

ZERO LIQUID DISCHARGE SOLUTIONS

We Serve, Technical Expertise.. From Concept to Commissioning..



Your trusted turnkey solution provider for advanced evaporation and drying technologies.

SAVE WATER, SAVE ENVIRONMENT, SAVE FUTURE...

Website : www.rototech.co.in, www.rototechengineeringsystems.com, www.rototechmvr.com

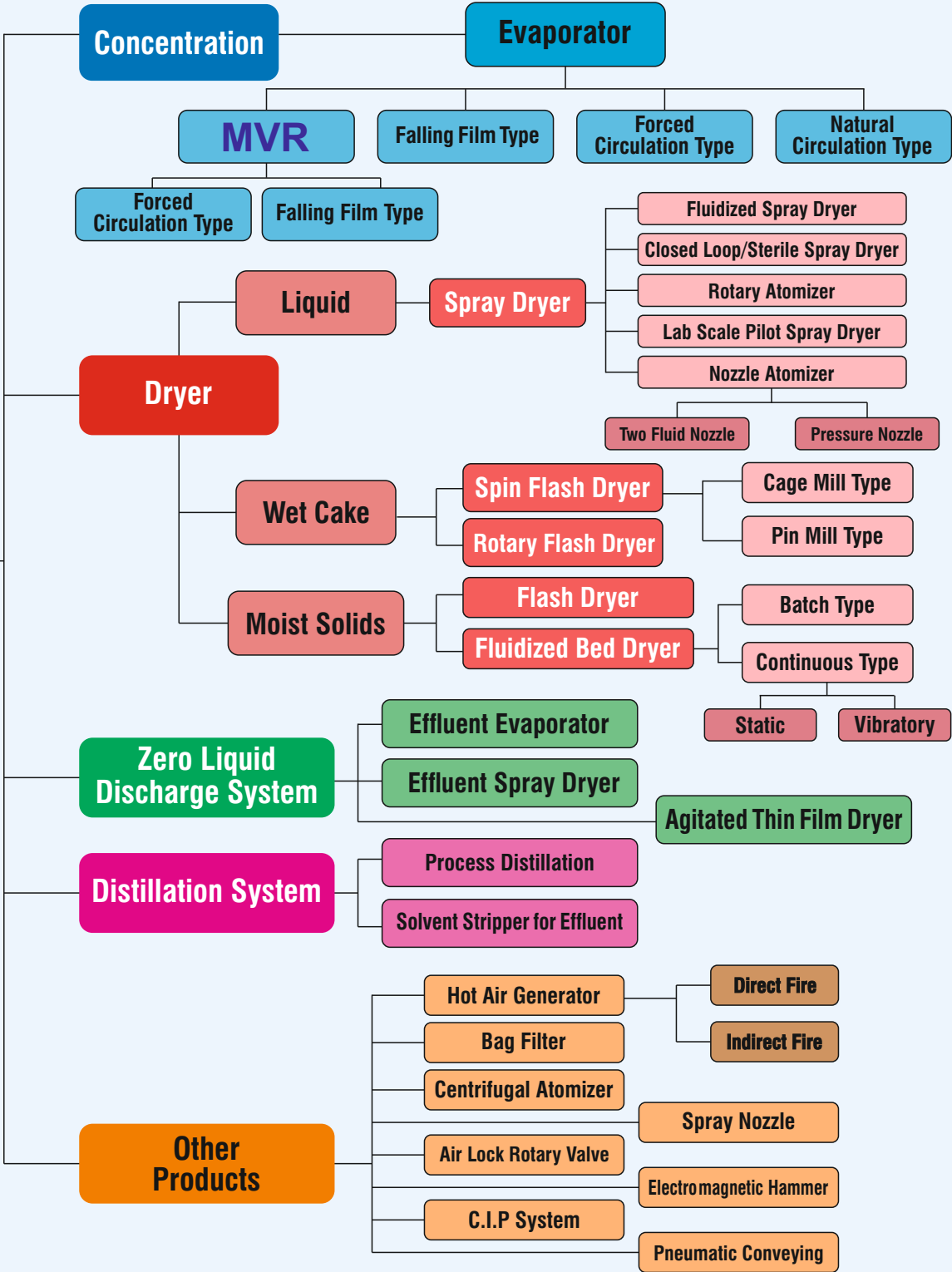
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ROTOTECH ENGINEERING SYSTEM is a technology-driven organization established in 2015, specializing in the development of advanced solutions in the fields of **Wastewater Treatment, Vacuum Systems, Multiple Effect Evaporators (MEE), Mechanical Vapor Recompression Evaporators (MVR),** and more.

We also provide comprehensive technical services, including case studies for specialized water purification or waste treatment processes, as well as basic and detailed engineering for systems such as MEEs, Strippers, Distillation Units, Drying Systems, etc.

