

**KEP Engineering  
Services Pvt. Ltd.**

[www.kepengg.com](http://www.kepengg.com)

# ABOUT US

The Genesis of KEP was traced in 2010 when a group of technocrats with years of experience in diverse fields decided to pool their combined talent and create an engineering company that would be a projection of their personality and achieve their goals. KEP Engineering Services Pvt Ltd is the outcome. KEP commenced operations in Jeedimetla, Hyderabad providing technology to diverse industries while commencing manufacture of a wide range

of ETP, RO, evaporators and dryers. Today we have a core staff of 100 besides numerous contractors and sub-contractors. In a short span of time we established ourselves as a leading Manufacturer of Industrial Evaporators & Dryers including best solution for ZLD in India. Our approach, based on Knowledge, Concept, Design, Engineering, Planning and Execution, especially when it comes to specialized MEE, ATFD, MVRE & RO Technologies.



## VISION

To provide good quality services that exceeds the expectations of our esteemed



## MISSION STATEMENT

To build long term relationships with our customers and clients and provide exceptional customer services



## CORE VALUES

We believe in treating our customers with respect and faith. We grow through creativity, invention and innovation.

# QUALITY POLICY

KEP is committed to design, and deliver quality products, equipment, services and solutions to generate delighted and loyal customers in various industries. Quality is the foundation of KEP and its fully rooted in KEP way of working. We continuously improve our quality management system and its processes through clearly defined manner.

# QUALITY OBJECTIVES

- Providing optimistic design & engineering with best quality to achieve committed performance for satisfying the customers.
- Strengthen relations with suppliers and other stakeholders to get the materials as per defined time.
- Innovate technologies, products and services to enhance productivity.
- Proactive up gradation of manufacturing facilities to meet future challenges.
- Maintain safe and Healthy work condition.

# TECHNOLOGY SOLUTION

KEP Engineering leads by virtue of superior engineering design capabilities, manufacturing excellence and a project based approach for commitment to delivery with high performance for total ZLD & evaporation solutions customized to a client's requirement. KEP's product range is as under.

## ZERO LIQUID DISCHARGE

- + Effluent Treatment Plants
- + Stripper Columns
- + Multi Effect Evaporation System
- + Agitated Thin Film Evaporator
- + Aerobic & Anaerobic System
- + Reverse Osmosis
- + Ultra Filtration
- + Condensate Polishing

## EVAPORATION TECHNOLOGY

- + Falling Film Evaporator
- + Rising film Evaporator
- + Forced Circulation Evaporator
- + Multi Effect Evaporator
- + Thermal Vapor Re-Compressor Evaporator (TVRE)
- + Mechanical Vapor Re-Compressor Evaporator (MVRE)

## RECOVERY SYSTEM

- + Solvent Recovery Units
- + Distillation Column
- + Ammonia Recovery System
- + Gas Scrubber
- + Crystallizers

## INDUSTRIAL DRYERS

- + Agitated Thin Film Dryer
- + Agitated Thin Film Evaporator
- + Short Path Evaporator
- + Wiped Film Evaporator

## PROCESS EQUIPMENT

- + Reactors
- + Tanks & Vessels
- + Heat Exchangers
- + Condensers

## DESIGN & ENGINEERING

- + Basic Engineering
- + Detail Engineering
- + Concept Development
- + Feasibility Report
- + Heat Exchanger Sizing
- + Vessel Sizing
- + Site Survey & Layout Development

## SERVICES

- + Erection & Commissioning Support
- + Operation & Maintenance Support
- + Deputation of Engineers for Technical Support
- + Repairing & De-Bottle necking of existing plant
- + Piping & Fittings Fabrication at site
- + Civil & structure construction at site
- + Electrical & Instrumentation support at site

