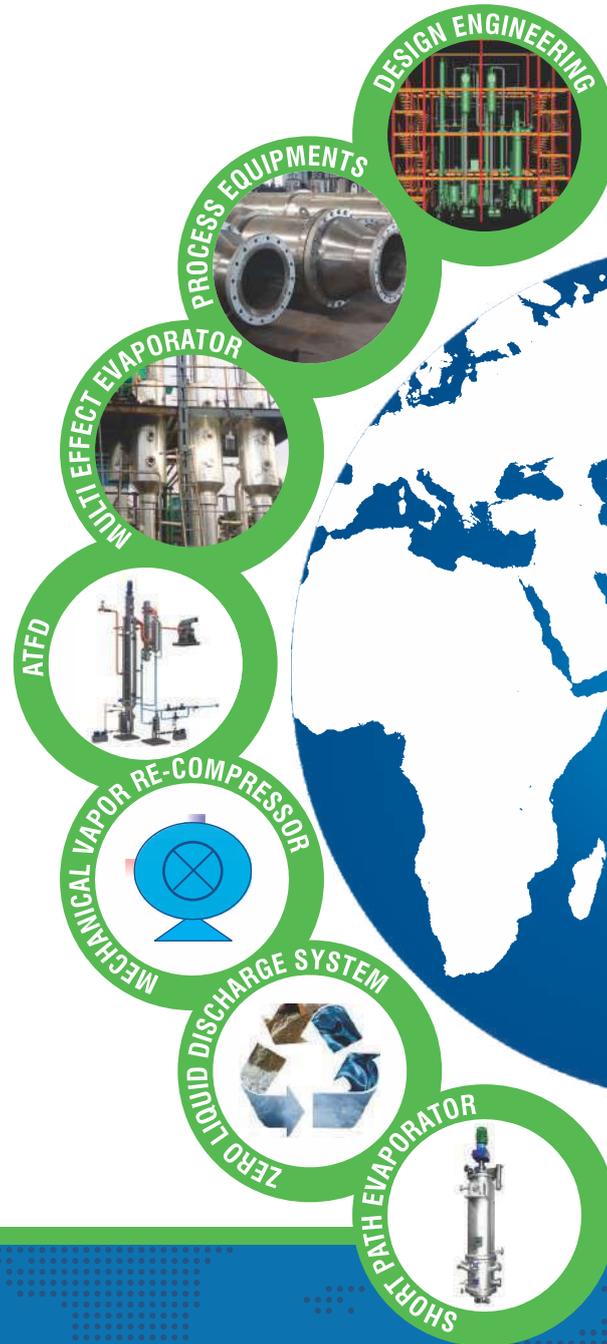




KEP[®]

knowledge engineering planning



**KEP Engineering
Services Pvt. Ltd.**

www.kepengg.com

ABOUT US

The genesis of KEP can be traced back to 2010 when a group of seasoned technocrats, each with extensive experience in diverse fields, decided to pool their talents and establish an engineering company that would reflect their collective vision and achieve shared goals. The result of this collaboration is KEP Engineering Services Pvt Ltd, which began its operations at Kallakal village, Medak, Hyderabad, focusing on providing technology to various industries and manufacturing a wide range of ETP, RO, Evaporators, Strippers, Crystallizers and Dryers. Presently,

with a core staff of more than 150 individuals and numerous contractors and sub-contractors, KEP has swiftly positioned itself as a leading manufacturer of Industrial Evaporators & Dryers, excelling particularly in providing optimal solutions for Zero Liquid Discharge (ZLD) in India. The company's approach revolves around Knowledge, Concept, Design, Engineering, Planning, and Execution, with a specific emphasis on specialized technologies like ETP, MVRE, MEE, ATFD, UF and RO.



VISION

Strive To Become A World Class Organization Ensuring Customer Satisfaction By Delivering Value Through Quality, Innovation And Unparalleled Service.



MISSION

To Be A Leader In Design and Manufacturing of Zero Liquid Discharge Systems and Industrial Processing Solutions by Delivering Superior Technology, Quality and Service to Our Customers.



VALUES

We believe in treating our customers with respect and trust, fostering growth through creativity, invention, and innovation.

QUALITY POLICY

KEP is dedicated to crafting and delivering superior products, equipment, services, and solutions to consistently exceed customer expectations across various industries. Quality stands as the cornerstone of KEP, ingrained in our operational philosophy.

We persistently refine our quality management system and associated processes through clearly defined methodologies.