Driven by the mission to conserve one of nature’s most precious resources — **water** — we strive to offer **cost-effective and sustainable solutions**, particularly aimed at supporting small-scale industries in becoming more environmentally responsible. Our goal is clear: to maximize water conservation and contribute meaningfully to a more sustainable future.



WATER DISTILLATION
WITHOUT STEAM &
COOLING TOWER

ECONOMICAL EVAPORATION SYSTEM BASED ON MVR TECHNOLOGY

ROTOTECH has developed a **Forced Circulation MVR Evaporator (Eco Pack) System** for wastewater treatment, designed to achieve **Zero Liquid Discharge (ZLD)** and provide an **environmentally friendly solution**.

Why MVR

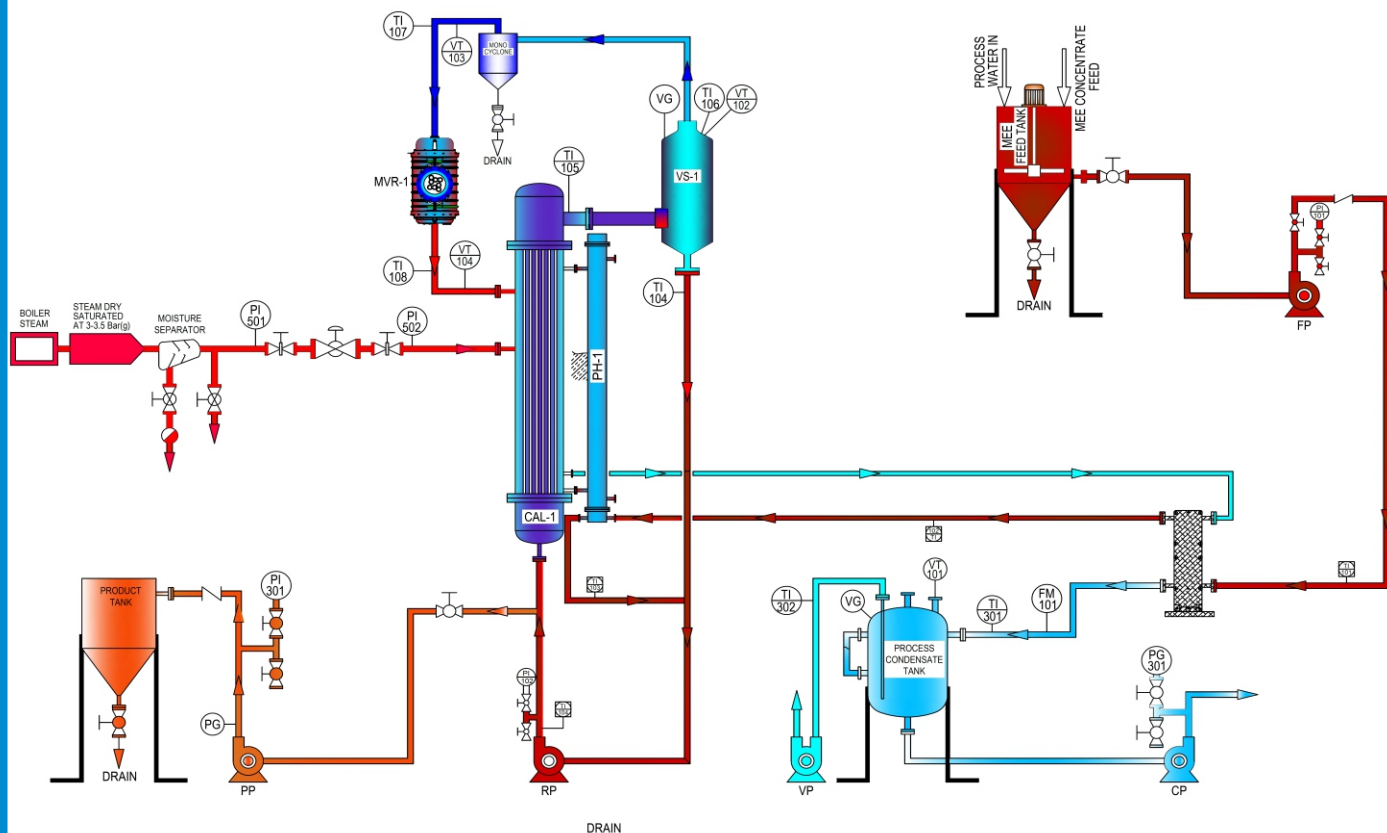
- MVR technology offers a cost-effective alternative to energy-intensive steam evaporation.
- Eliminates boilers and cooling towers, reducing capital and fuel costs.
- Requires less manpower due to minimal auxiliary equipment.
- Runs entirely on clean, affordable, and widely available electricity.
- Compact design reduces installation space requirements.
- Efficiently concentrates various liquids using forced circulation with low temperature difference.
- Simple, fully automated system ensures continuous operation.
- More energy-efficient than multi-effect evaporators, lowering operating costs.