## DESIGN STANDARDS

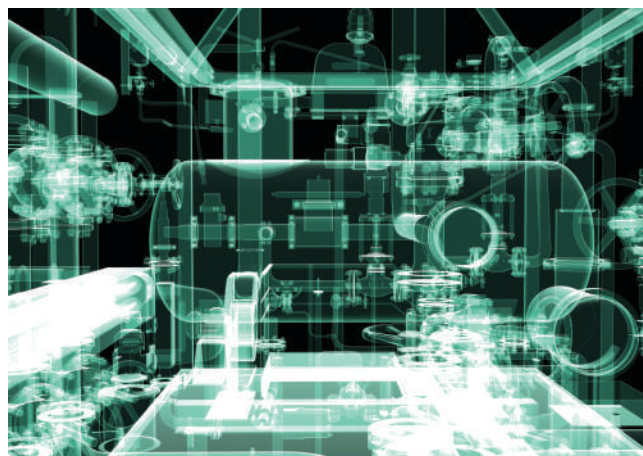
- + ASME
- + TEMA
- + API
- + GMP

# DESIGN, ENGINEERING & SERVICES

## CONCEPTUAL DESIGN

During conceptualization stage KEP has the expertise to evaluate processes to assess its procedural possibility, financial viability and operational ease. According to these reflections, we develop an enhanced process scheme along with the process flow diagram and the heat and material balance for the facility. In addition to the fundamental facilities, we routinely conduct these activities for existing systems with respect to:

- Capacity Enhancement & Expansion of Plant
- Increase in process throughput
- Product purity / yield enrichment
- Modifications in modes of operation
- Conversion from batch to continuous systems



## DETAILED ENGINEERING

The prime success of detailed engineering is having an integrated approach to project co-ordination, management and design. This helps to create an enhanced & comprehensive design work; hence making it cost-effective and efficient execution.

- Engineering Coordination
- Client Interface
- Project Monitoring
- Equipment Layouts
- Piping Layout Plans, Isometrics
- Bill of Materials
- Cable Layouts
- Building and Structures
- Equipment Foundation and Pipe Racks HAZOP & HAZID Workshops



## COMMISSIONING

Along with the highly skilled engineers at KEP we aim to offer class-apart services in startup and commissioning activities. We undertake the following activities as part of Pre-commissioning and commissioning services:

- Pre-commissioning & Commissioning planning and manuals.
- Prepare work breakdown structure and schedule
- Carrying out Pre-commissioning & Commissioning activities
- Resolution of technical issues
- Coordination with design team at home office

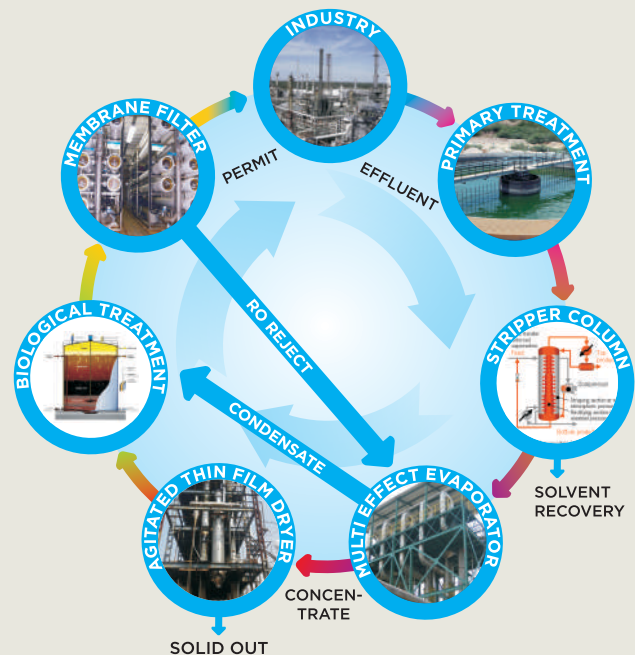




# ZERO LIQUID DISCHARGE

Zero Liquid Discharge (ZLD) describes a process that completely eliminates liquid discharge from a system. The goal of any well-designed ZLD system is to minimize the volume of wastewater that requires treatment, process wastewater in an economically feasible manner, while also producing a clean stream suitable for reuse elsewhere in the facility. Interest in Zero Liquid Discharge technology has grown in the industrial manufacturing sector over the past decade.

