

TECHNICAL PACKAGES



PROCESS ENGINEERING EXPERTISE

We form a combination of Chemical Engineers in the field of Process engineering and its application in the glass equipments/process packages.

DESIGN AND SUPPLY OF VARIOUS UNITS

As per client's requirement are as under:

Absorption systems for gases such as HCl, Cl₂, SO₂, HBr, NH₃, Br₂, NO_x etc.
Anhydrous HCl Gas Generation Unit by different routes viz.

- Sulphuric Acid Route
- Boiling Route
- Calcium Chloride Route
- Cyclic Route

HBr Gas Generator (By Boiling Route)

Sulphuric Acid Dilution Units

Hypochlorite Manufacturing Units

MCA Condensation Assembly

Distillation - Conversion of Batch Process to Continuous Process

Solvent Recovery

Iodine Recovery

Raw DCB Plant

KNOW-HOW WITH PLANT

for the following products:

Bromine recovery from industrial waste / salt bittern.

Nitric Acid Concentration

Sodium Hypochlorite

TROUBLE SHOOTING

in above units as well as client's existing plant.

WIPING FILM EVAPORATOR

Heat sensitive products like vitamins, hormones, enzymes or aromatic substances get adversely affected by way of material degradation due to higher temperature and residence time. This can be avoided if the reactions are carried under vacuum which allows the working temperature to be lowered, and by forming a thin film to reduce residence time, especially in case of liquids of high viscosity, or low thermal conductivity. For these, GOEL introduces a specially designed range of Evaporators made of Borosilicate Glass. The range varies from laboratory size (80DN) to production plants (300DN).

CONSTRUCTION

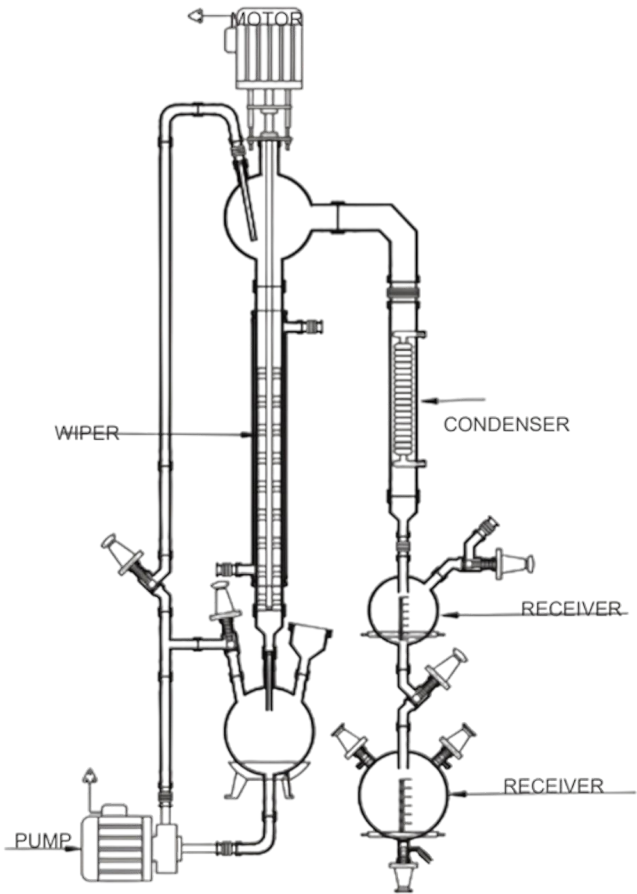
The core of the unit is a rotating, fully corrosion resistant wiper system. This has four rows of PTFE wipers. These rows of wipers are divided into vertical segments and each wiper is mounted between two glass rods.

A liquid distributor is located above the wipers. It distributes the medium, fed in through the feed pipe uniformly around the circumference of the evaporator before the medium is finally picked up by the wiper system itself.

The Evaporator has a vapour outlet which can be connected to a descending coil condenser and a receiver.