QUALITY OBJECTIVES

- ◆ Ensuring optimistic design and engineering of the utmost quality to consistently meet committed performance standards and exceed customer satisfaction.
- ◆ Strengthening relationships with suppliers and stakeholders to guarantee the timely procurement of materials.
- ◆ Driving innovation in technologies, products, and services to elevate overall productivity.
- ◆ Proactively upgrading manufacturing facilities to adeptly address future challenges.
- ◆ Upholding a secure and healthy work environment for all employees.

TECHNOLOGY SOLUTION

KEP excels through its superior engineering design capabilities, manufacturing excellence, and a project-oriented approach, demonstrating unwavering commitment to delivering high-performance solutions for customized ETP, Zero Liquid Discharge (ZLD) and evaporation solutions. KEP's product range is outlined below

EFFLUENT TREATMENT SYSTEMS

- ◆ Zero Liquid Discharge
- ◆ Stripper Columns
- ◆ Multi Effect Evaporation System
- ◆ Agitated Thin Film Evaporator
- ◆ Aerobic & Anaerobic System
- ◆ Reverse Osmosis
- ◆ Ultra Filtration
- ◆ Condensate Polishing

EVAPORATION TECHNOLOGY

- ◆ Mechanical Vapor Re-Compressor Evaporator (MVRE)
- ◆ Multi Effect Evaporator (MEE) with TVR
- ◆ Falling Film Evaporator
- ◆ Rising film Evaporator
- ◆ Forced Circulation Evaporator

RECOVERY SYSTEM

- ◆ Solvent Recovery Units
- ◆ Distillation Column
- ◆ Ammonia Recovery System
- ◆ Gas Scrubber
- ◆ Crystallizers
- ◆ CIGAR system

INDUSTRIAL DRYERS

- ◆ Agitated Thin Film Dryer
- ◆ Agitated Thin Film Evaporator
- ◆ Paddle Dryer
- ◆ Wiped Film Evaporator

PROCESS EQUIPMENT

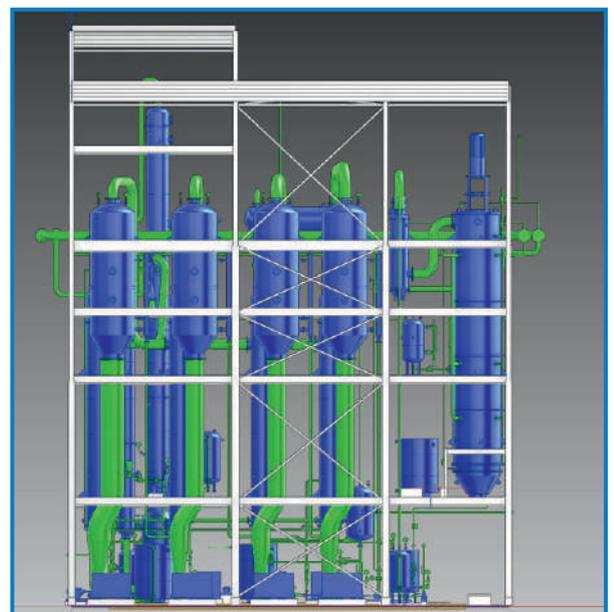
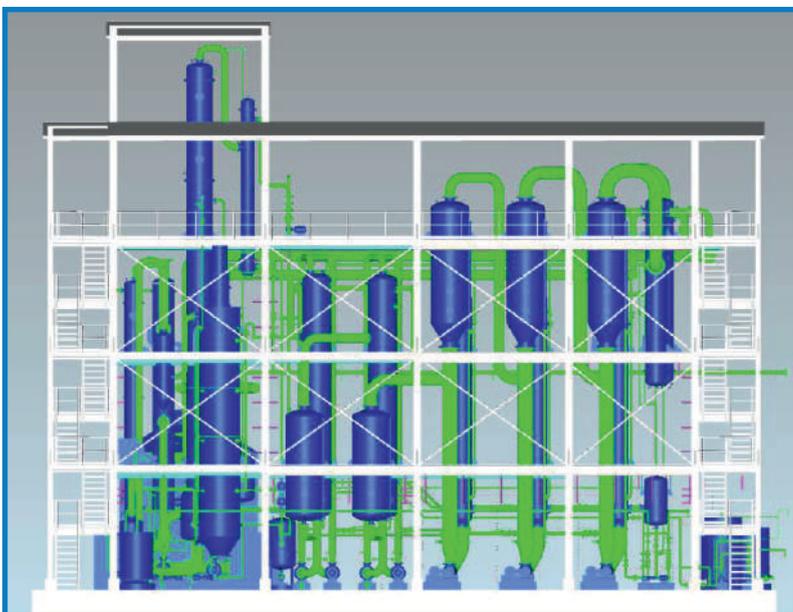
- ◆ Reactors
- ◆ Tanks & Vessels
- ◆ Heat Exchangers
- ◆ Condensers