Comparison Between MVR and MVV Technologies

Feature	MVR (Mechanical Vapor Recompression)	MVV (Multi-Effect Vacuum Evaporation)
Energy Source	Electricity	Steam (thermal energy)
Energy Efficiency	Very high (reuses vapor energy)	Moderate (uses steam in multiple stages)
Operating Cost	Low (due to electricity and no steam use)	Higher (steam and utility costs)
Initial Investment	Moderate to high (due to compressor)	Higher (due to multiple effects and auxiliaries)
Boiler Requirement	Not required	Required
Cooling Tower	Not required	Often required
Automation	Fully automated	Semi or fully automated
Footprint (Space Requirement)	Compact	Larger footprint
Maintenance	Low (fewer components)	Higher (more equipment and piping)
Environmental Impact	Lower (no fuel combustion)	Higher (due to fuel-based steam)
Application Suitability	Ideal for continuous, high-load operations	Suitable for batch processes or where steam is available

Why ROTOTECH MVR

- **Prevents Scaling & Choking:** Works on **forced circulation** with high flow/pressure to avoid scaling and choking, ensuring smooth operation.
- **Handles High Concentration:** Efficiently treats waste water with up to **35% (350,000 ppm)** solids content.
- **Low Vibration, Leak-Free Design:** Features a **dynamically balanced rotor** and **advanced sealing system** (lip seal, labyrinth, and double oil seal) to prevent contamination and ensure durability.
- **Energy Efficient & Cost Saving:** High heat transfer rates result in **low specific energy consumption** and **reduced operating costs**.
- **Compact & Skid-Mounted:** **Space-saving** design with no need for boilers or cooling towers.
- **Low Temperature & Pressure Operation:** Minimizes fouling and maintains **product quality**.
- **Fast Execution:** Projects delivered **on schedule** with optimized design.



FLOW DIAGRAM FOR MVR SYSTEM (ECO PACK)

Comparison of MVR with PHE vs. Shell and Tube Heat Exchanger Systems

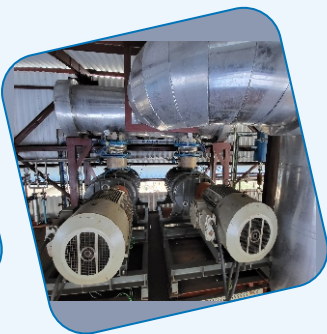
Item	MVR with PHE	MVR with Shell and Tube
Basic Design	Small plate gaps (2mm) lead to high scaling risk.	Larger tube size (32mm OD) reduces scaling.
Concentration	Max concentration: 20% due to space limits.	Max concentration: 35%.
Heat Load for Dryer	The final concentration in PHE is typically 20-22%. Due to this lower concentration, further evaporation to remove water requires a high effluent load on the ATFD (Aided Thermal Fluid Dryer) . This results in higher energy consumption and larger ATFD systems.	With Shell and Tube, the final concentration reaches up to 35%, reducing the hydraulic load on the ATFD. This allows for lower energy consumption, smaller ATFD systems, and more efficient operation, especially during further evaporation.
Salt Separation	Larger ATFD size needed.	Optimized ATFD size.
Scaling	High scaling risk.	Low scaling risk.
Cleaning	Cleaning is challenging due to narrow plate gaps, requiring manual cleaning and disassembly.	Shell and Tube systems allow easy in-place cleaning (CIP) , reducing downtime and maintenance effort.
Maintenance	Maintenance on PHE requires dismantling or cutting the main body, making it time-consuming and costly.	Shell and Tube systems allow for easy maintenance by simply opening the cover flanges, reducing downtime and repair costs.

MECHANICAL VAPOR RECOMPRESSION (MVR)

FORCE CIRCULATION MVR EVAPORATOR SYSTEM

Mechanical Vapor Recompression (MVR) systems recover and reuse energy normally lost through Condensation of vapour in last stage. Because of the ability to use and upgrade wasted energy, **MVR** can significantly increase the efficiency of industrial heating and evaporation processes. They achieve this by recompressing vapour for reuse as a heat source from the same process from which the heat was generated.

Using **mechanical vapor recompression**, a mechanically operated compressor recompresses practically the complete vapour of an evaporation effect from a lower evaporation pressure and temperature level to the heating pressure of the same evaporation effect. In this way, its heat energy is re-used for heating and does not have to be condensed without being used.