The drive used for the wiper system is a standard geared-motor with an AC speed regulator. The wiper shaft is sealed by means of a mechanical seal. The evaporator body is constructed as a jacketed pipe. For heating, thermic fluid upto 150 C can be circulated in the jacket.

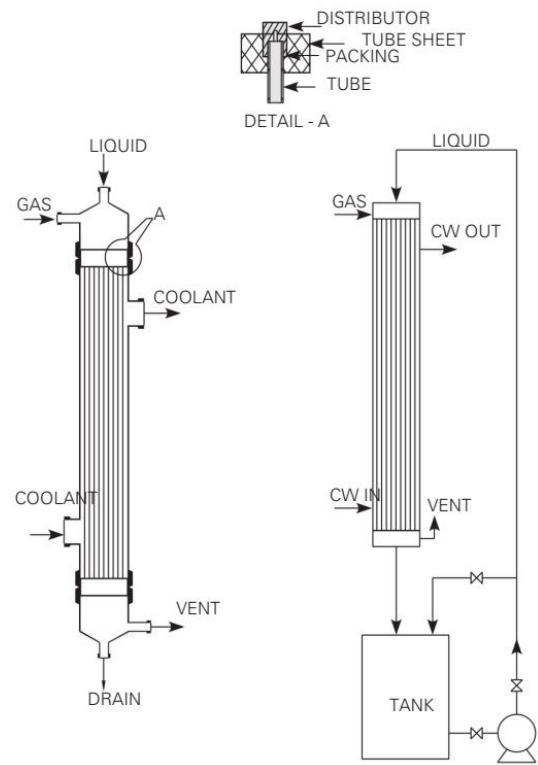
The unit is designated by the jacketed pipe size. And the capacity of the unit depends on the evaporation rate which in turn depends on the HTA available, the type of heating media, and the evaporation environment i.e. vacuum conditions.



Model	Size DN (mm)	HTA (M ²)
WFE3	80	0.35
WFE4	100	0.47
WFE6	150	0.70
WFE9	225	1.06
WFE12	300	1.41



FALLING FILM ABSORBER



The Falling Film Absorber provides efficient gas absorption by utilising the falling film principle. A liquid film flows down the inner wall of vertical tubes while the gas flows counter-currently upward, ensuring high contact area and mass transfer efficiency.

The absorber is constructed from Borosilicate Glass 3.3 making it suitable for highly corrosive gas streams. The shell-and-tube design allows indirect cooling through a jacket or shell-side coolant, enabling precise temperature control during exothermic absorption reactions.