DESIGN & ENGINEERING SERVICES

- ◆ Basic Engineering
- ◆ Detail Engineering
- ◆ Concept Development
- ◆ Feasibility Report
- ◆ 3D Plant Modelling
- ◆ Research & Development
- ◆ Erection & Commissioning
- ◆ Electrical & Instrumentation
- ◆ Annual Maintenance Services
- ◆ Pilot Plant boot systems
- ◆ Modifications and Development of existing systems

DESIGN STANDARDS

- ◆ ASME
- ◆ TEMA
- ◆ API
- ◆ GMP



DESIGN, ENGINEERING & SERVICES

CONCEPTUAL DESIGN

During the conceptualization stage, KEP leverages its expertise to assess procedural feasibility, financial viability, and operational ease when evaluating processes. Based on these considerations, we formulate an enhanced process scheme, accompanied by a detailed process flow diagram and a thorough heat and material balance for the facility. Our proficiency extends beyond addressing fundamental facilities, as we consistently apply these activities to existing systems, focussing on:

- ◆ Capacity Enhancement & Plant Expansion
- ◆ Increased Process Throughput
- ◆ Product Purity / Yield Enrichment
- ◆ Modifications in Modes of Operation
- ◆ Transition from Batch to Continuous Systems.

COMMISSIONING

In collaboration with our highly skilled engineers at KEP, we aspire to deliver exemplary services in startup and commissioning activities. As part of our comprehensive pre-commissioning and commissioning services, we engage in the following activities:

- ◆ Planning and documentation for Pre-commissioning & Commissioning
- ◆ Development of a work breakdown structure and schedule
- ◆ Execution of Pre-commissioning & Commissioning activities
- ◆ Resolution of technical issues



DETAILED ENGINEERING

The essential factor for success in detailed engineering is the implementation of an integrated approach to project coordination, management, and design. This all-encompassing strategy facilitates the creation of a more refined and comprehensive design, ensuring that the project is both cost-effective and executed efficiently.

- ◆ Coordination of Engineering Activities
- ◆ Client Engagement and Interface
- ◆ Continuous Project Monitoring
- ◆ Development of Equipment Layouts
- ◆ Planning Piping Layouts and Isometrics
- ◆ Generation of Bill of Materials
- ◆ Designing Cable and Cable Trays Layouts
- ◆ Architectural Planning for Buildings and Structures
- ◆ Engineering of Equipment Foundations and Pipe Racks
- ◆ Facilitating HAZOP & HAZID Workshops



EVAPORATOR

In the process of optimizing the design of an Industrial Evaporator, a pivotal consideration is the steam economy (kg of liquid evaporated per kilogram of steam used). The most efficient approach to achieving high economies involves the utilization of a multi-effect evaporator. In this system, the vapor from one effect is utilized to heat the feed in the next effect, facilitating boiling at lower pressure. Further efficiency can be achieved through thermo vapor compressor (TVR)

TYPES OF EVAPORATORS

- ◆ Falling Film Evaporator
- ◆ Forced Circulation Evaporator
- ◆ Rising Film Evaporator

FALLING FILM EVAPORATOR

The tubular Falling Film Evaporator is specially designed for processing temperature-sensitive products with low viscosity and a tendency for fouling. The liquid to be concentrated is introduced at the top of the calandria and evenly distributed, forming a thin layer inside the tubes as it descends. External heating initiates the evaporation of the liquid film. The downward flow, initially driven by gravity, is further enhanced by the parallel downward flow of the vapors formed. The residual liquid film and vapor are separated in the lower part of the calandria and in the downstream vapor separator. The entire system operates under vacuum, depending on the specific application.

FEATURES

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

- ◆ Operates under vacuum
- ◆ Low fouling across the tube
- ◆ Easy to initiate, operate, and clean
- ◆ Low pressure drop
- ◆ Requires minimal power
- ◆ Low circulation of Liquid
- ◆ High heat transfer coefficient



FORCED CIRCULATION EVAPORATOR

The forced circulation evaporator is specifically designed for concentrating high-viscosity materials and products with a higher solids content. It is also utilized as an evaporative crystallizer. To achieve the desired concentration, a Falling Film Evaporator is commonly used before the forced circulation evaporator to minimize operating costs. In this type of evaporator, liquid is pumped through the tube side of the calandria at high velocity, preventing precipitation and fouling. The liquid passes through a vapor separator for vapor separation. The concentrated liquid is continuously discharged from the bottom of the vapor separator using a pump.