APPLICATIONS OF MVR

- Common Effluent Treatment Plants
- Mining, Oil & Gas Industries
- Metals and Minerals Industries
- Breweries Wastewater Recycling
- Textile & Dyeing Industries
- Paper Industries
- Food and Dairy Industries
- Battery Manufacturing Industries
- Desalination
- Automobile Industries
- Semiconductors Industries
- Nuclear Industries
- Petrochemicals & Chemicals Industries
- Spent Wash Treatment for Sugar Industries
- Bulk Drugs, API, Pharmaceuticals & Intermediates Industries





MULTI EFFECT EVAPORATOR (MEE)

Industrial evaporation is employed for the large scale production of concentrated solutions, playing an critical role in the manufacture of a variety of process industries, including chemicals, specialty and fine chemicals, polymers, fertilisers, pulp & paper, pharmaceuticals and foods. Nowadays evaporation is widely used to treat effluents waters and often allowing the recovery of valuable products.

Rototech offers all sizes and all type of evaporators namely falling, forced circulation, scrapped surface, Evaporator & Crystallizer in effective combination with multiple effect evaporation system. Optimum number of effects in combination with falling film and forced circulation provided by **Rototech** is the least operating cost of the capital cost

Rototech offer a system comprising of Thermovapour re-compressor (TVR), Feed pre-heaters, Condensate flashing to reduce the steam consumption & thus achieving higher steam economy.



APPLICATION OF MULTI EFFECT EVAPORATOR

Properly selected & designed scheme, adequate heat transfer area at best operating temperatures ensures the plant performance for longer time and reduces CIP frequency & plant stoppages.

Easy & Quick CIP facility for the plant, Fully automated and manual operation mode as per requirement

- RO Reject.
 - Mix salt Recovery.
 - Pharma Industries.
 - Automobile Industries.
 - Food Industries.
 - Textile Industries.
- Chemicals and Organic Chemicals.
 - Dye Bath Water.
 - Dairy & Food Products.
 - Sugarcane Industries.
 - Tea/Coffee Extract.
 - Steel Industries.

Particulars	Single Effect	Double Effect	Triple Effect	Quadruple Effect
Recommended for Water evaporation capacity in Kg/hr	<500	>500<=1200	>1200<=2500	>2500<=5000
Steam Economy (Kg of Evaporation/Kg of Steam Consumed)	1.2	2.2-2.4	3.1-3.3	4.0-4.2



AGITATED THIN FILM DRYER (ATFD)

Rototech ATFD (Agitated Thin Film Dryer) systems are designed for concentrating, refining, or recovering valuable materials through distillation or similar thermal separation processes. These dryers feature a **tubular heat transfer surface** with an **external heating jacket** and a fast-revolving **inner rotor** equipped with either flexible or rigid wiper elements.

The feed is evenly distributed by the rotor and wipers over the heating surface, forming a thin, uniform film. Heat is transferred to the film as the feed passes through various stages: **liquid slurry**, **wet powder**, and ultimately, the **desired dry powder**.

The vapors generated during the process flow **counter-current** to the thin film, passing through a **cyclone separator** for initial separation. The remaining vapors are then condensed in an **indirect contact condenser**.

Finally, the dry powder is collected in a **receiver** at the bottom of the unit.



STRIPPER COLUMN

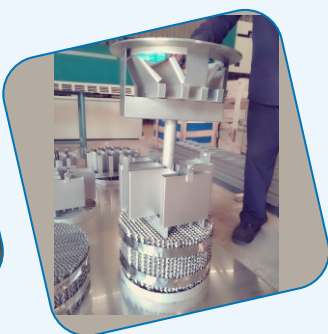
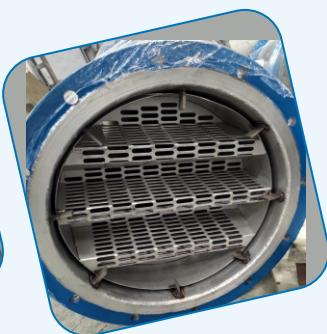
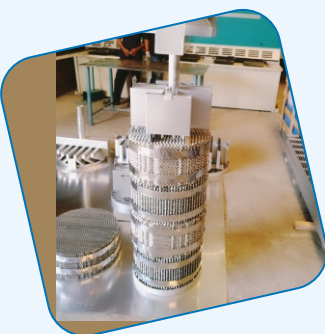
Rototech designs and manufactures highly efficient and low-maintenance **stripper columns**. With years of expertise, **Rototech engineers** have tailored stripper columns for various industries, ensuring optimal performance and reliability.

Stripper columns are specifically designed for **solvent recovery**, where steam is introduced from the bottom. The steam carries volatile substances upwards, allowing them to be removed at the top of the column.

In cases where high **COD streams** need to be evaporated, the use of a stripper column is essential for the effective recovery of **low-boiling substances** from the solvent stream.