SALIENT FEATURES

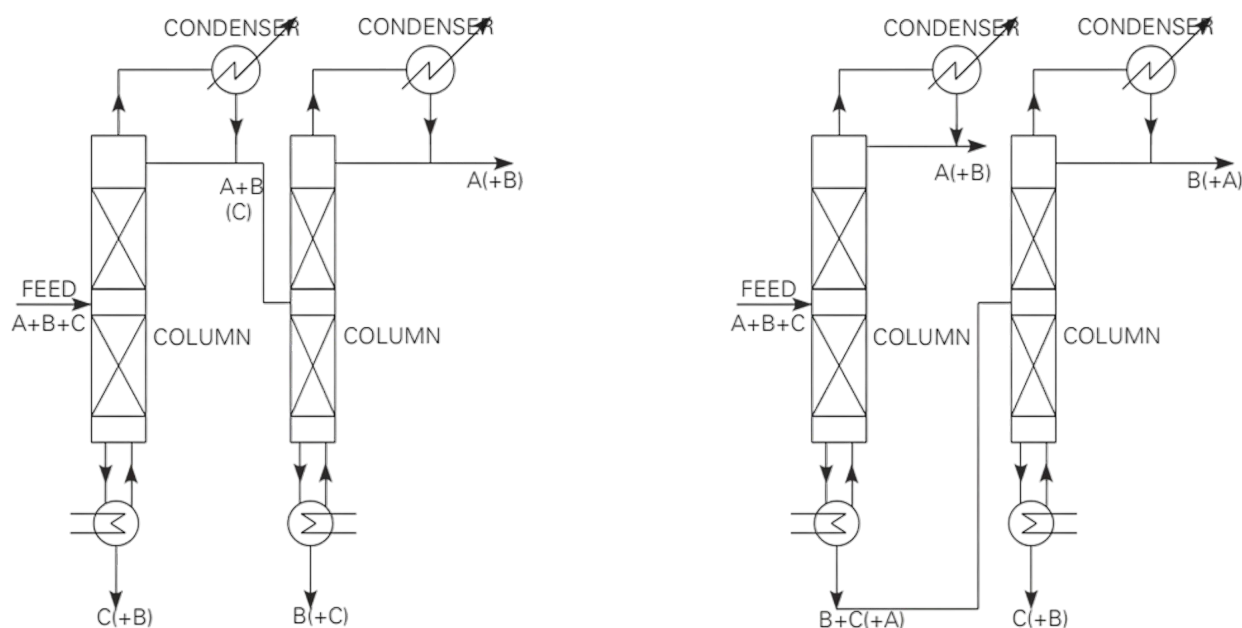
- Efficient mass transfer due to thin film formation
 - Suitable for corrosive and aggressive gases
 - Low pressure drop across the absorber
 - High absorption efficiency up to 99.9%
 - Compact design with small footprint
 - Borosilicate glass construction for chemical resistance
 - Easy to clean and maintain
 - Uniform liquid distribution by special distributors
 - Suitable for HCl, Cl₂, SO₂, HBr, NH₃ absorption
 - Available in standard sizes from 80DN to 600DN
 - Modular design for easy scale-up
 - PTFE internals for additional corrosion resistance
 - Suitable for both horizontal and vertical installation
 - Compatible with standard chemical process equipment
 - Low operating and maintenance costs

LIMITATIONS

- Not suitable for liquids with heavy suspended solids that may block the tubes.
- Requires a minimum liquid flow rate to maintain a continuous film on the tube walls.

SPECIFICATIONS

Sr.No.	Nominal Size (mm)	Absorber Area (m ²)	No. Tubes / Tube OD (mm)	Max Gas Rate (kg/hr)	Max Acid Rate (kg/hr)	Height (mm)
1	80	1.00	4/20	30	100	4400
2	100	1.76	7/20	60	200	4500
3	150	4.80	19/20	150	500	4600
4	225	7.80	31/20	250	833	4920
5	300	15.30	61/20	500	1667	5050
6	400	36.00	143/20	1175	3917	5300
7	450	47.00	187/20	1500	5000	5700
8	600	84.00	333/20	2700	9000	5800



SOLVENT RECOVERY

Solvents are universally used in wide variety of industries, their use by no means being limited to the chemical industry. The choice of solvents such as xylene, acetone, butyl acetate, methanol etc. depends on the type of application and economical considerations.