FEATURES

- ◆ Minimized fouling of tubes
- ◆ Maintenance of high re-circulation inside the tubes by re-circulation pump
- ◆ Suitable for high TDS and viscous liquid concentration
- ◆ Developed to process high scaling and crystallizing liquids
- ◆ Prevention of tube side liquid boiling
- ◆ Minimum deposition of salt or crystalline material along the heating surface
- ◆ Capital cost is high as compare to falling film Evaporator.



RISING FILM EVAPORATOR

A rising film or vertical long tube evaporator functions as a vertical shell and tube heat exchanger. The liquid undergoing evaporation is introduced from the bottom into long tubes and heated by steam condensing on shell side of Heat Exchanger

FEATURES

- ◆ Low residence time, making it suitable for heat-sensitive materials.
- ◆ Relatively high heat transfer coefficient due to partial two-phase flow.
- ◆ Ideal for liquids with high viscosity prone to fouling.
- ◆ Suited for high-temperature applications

AGITATED THIN FILM EVAPORATOR

KEP's Agitated Thin Film Evaporator provides an alternative and economical solution for heat-sensitive products. KEP has innovatively developed agitated thin film evaporation technology, optimizing both capital and operating costs. Agitated Thin Film Evaporators are employed 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
- ◆ High heat transfer coefficient
- ◆ One-shot concentration, no re-circulation required
- ◆ Operates with flexible operating parameters
- ◆ Higher operating vacuums
- ◆ Efficiently processes viscous solutions
- ◆ Less residence time eliminates thermal degradation



CIGAR SYSTEM

The CIGAR

(Condensate, Intermediary Gas and Recirculation) system is an advanced evaporator technology used in industrial processes, primarily for improving the efficiency of Zero Liquid Discharge (ZLD) systems. It plays a crucial role in handling and optimizing the vaporization and recirculation of fluids, particularly within multi-effect evaporator (MEE) setups.

Key Components of CIGAR

Shell Side Fluid

- ◆ The shell side of the CIGAR unit handles ATFD vapor (Agitated Thin Film Dryer vapor).
- ◆ This vapor is collected from other stages of the evaporative process for further treatment.

Tube Side Fluid

- ◆ The tube side carries MEE condensate, which is the condensate formed from vapor during the operation of the Multi-Effect Evaporator.

Vapor Routing

- ◆ Vapors produced in the CIGAR system are directed to the shell side of the MEE (Multi-Effect Evaporator) through a Thermo Vapor Compressor (TVR)
- ◆ The use of TVR allows the recompression and reuse of low-pressure vapors, improving the overall energy efficiency of the evaporative process.

MECHANICAL VAPOR RE-COMPRESSION EVAPORATION (MVRE) SYSTEM

Over the last 10-15 years, mechanical vapor recompression (MVR) has become the preferred system in many industries due to its economy and operational simplicity. In most cases, the need for steam to provide heat for evaporation and cooling water for condensing overhead vapors is nearly eliminated by installing MVRE. MVRE allows for a wide range of turndown possibilities.

The enthalpy of the thermal steam compressed by the compressor is increased, and the vapor is used to heat the circulation liquid in the evaporator. This approach saves fresh steam and reduces energy consumption.

OPERATING PRINCIPLE OF MVRE

The Mechanical Vapor Recompressor is used to increase the pressure of the vapors generated in the Separator. The rise in pressure in the compressor increases the condensation temperature of the water vapor (steam), making it suitable for heating the original mixture in a calandria. The resulting temperature difference, achieved by compressing the water vapor, enables highly efficient heat transfer. As the water vapors condense in the shell side of the calandria, they release latent heat, further heating the original mixture to evaporate the water vapors will compressed to elevate the temperature by mechanical vapor compressor

FEATURES

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



AGITATED THIN FILM DRYER (ATFD)

The Agitated Thin Film Dryer (ATFD) is designed for the evaporation of water/solvents, converting concentrated liquid into dry powder with up to 5% moisture. The choice between recovered solvent or dry product depends on the specific application. The Agitated Thin Film Dryer is an ideal apparatus for the continuous processing of concentrated materials for drying.