STRIPPER PLANT



Distillation Columns:

Technology:

- Continuous and batch
- Single and Multi Stage
- Extractive
- Azeotropic

Column Internals:

- Structured Packing
- Random Packing
- Bubble Cap, Sieve Tray
- Phase Separators
- Distributors & Connectors

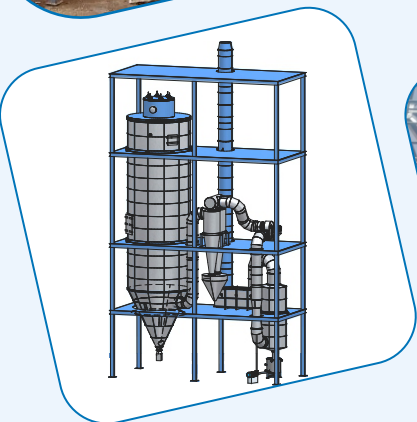


SPRAY DRYING TECHNOLOGY

SPRAY DRYERS

Spray Dryers are a single-step drying process in which liquid feed solutions, emulsions, dispersions, or slurries are directly converted into **free-flowing powders** or **granules**.

These dryers feature **customized designs** with various atomization and flow patterns, allowing them to be tailored to suit specific feed and product characteristics. Spray dryers are versatile and can be used for **multi-product drying**, ensuring flexibility across different applications.



NOZZLE ATOMISATION

Nozzle Atomisation involves atomizing feed solutions or slurries at high pressure through a nozzle, creating fine droplets that are then dried instantaneously. This method offers flexibility with various air flow patterns, allowing the system to be tailored to specific needs.

Nozzle-type spray dryers are ideal for producing materials in **granular, non-dusty forms**, or as **powder**, depending on the requirements. The choice of **co-current, counter-current, or mixed air flow** is selected based on the desired physical properties of the final product, ensuring optimal results.

APPLICATIONS:

- Can dry a **wide range of materials** efficiently.
- Offers **single-fluid** or **two-fluid nozzle** options to suit different requirements.
- **Easy to operate** with a **user-friendly interface**.
- **Compact layout** for space-saving installations.
- Features **automatic nozzle changeover** with **steam/air flushing** for seamless operation.



FLASH DRYER

SWIRL AGITATED (SPIN) FLASH DRYER

SPIN Flash Dryers are ideal for drying **sticky, thixotropic cakes**. In this system, the wet feed is introduced into a **swirling fluidized bed** of material, which is continuously agitated by an **agitator** mounted at the bottom. This agitation ensures that the material remains in motion, providing adequate residence time for effective drying.

The **particle size** of the final product can be precisely controlled, allowing for consistent output. For applications involving solvent-laden cakes, **Closed Loop Designs** are available, where **nitrogen** is used as the heating media to ensure a controlled, safe drying process.

Rototech offers **SPIN Flash Dryers** with feed capacities ranging from **50 kg/hr to 6000 kg/hr**, making it suitable for a wide range of industrial applications.



ROTARY DRYER

Rotary dryers are designed to handle a wide range of materials, especially when the feed has uneven particle size distribution. The dryer consists of a **rotating shell**, through which a stream of hot air passes over the wet feed, effectively drying the material.

Equipped with **spirally mounted lifters**, the dryer ensures uniform distribution of the material, promoting efficient drying. The **rotary dryer** is powered by **gears and tyres**, and is always slightly inclined to facilitate smooth material movement throughout the process.

Rotary dryers are known for their **robust design** and **low maintenance costs**, making them a reliable choice for many industrial drying applications.

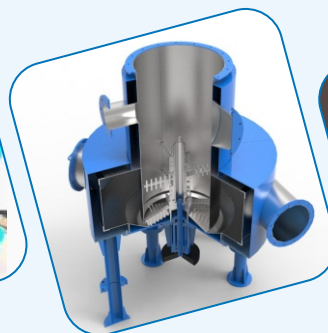
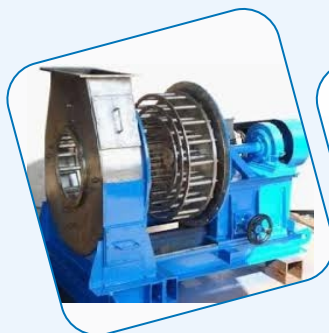


FLASH DRYER

Flash Dryers are designed for drying wet cakes, crystals, or granular products, whether sticky or non-sticky. The system consists of long ducts that carry air at **high velocity**, where the material is pneumatically conveyed and dried simultaneously with hot air.

Advantages:

- **Continuous operation** with **single-step drying** of free-flowing powders and crystals.
- Equipped with **unique feeding devices** to handle **uneven feed moisture**, ensuring consistent drying performance.



HOT AIR GENERATOR



Direct Gas/Light Oil Fired:

A **Direct Fired Air Heater** generates hot air by combusting fuel. The system features a **suitable burner mounting arrangement** and air inlet and outlet nozzles. In this setup, **flue gases mix with process air**, delivering heat directly to the process.

- Max Temperature: 1000°C
- Ideal for high-temperature applications where direct contact with process air is acceptable.

