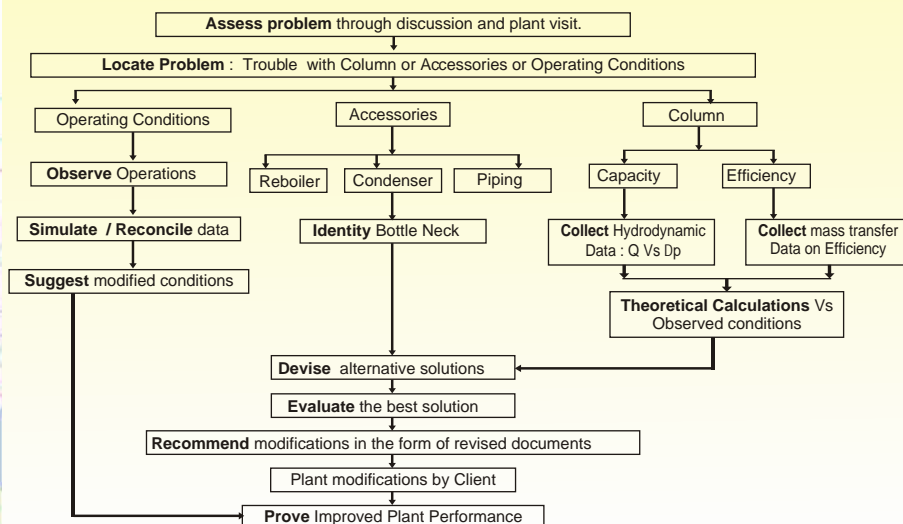
We can offer total system integration of Instrumentation and Control for plants engineered by us. Control strategy and schemes will be designed for the specific requirements of the project. Instrumentation package based on International guidelines can be devised and implemented using reliable instruments and control elements. Different types of control systems, from conventional control panel to PLC based system with SCADA/ HMI or Distributed Control System can be engineered and implemented.



Troubleshooting Expertise

Some times distillation systems do not function satisfactorily. The problems may be with column or the associated system. This most often results in to lower capacity, higher energy requirements, purity problems or any other operational troubles. Synergy when called for troubleshooting approaches the problem in a systematic way to come out with the most economical solution.

TROUBLESHOOTING NAVIGATION TREE



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