ATFD PRINCIPLE

The Agitated Thin Film Dryer (ATFD) is used for the evaporation of water/solvents, transforming concentrated liquid into dry powder or flakes. The decision between recovered solvent or dry product is application-dependent. The Agitated Thin Film Dryer consists of a cylindrical, vertical body with a heating jacket and a rotor inside the shell equipped with rows of pendulum blades throughout its length.

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

FEATURES

- ◆ Single-point solution for drying applications.
- ◆ Compact design.
- ◆ Optimal heat transfer.
- ◆ Operating temperature and pressure flexibility.
- ◆ Unique design for the Liquid distribution

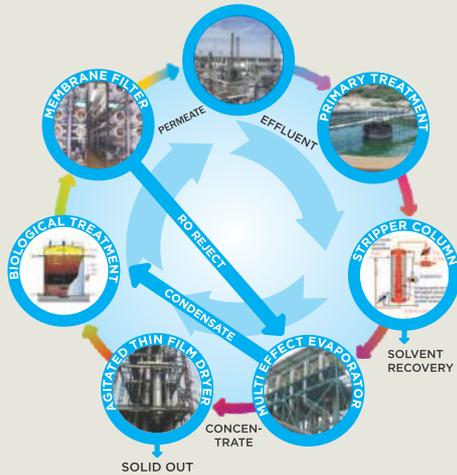
A single-point solution for drying applications that includes concentrations, slurry formation, cake formation, and powder/flake recovery. It eliminates the need for other unit operations like Concentration, Crystallization, Filtration, Centrifuging before drying. It also eliminates the need for Rotary Dryer, Pulverizing, and grinding operations after drying. The compact design reduces space requirements, and low maintenance enhances production efficiency.



ZERO LIQUID DISCHARGE

Zero Liquid Discharge (ZLD) denotes a process that entirely eliminates liquid discharge from a system. The aim of a well-structured ZLD system is to minimize the volume of wastewater and produce a good quality of water which can be reuse and produce a clean stream suitable for reuse within the facility. Interest in Zero Liquid Discharge technology has significantly increased in the industrial manufacturing sector over the past decade.

KEP provides a comprehensive turnkey solution for Zero Liquid Discharge, encompassing processes such as primary treatment, secondary treatment, tertiary treatment, and evaporators and dryers. By tailoring the treatment process to the specific characteristics of the effluent, KEP ensures the recycling of 100% water for use in the manufacturing process.