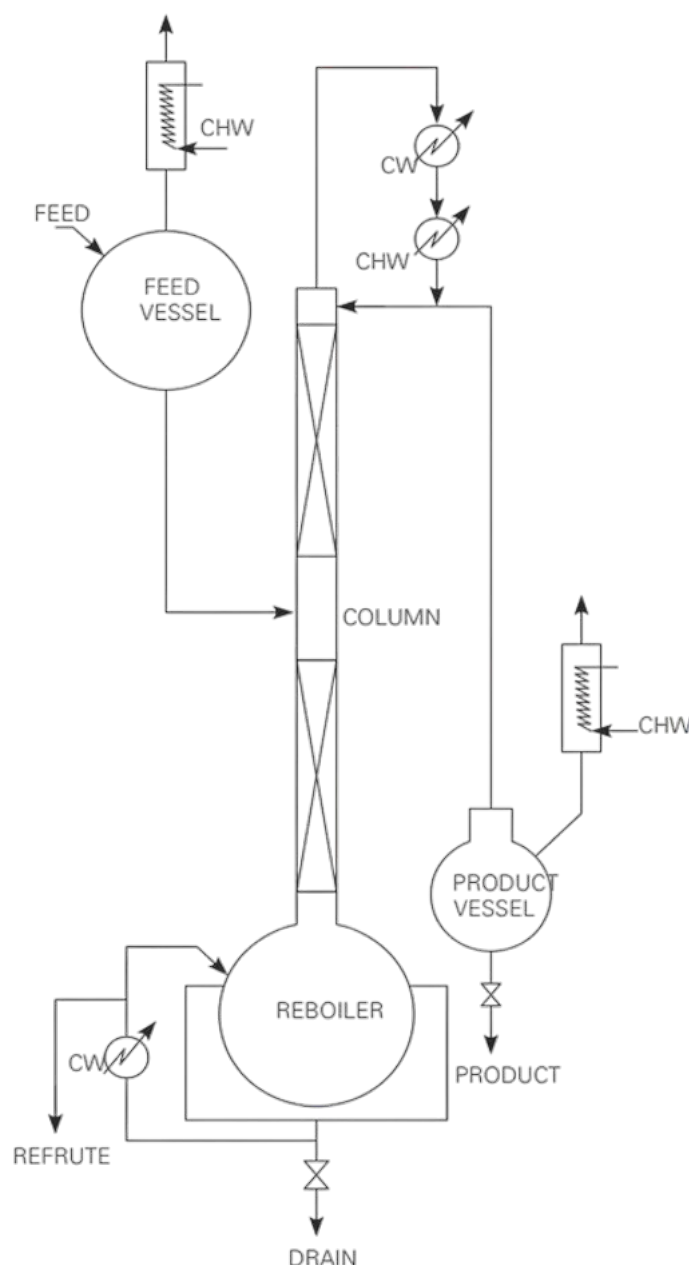
In many cases, the solvent - after use - is contaminated and not in a reusable condition. Purchase of fresh solvent and disposal costs of the contaminated solvent can prove expensive operations. Therefore, it makes sound economic sense to investigate the recovery of contaminated solvents for re-use.

GOEL design and supply solvent recovery plants which are capable of recovering solvents from a few kg/day to many tons/day.

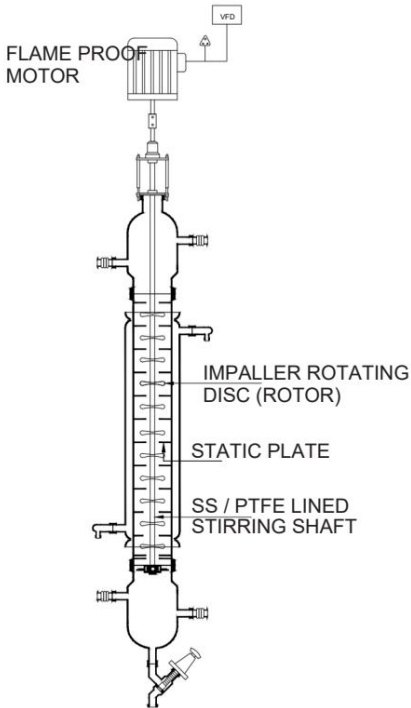
APPLICATIONS

1. GOEL Solvent Recovery Units are carefully designed to cater the specific requirement for each duty for wide range of solvents.
2. Continuous Distillation Units have distinct advantages, such as
3. Ease of Operation due to steady state working.
4. Economical design as each equipment viz. column, condenser reboiler is designed for uniform and steady-load.
5. Uniform product quality,
6. Uniform & low consumption of utilities.
7. Higher productivity as down time for start-up, emptying etc. is eliminated.

The outline flow-sheet of a typical solvent recovery plant includes a feed vessel, distillation column, primary condenser, secondary condenser, vent condenser, reboiler/oil bath and receiver. The feed solvent is charged to the overhead vessel and fed to the distillation column where separation occurs. Vapours from the column top are condensed in the primary and secondary condensers, with uncondensed vapours passing through a vent condenser before venting to atmosphere or a scrubbing system.