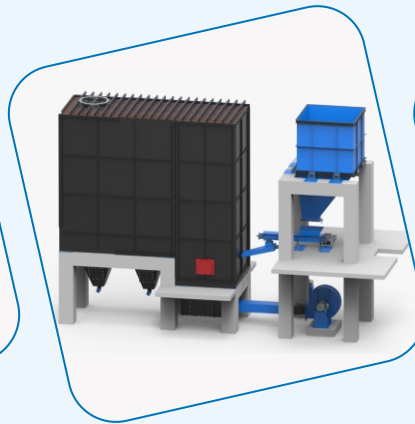
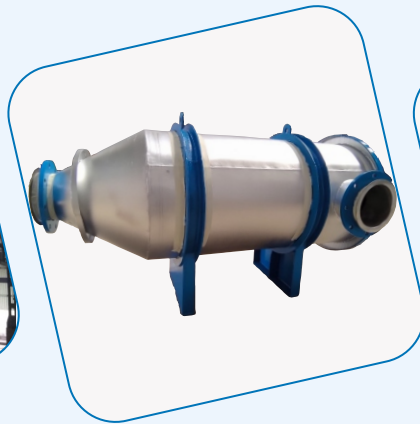
Indirect Gas/Light Oil Fired-

An **Indirect Fired Air Heater** features a **shell-in-shell construction**, where multiple shells are arranged to ensure that **flue gases do not mix with the process air**. This configuration provides a safe, clean heating process. The system includes **cleaning nozzles** and an **explosion/access door** for easy maintenance and cleaning.

- Max Temperature: 320°C
- Suitable for applications requiring separation of flue gases from process air for cleaner operations.

Features:

- **Durable and Compact Construction** for long-lasting performance in tight spaces.
- **Easy Operation** with minimal maintenance requirements for hassle-free use.
- **High Safety Standards** ensuring reliable operation with reduced risk.
- **Optional Recirculation System** to enhance overall thermal efficiency.
- **Fully Automatic Burner and Temperature Control** for precise and consistent performance.
- **Horizontal & Vertical Mounting Options** for versatile installation based on space and process needs.



Solid Fuel Fired HAG

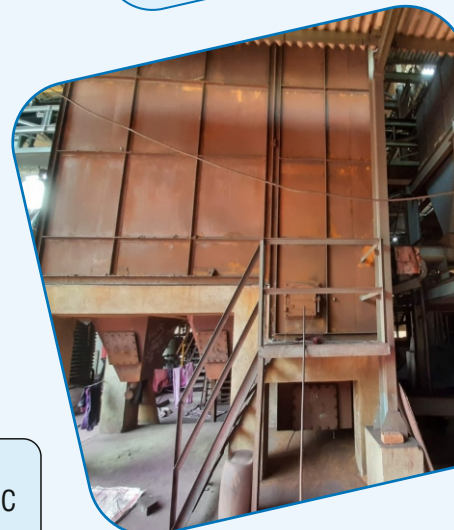
These **hot air generators** are engineered for **maximum efficiency**, capable of utilizing a variety of solid fuels. Designed with **fuel flexibility** in mind, they can burn a wide range of solid fuels. The system operates efficiently at **low and medium process temperatures** without the need for operating pressures.

Feature:

- **High Capacity Heating System** for efficient and reliable performance.
- **Multi-Fuel Flexibility** – Supports wood, coal, briquettes, and any type of solid fuel.
- **Rugged Design** – Built to last with minimal maintenance requirements.
- **User-Friendly Operation** for easy control and management.
- **Fully Automatic Temperature Control** for precise and consistent heating.

Type

Direct Max Temp 550 Deg C
Indirect Max Temp 320 Deg C



CAUSTIC RECOVERY PLANT

Mercerizers in Textile Mills are used to Mercerize Cotton. This Cotton can be Grey/ Desized/ Bleached OR It can be Yarn / Dyed Yarn OR Knit OR Denim Fabric. Depending on the Design of Mercerizer they generate large Amount of Dilute Caustic Liquor of concentration of about 7 be of 5% containing impurities of various natures. if drained to effluent treatment plant it creates substantial loss of caustic soda and also severe problems in meeting the Environmental standards.

95 % RECOVERY OF THE CAUSTIC WHICH WILL ANY HOW GOING IN WASTE AND INCREASE YOUR ETP LOAD.

ADVANTAGE

- No alkaline waste water from mercerizing machine.
- Generation of hot water from the waste energy.
- Generation of soft water, the vapor condensate is slightly alkaline.
- Recovery of surplus lye for wet-on-wet mercerizing.
- No contamination of the heating steam environmental protection.
- Less chemicals for neutralisation are needed.

EFFLUENT TREATMENTS SYSTEMS (ETP)

- **Research, Design and Development** of customized plants, including specific calculations and plant erection.
- Proficiency in all types of **design systems** such as **Extended Aeration, Anaerobic Reactors, Trickling Filters, SAF Systems, SBR, MBBR and MBR Systems.**
- **Testing and Commissioning** of **Mechanical, Electrical, Piping, and Instrumentation** components.
- **Efficiency Improvement** for optimized plant performance.
- **Treatability and Feasibility Studies** to assess and enhance system design.
- **Turnkey Execution** for end-to-end project management.