High TDS & High COD System



Low TDS & Low COD System

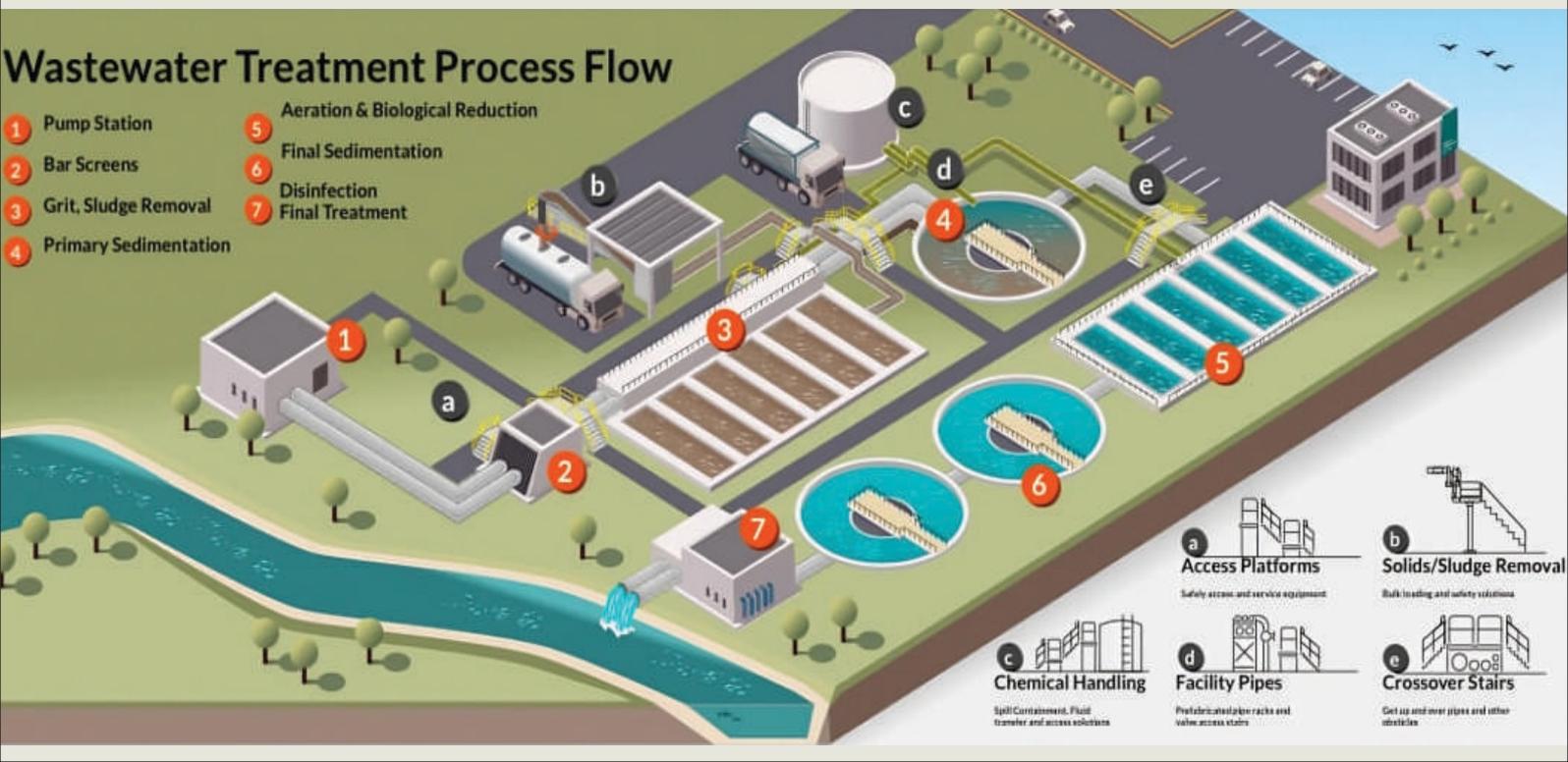
PROCESS EQUIPMENT

KEP distinguishes itself in the design and manufacturing of major industrial equipment, strictly adhering to international standards. Our expertise encompasses the design, engineering, and production of the following equipment:

- ◆ Shell & Tube Heat Exchangers
- ◆ Jacketed & Limped Type Reactors
- ◆ Vessels, Tanks, and Receivers, Storage Tanks & Vessels
- ◆ Blowers & Air Coolers, Fin Type & Corrugated Condensers

FEATURES

- ◆ Designs adhere to TEMA, ASME & GMP standards
- ◆ Versatile selection of construction materials
- ◆ Exceptional durability and reliability
- ◆ Minimal maintenance requirements
- ◆ Integration of an internal quality assurance system
- ◆ Flexible and compact design
- ◆ Highly productive equipment with optimal efficiency





ULTRA FILTRATION

Ultra filtration (UF) is a membrane filtration process where a porous membrane acts as a barrier to separate dissolved and suspended particles from a liquid. The UF process utilizes pressure to drive water or other fluids through a semi-permeable membrane, retaining larger molecules like proteins, suspended solids, and certain organic materials while allowing smaller molecules, such as water and ions, to pass through.

FEATURES

- ◆ High Separation Efficiency
- ◆ Low Energy Requirement
- ◆ Consistent Filtrate Quality
- ◆ Compact Design
- ◆ Low Investment & Maintenance cost
- ◆ Modular and Scalable
- ◆ Chemical-Free Treatment
- ◆ Recovery ratio up to 98%

REVERSE OSMOSIS

Reverse Osmosis (RO) is a water purification process that removes dissolved solutes and impurities from water using a semi-permeable membrane. The process works by applying pressure to overcome the natural osmotic pressure, forcing water to move from a region of high solute concentration to a region of low solute concentration. This effectively separates dissolved salts, organic compounds, and other impurities from the water.

FEATURES

- ◆ Low Operating Cost
- ◆ Low Maintenance
- ◆ Easy to install and service
- ◆ Energy-saving separation technique
- ◆ Eliminates thermal degradation
- ◆ High-Quality Water Recovery
- ◆ Chemical-Free Operation





knowledge engineering planning

AN ISO 9001:2015 CERTIFIED COMPANY

KEP ENGINEERING SERVICES PVT. LTD.

OFFICE & WORK STATION

149/A, Toopran Mandal, Kallakal Village, Medak, Hyderabad-502336, Telangana.

Email: info@kepengg.com | website: www.kepengg.com | Phone No: +91-08454-235236