ROTATING DISC EXTRACTION COLUMN



Model	Size	DN (mm)Hight
RDC3	80	2.0
RDC4	100	2.0
RDC6	150	2.0
RDC9	225	2.0
RDC12	300	2.0
RDC16	300	2.0

INTRODUCTION

Separation will be carried out normally with the help of distillation but when it is not feasible by distillation or ineffective liquid-liquid extraction is one of the process to consider. There few mixtures are having close boiling points components or heat sensitive components which can not withstand the temperature of distillation, even under vacuum may often be separated from impurities by extraction which utilize the chemical properties like specific gravity, solubility etc. instead of vapour pressure differences.

Separations by liquid-liquid extraction can be defined as the selective removal of one or more components either from a homogenous liquid mixture or from a solution, using a second liquid or solvent, which is partially or wholly immiscible with the first.

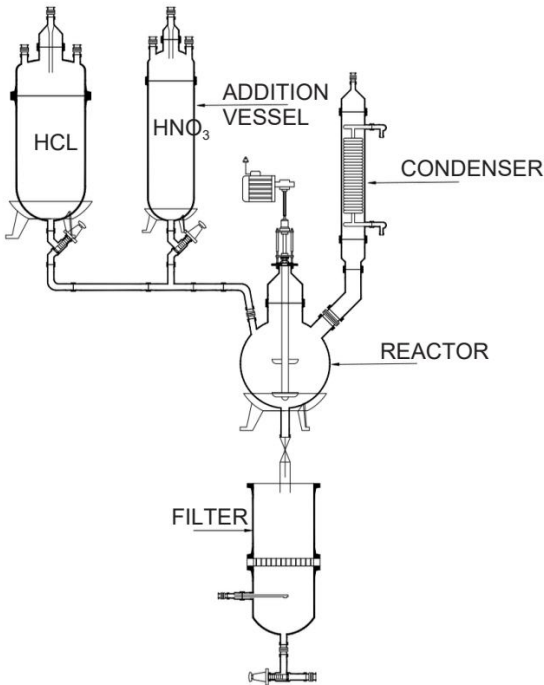
CONSTRUCTION

The core of the unit is a rotating disc with varied no of stages between 1 m to 2 m height. The RDC blade can be made of PTFE or SS 304 or SS 316 depending on the customer requirement.

The system can be supplied with or without dosing pump and two feed vessels as well as two receivers.The drive used for the rotation of the disc is a standard geared-motor with an AC speed regulator. The agitator shaft is sealed by means of a mechanical seal.

The outer column can be constructed as a jacketed pipe or without jacket as per the customer requirement. The unit is designated by the diameter of the extraction column and no. of stages as per the customer specification depends on the flowrates and properties of the chemical used.

PRECIOUS METAL REFINING



Borosilicate glass is inert to almost all materials. Due to which it is now widely used in Precious Metal Refining Industry. Borosilicate Glass is the only material which doesn't absorb precious metals. Its transparency allows ease of visualization & smooth surface allows ease of cleaning.

We have supplied various capacity glass assemblies in precious metal refinery for Aqua Regia solution. Our Glass Container/Vessel are also used as dissolution, precipitator and separator for Gold /silver/ platinum recovery with Aqua Regia / Hydrazine solution.

Scrubbing Unit :The fumes generated by Aqua Regia in a gold refining process are toxic. We design & offer suitable capacity Glass Scrubber Unit for removal of NOX Fumes. Filer Unit :We also offer Glass Filter Unit on wheels for removing of precious metal from the Aqua Regia solution. Nitric Acid Boiling Apparatus :Nitric Acid Boiling Apparatus with condenser for Laboratory testing is also available with us. Sampling Tubes :Vacuum Tubes (VPT 111) for removal of samples from the batch are also manufactured by us.