The KEP is providing the turnkey solution for zero liquid discharge, which includes the process like primary treatment, secondary treatment, tertiary treatment and evaporator and dryers. Based on the effluent characteristic's KEP will select the process of treatment to recycle 100% water to process.



## PROCESS EQUIPMENT

KEP designs and manufactures major industrial equipment with international standards. We are expert in following equipment design, engineering and manufacturing

- Shell & Tube Heat Exchangers
- Jacketed & limped type Reactors
- Vessels, Tanks and Receivers
- Storage Tanks & Vessels
- Blowers & Air Coolers
- Fin type & corrugated Condensers

## FEATURES

- Design adhere to TEMA, ASME & GMP
- Wide choice for material of construction
- High durability and reliability.
- Less maintenance required
- Internal quality assurance system.
- Flexible & Compact Design
- Highly Productive equipment with maximum efficiency





# EVAPORATOR

In optimizing the design of an Industrial Evaporator, another important consideration is the steam economy (kg of liquid evaporated per kilogram of steam used). The best way to achieve high economies is to use a multi effect evaporator, whereby the vapor from one effect – is used to heat the feed in the next effect, where boiling occurs at lower pressure. Thermo-compression of the vapor, whereby the vapor will condense at a temperature high enough to be reused for the next effect through compression, will also increase efficiency

## DIFFERENT TYPE OF EVAPORATOR:

- + Falling Film Evaporator
- + Forced Circulation Evaporator
- + Rising Film Evaporator

## FALLING FILM EVAPORATOR:

The tubular Falling Film Evaporator is specifically suited for processing temperature sensitive products with a low viscosity and tendency for fouling. The liquid to be concentrated is fed to the top of the calandria and properly distributed in such a way as to falling, feed in-side the tubes will form a thin layer in-side tube. Because of external heating, liquid film starts to evaporate. The downward flow, caused initially by gravity, is enhanced by the parallel, downward flow of the vapors formed. Residual film liquid and vapor is separated in the lower part of the calandria and in the downstream vapor separator. The total system is operating under vacuum depending upon the application.

## FEATURES

**Design Features:** High heat transfer coefficient, Thermal vapor re-compression, short residence time multiple effects used for the steam economy

- Operate under vacuum
- Fouling across the tube is less
- Easy to start, operate and clean
- Low pressure drop
- Required less power
- Low circulation mass
- High heat transfer coefficient





# FORCED CIRCULATION EVAPORATOR

Forced circulation evaporator for concentration of high viscosity material and products with higher solids. This is also used as evaporative crystallizer. To achieve desired concentration Falling Film Evaporator followed by forced circulation evaporator is used to minimize the operating cost. In this type of evaporator, the liquid is pumped through tube side of calandria at high velocity avoiding precipitation and fouling the liquid is then passed through vapor separator for separation of vapor. Concentrated liquid is continuously discharged from bottom of the vapor separator with pump.

## FEATURES

- Fouling of tubes is minimized
- High re-circulation is to be maintained inside the tubes by re-circulation pump
- High TDS and viscous liquid concentration
- Development to process high scaling and crystallizing liquid
- Tube side liquid boiling is prevented.
- Minimum disposition salt or crystalline material along the heating surface.
- Capital cost is more as compare to other evaporators.



# RISING FILM EVAPORATOR

A rising film or vertical long tube evaporator is a type of evaporator that is essentially a vertical shell and tube heat exchanger. The liquid being evaporated is fed from the bottom into long tubes and heated with steam condensing on the outside of the tube from the shell side.

## FEATURES

- Residence time is also low permitting application for heat sensitive materials.
- Low capital cost.
- Relatively high heat transfer co-efficient due to partial two-phase flow.
- Ideal for liquids which attain high viscosity and tend to foul.
- Suitable for high temperature application.