SEWAGE TREATMENTS SYSTEMS (STP)

- MBR (Membrane Bio Reactor)
- MBBR (Moving Bed Bio Reactor)
- SAFF (Sub merged Aerated fixed film)
- SBR (Sequencing Bio Reactor)
- FBR (Fluidised Aerobic Bio-Reactors)
- MBR (Membrane Bio Rector) and so on based on requirements



ELECTROMAGNETIC HAMMER

FEATURES

- ⑩ Maintenance of Our Electromagnetic Hammer is Very Low; where as others is very costly.
- ⑩ Installation cost of our Hammer is very low compared to other hammering systems.
- ⑩ In operating system no man power is required.
- ⑩ Our Hammer can be serviced without any prior maintenance even after long shut down.

APPLICATION

Our hammer is generally used in:

- ⑩ Ceramic;
- ⑩ Chemical;
- ⑩ Cement;
- ⑩ Dairy Products;
- ⑩ Pharmaceutical

TECHNICAL SPECIFICATION

DATA / MODEL	PEC / EH-25	PEC / EH-50	PEC / EH-75
RATED VOLTAGE	220V, AC, 50Hz	400V, AC, 50Hz	400V, AC, 50Hz
OPERATING VOLTAGE RANGE	220 V	380 V - 460 V	380 V - 460 V
RATED PULSE CURRENT	1 Amp	4.2 Amp	6 Amp
POWER @10 STROKES / MIN.	0.002 UNITS / HR	0.003 UNITS / HR	0.045 UNITS / HR
IMPACT FORCE	30 KG	70 KG	125 KG
WEIGHT	9 KG	15 KG	20 KG

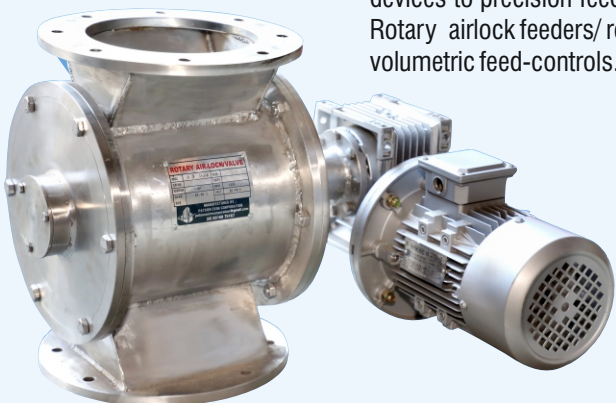


ROTARY VALVE

The basic use of the rotary airlock feeder is as an airlock transition point, sealing pressurized systems against loss of air or gas while maintaining a flow of material between components with different pressure and suitable for air lock applications ranging from gravity discharge of filters, rotary valves, cyclone dust collectors, and rotary airlock storage devices to precision feeders for dilute phase and continuous dense phase pneumatic convey systems. Rotary Valve Rotary airlock feeders/ rotary airlock valves are used in pneumatic conveying systems, dust control equipment, and as volumetric feed-controls.

The Benefits of our Rotary Airlock Valves and Feeders:

- Our rotary airlock valves are used in a wide range of applications where there is need to minimize system air loss while transferring material between vessels with differing pressures.
- They are used as feeder valves to meter the flow of material between vessels with equivalent pressures.
- You will also find them doing double duty in systems where there is a need to minimize system air or gas loss while regulating the flow of material between vessels with differing pressures.



POLLUTION CONTROL SYSTEM

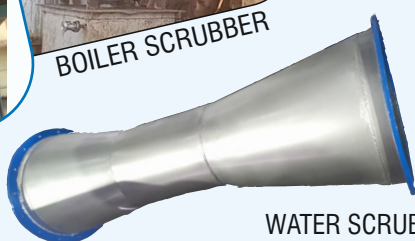
At **Rototech**, we are dedicated to upholding **moral and environmental** values by providing industries with **modern, eco-friendly technologies**. We manufacture and supply a range of pollution control equipment, including **Multi-Cyclone Dust Collectors**, **Bag Filters**, and **Electrostatic Precipitators**, designed to meet **Pollution Control Board standards** for **SPM levels** and **temperature regulation**, ensuring effective environmental compliance.