# AGITATED THIN FILM DRYER (ATFD)

Agitated Thin Film Dryer (ATFD) for evaporation of water/solvents to make concentrated liquid to dry powder up to 5% moisture. Based on application either recovered solvent or dry product is important. Agitated Thin Film Dryer design is the ideal apparatus for continuous processing of concentrated material for drying.

## ATFD PRINCIPLE

Agitated Thin Film Dryer (ATFD) for evaporation of water/solvents to make concentrated liquid to dry powder or flakes. Based on application either recovered solvent or dry product is important. Agitated Thin Film Dryer design is the ideal apparatus for continuous processing of concentrated material for drying. Agitated Thin Film Dryer is consist of cylindrical, vertical body with heating jacket and a rotor inside of the shell which is equipped with rows of pendulum blades all over the length of the dryer.

The vapors produced rise upwards, counter-current to the liquid and pass through a Cyclone Separator mounted at the vapor outlet of Agitated Thin Film Dryer (ATFD). Further these vapors will be condensed in a condenser and recovered as condensate. The system will be operated under vacuum for temperature sensitive products and atmospheric conditions for normal drying.

## FEATURES

- Single point solution for drying applications.
- Compact design
- Best in heat transfer
- Operating temperature and pressure flexibility.
- Unique design for distribution system

Single point solution for drying applications. Concentrations, slurry formation, cake formation, powder/flake recovery It eliminates the other unit operation like Concentration, Crystallization, Filtration, Centrifuging which required before drying. Eliminate & Rotary Dryer, Pulverize and grinding which are required after drying. Compact design eliminates large area requirement. Less maintenance increases efficiency of production.





# AGITATED THIN FILM EVAPORATOR

KEP's Agitated Thin Film Evaporator is an alternative & economical solution for heat sensitive products. KEP has developed agitated thin film evaporation technology with innovation at an optimized Capital & Operating Cost.

Agitated Thin Film Evaporators are used for the purification of liquid compounds that are heat sensitive, viscous and have high boiling points.

## FEATURES

- Continuous operation
- Low Maintenance
- Easy to start, operate and shut down
- Heat transfer coefficient is high
- One shot concentration no re-circulation is required
- Can operate with flexible operating parameters
- Higher operating vacuums
- Efficiently processes viscous solutions
- Low residence time eliminates thermal degradation



## SHORT PATH EVAPORATOR

KEP's short path evaporator is an alternative & economical solution for high vacuum distillation/ fractionation. KEP has developed short path evaporation technology with innovation and revelation at an optimized capital & operating Cost.

Short path evaporation is a thermal separation technique that provides minimum pressure drop, permitting high vacuum operation down to 0.001 mbar. Short path evaporation is excellent for gently processing heat sensitive, high boiling products.

## FEATURES

- Residence time of few seconds, important for heat sensitive products
- Operation pressure as low as 0.001 mbar (a). Hence production can be distilled at lower temperatures to avoid degradation
- Suitable for viscous products
- Excellent turn down capability
- Low product holdup, good for hazardous materials
- Low power requirements

# MECHANICAL VAPOR RE-COMPRESSSION EVAPORATION (MVRE) SYSTEM

Over the past 10-15 years, mechanical vapor recompression (MVR) has become the preferred system in many industries, because of its economy and simplicity of operation. In most instances, the need for steam to provide heat for the evaporation and cooling water for condensing the overhead vapors is virtually eliminated; by installing MVRE. A wide range of turndown is possible in MVRE.

The enthalpy of the thermal steam compressed by the compressor was increased, and the vapor was used to heat the circulation liquid in the evaporator. The fresh steam is saved and the energy consumption was reduced too.

## OPERATING PRINCIPLE OF MVRE:

Mechanical Vapor Recompressor is used to increase the pressure of the vapors, which are generated in the Separator. An increase in pressure in compressor will increase the condensation temperature of the water vapor (steam) rendering it usable to heat the original mixture in a calandria. It is this resulting temperature difference produced by compressing the water vapor that enables a highly efficient heat transfer to occur. As the water vapors condense in the shell side of calandria, it releases its latent heat to further heat the original mixture, which in turn produces more steam.

MVRE Plant View



## FEATURES

- Found to be the most economical choice when there is no boiler available or when electrical power is priced competitively in comparison to steam
- Gentle evaporation of the product due to low temperature differences
- Reduced load on cooling towers since no residual vapors, due to the complete re-compression of the process vapor, cooling water consumption is negligible
- Easy capacity controlling through variable frequency drive
- (VFD)
- Efficient vapor compression technology to minimize operating
- Cost
- Due to absence of the recycled cooling water, electricity, water and maintenance costs are saved (low maintenance)
- High-water recovery rate – up to 98%
- Compact, portable, and easy to install
- Recycling the latent heat of the steam and avoiding fresh steam consumption, makes MVR more energy saving
- High heat efficiency, energy-saving, zero contaminant





## ULTRA FILTRATION

KEP's filtration offers the widest range of ultra filtration membranes available to provide maximum flexibility in solving unique process challenges. The membrane has pores that allow the solvent and small molecules to pass through and the larger molecules to be retained. Ultra filtration may therefore be considered as a selective separation step used to both concentrate and purify medium to high molecular weight components such as plant and dairy proteins, carbohydrates and enzymes.

### FEATURES

- Minimum pumping energy required, thus energy saving
- Easy to operate & maintenance
- Low investment cost
- No contaminant residue caused by chemical reaction
- Recovery ratio up to 98%
- High chemical resistance and temperature tolerance for effective membrane cleaning

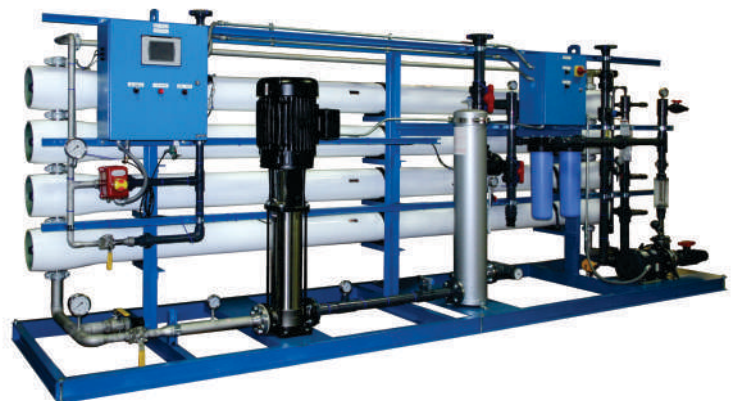
## REVERSE OSMOSIS

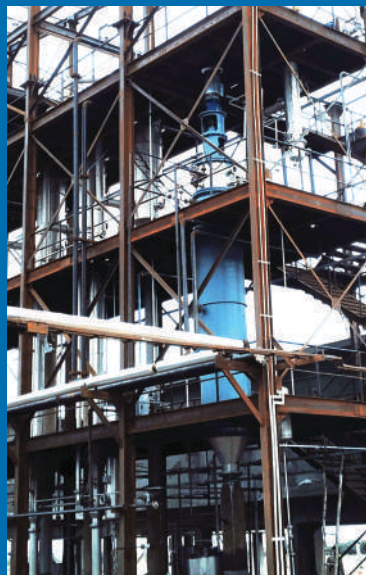
Reverse Osmosis is a technology that is used to remove large majority of contaminants from water by pushing the water under pressure through a semi-permeable membrane. KEP has developed reverse osmosis technology with innovation at an optimized Capital & Operating Cost.

Reverse osmosis is an effective and proven technology to produce water that is suitable for many industrial applications. RO is currently considered one of the most economic and effective process for waste water treatment. RO is an effective method of reducing the concentration of total dissolved solids (TDS) and many impurities found in water.

### FEATURES

- Low Operating Cost
- Low Maintenance
- Easy to install and service
- Energy-saving separation technique
- High Recovery
- Eliminates thermal degradation





**KEP**<sup>®</sup>

knowledge engineering planning

AN ISO 9001:2015 CERTIFIED COMPANY

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