BAG FILTER / DUST COLLECTOR



BOILER SCRUBBER

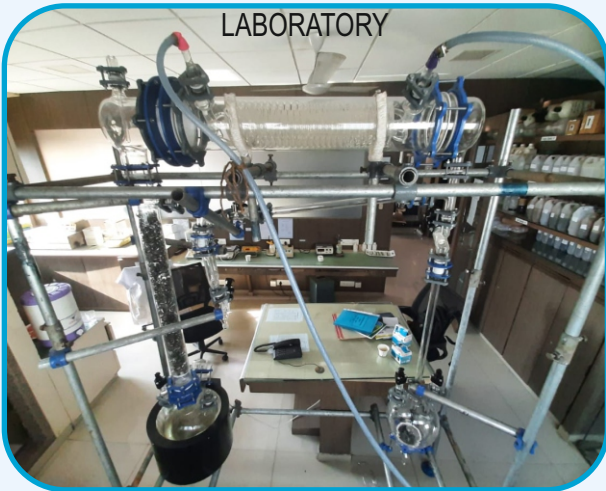


WATER SCRUBBER



MANUFACTURING FACILITY

Rototech Engineering System having working area of 1500m² with all Morden manufacturing facility.



APPLICATIONS



FOOD &
BEVERAGES



PESTICIDE



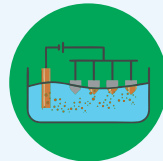
PHARMACEUTICALS



METAL
INDUSTRY



CHEMICALS



ELECTRO-PLATING
INDUSTRY



PRINTING &
DYEING

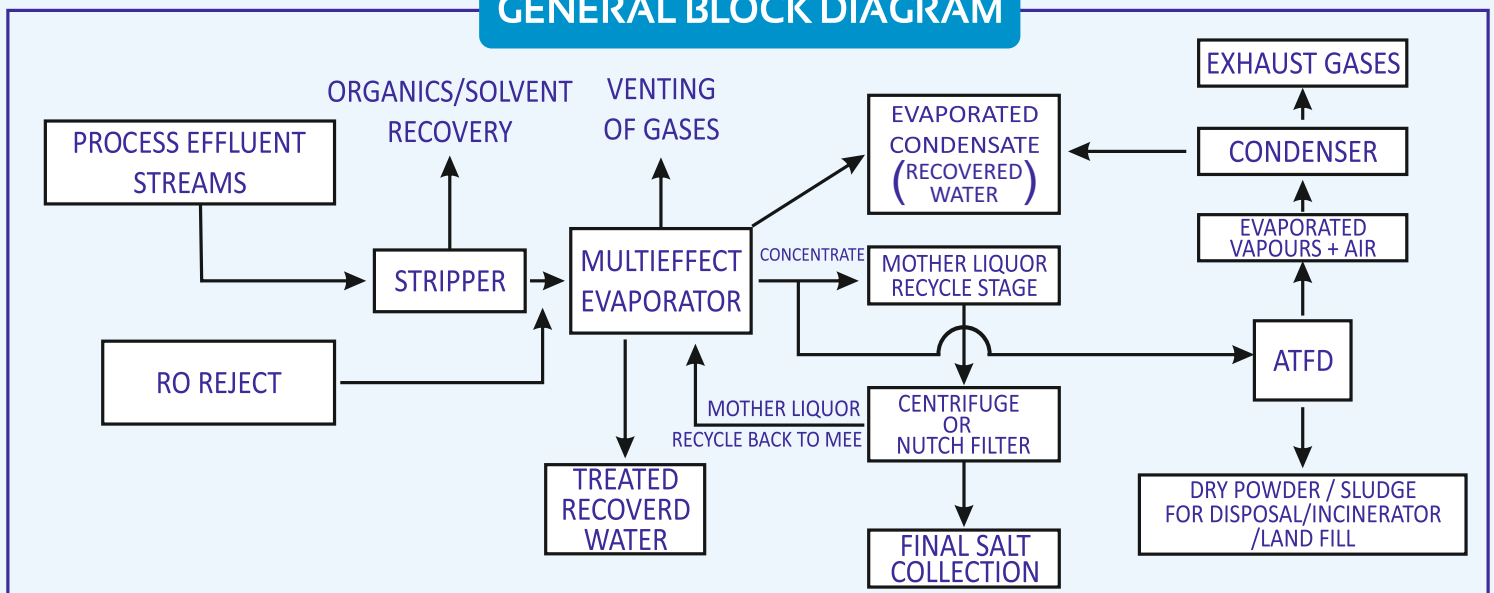
OUR CLIENTELE

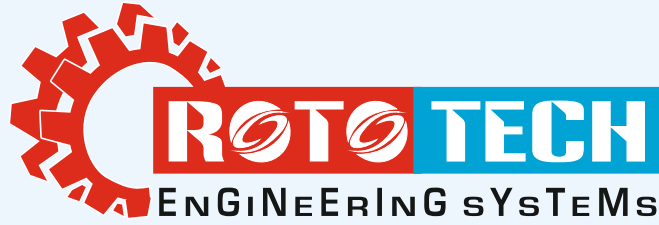


AURO
Laboratories Limited



GENERAL BLOCK DIAGRAM





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We Support:

