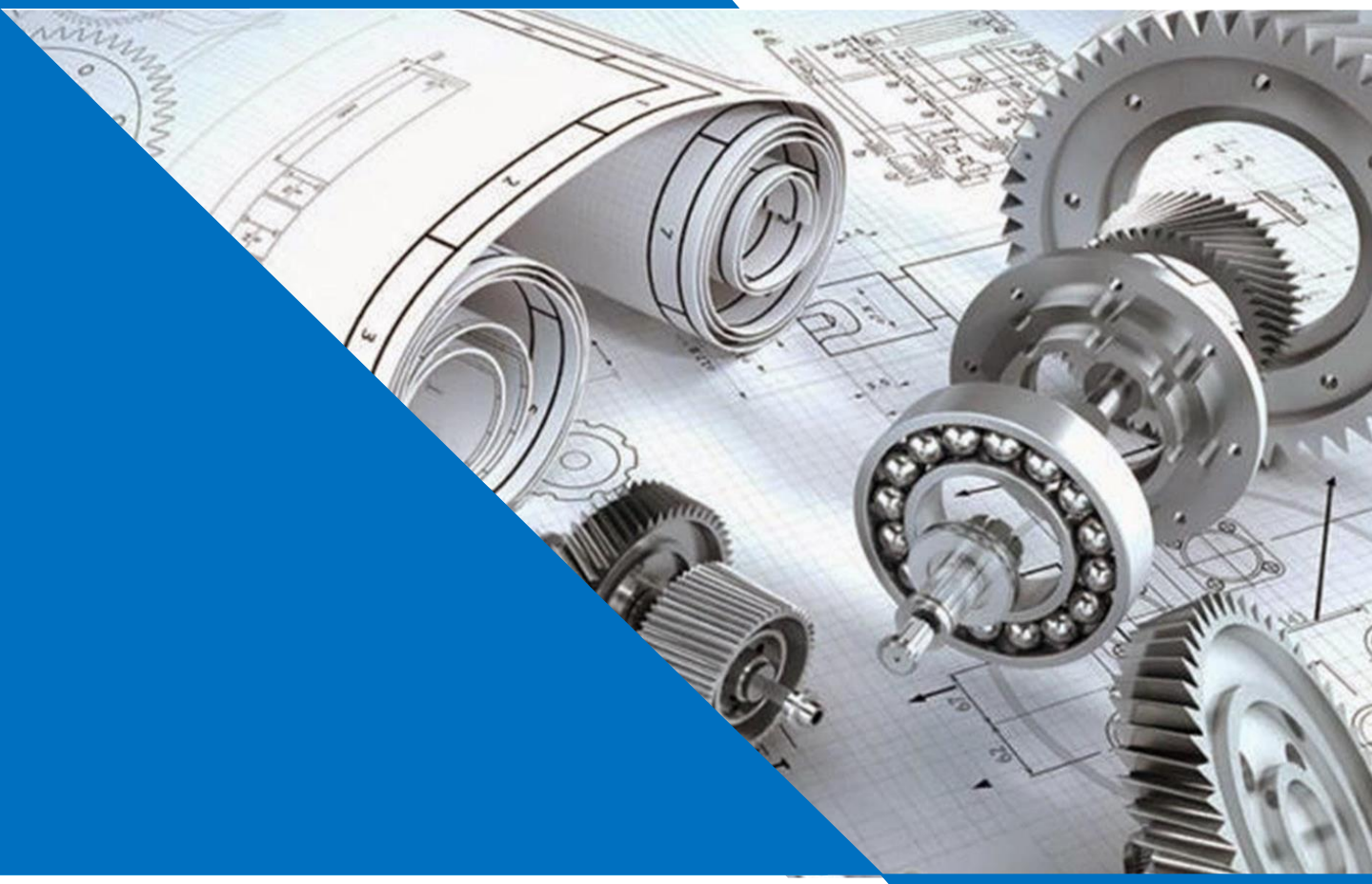
balief CORPORATION

An ISO 9001:2015 Certified Company



"WE ARE COMMITTED TO CUSTOMER SATISFACTION"

www.baliefcorporation.com

ABOUT BALIEF CORPORATION

Balief Corporation, an ISO 9001:2015 certified company, specializes in the manufacturing of special purpose machines and operates within the realm of research and development (R&D). Balief is dedicated to addressing distinctive and specialized needs in the areas of Thermal engineering, HVAC, water & air treatment, and laboratory equipment. Our comprehensive suite of services includes design, R&D, and manufacturing solutions tailored to meet the unique requirements that are often difficult to fulfill with standard market offerings. Balief boasts a diverse product portfolio and actively engages in R&D efforts, resulting in the submission of **18 patents** to date.

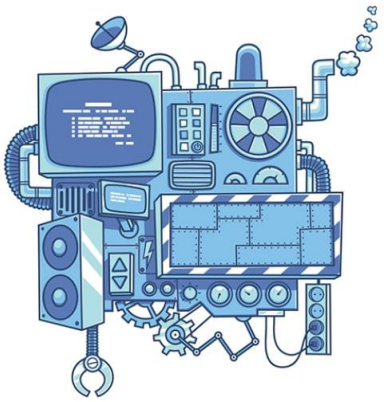
At Balief Corporation, we are unwavering in our commitment to delivering cost-effective solutions and ensuring timely, high-quality services. We distinguish ourselves by possessing a deep understanding of the technical and practical demands of our customers, allowing us to provide tailored solutions for every unique need, rather than adopting a one-size-fits-all approach.

Our aim is to enhance the quality of products in our society through innovative ideas.

To be the most trusted and respected organization that provides innovative solutions

Strives towards bringing best results for customers with constant discussion, research, feasibility analysis and clarity of project concept

OUR SERVICES



Special Purpose Machine (SPM) Manufacturing

Research & Development

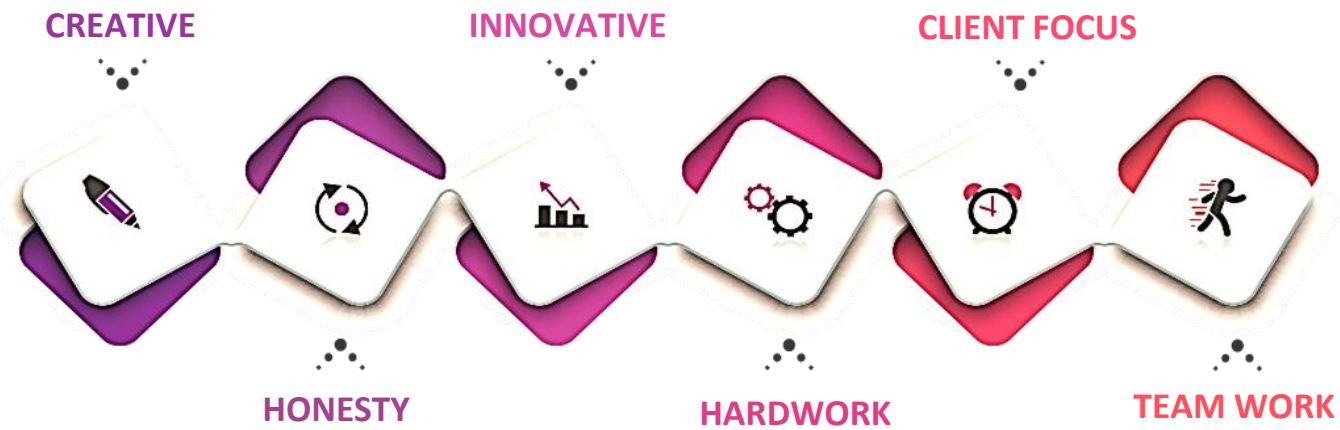
START UP Support

Customize Experimental Set Up

New Product Design & Development

Refrigeration Machine Manufacturing

OUR BEST QUALITIES



INDUSTRIAL PRODUCTS

HEAT PUMP FOR WATER AND AIR HEATING

Balief Corporation provides a superior alternative to traditional water heating systems. It offers increased reliability and efficiency while promoting environmental sustainability through renewable energy utilization. By merging renewable sources with vapor compression technology, it delivers significant cost savings and a greener water heating solution. This reduced reliance on fossil fuels also helps achieve cleaner air and meet CO_2 emission goals.

Heat Pump with separate storage Tank

Heat Pump with Inbuilt Storage Tank

Heat Pump for Air Heating

HEAT PUMP ASSISTED FOOD DRYER

Heat pump (HP) dryers are gaining popularity in the food industry due to their energy efficiency, low operating costs, high coefficient of performance (COP), and ability to dry food at low temperatures, minimizing quality loss. They offer flexibility in temperature and humidity control, making them ideal for drying heat-sensitive materials like vitamins.

Heat Pump Assisted Food Dryer with Separate Drying Chamber

Heat Pump Assisted Food Dryer with Inbuilt Drying Chamber

WATER AND AIR CHILLER

Balief offers versatile and efficient chillers for diverse cooling needs. These chillers work with different cooling media, such as water, glycol, air, and other coolants. They are modular and easily installed in a plug-and-play fashion, requiring only a plumbing connection to existing systems. Our systems prioritize maximum operating efficiency for their specific applications.

Water Chiller

Air Chiller

Air Cooler for the Food Industry

Mini Air Cooler

Mini Water/ Chemical Chiller

EFFLUENT TREATMENT PLANT (ETP) & INDUSTRIAL SCRUBBER

Balief Corporation conducts thorough analysis of effluent samples to assess their composition and nature. We perform treatability studies using various methods to determine their feasibility and then design treatment processes tailored to meet specific requirements. Our Effluent Treatment Plant (ETP) primarily operates on physio-chemical treatment, followed by polishing treatments including sand filtration, activated charcoal treatment (adsorption), ozonisation (chemical oxidation), ultrafiltration (UF), reverse osmosis (RO), and potential evaporation if necessary.

ETP (Onsite installation)

ETP (Plug & play type)

Industrial Scrubber:

Industrial scrubber systems are employed to remove harmful gases and particles from process emissions. They utilize various technologies to cleanse exhaust before it's discharged into the atmosphere. Scrubbers are vital for different combustion methods, aiding businesses in adhering to compliance codes and environmental regulations for safety.

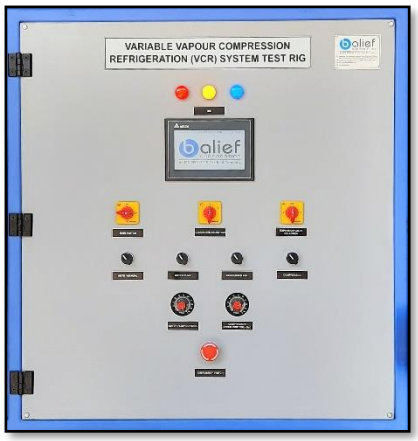
❑ Typical Industries :

Chemical, Pharmaceutical, Automobiles, Paint, Textile, Sugar, Ceramic etc…

RESEARCH PROJECTS

VARIABLE VAPOUR COMPRESSION REFRIGERATION (VCR) SYSTEM

This variable VCR system is designed to be "variable" in true sense. It consists of a variable speed compressor, two options for cooling load, two types of condenser and three types of expansion device. **This system gives a flexibility of operating 12 different VCR systems in a single setup.** It helps is analyzing the VCR system in every possible configuration. Each of this configuration can be operated at the desired compressor speed. Data acquisition and controlling is made seamless with the use of HMI. The entire operation of the VCR system is automated with PLC controls and data logging via USB. The system can also be remotely operated by an Ethernet connection & Wi-fi.



Technological innovations:

- Fully automatic HMI controlled system
- Remotely Operated using Wi-Fi is available
- Many combination can select for operation
- Also manual mode operation of the system can possible
- Variable range of the compressor speed

COMBINE SOLID-LIQUID DESICCANT WITH VARIABLE VCR SYSTEM

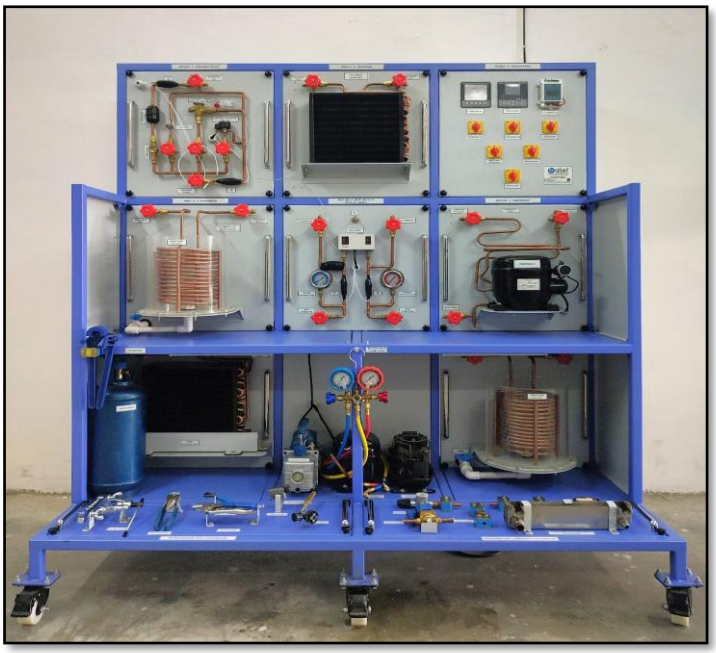
This system is a test rig to study the entire operation of an AHU or domestic air conditioning systems. It consists of a variable speed compressor, a humidifier with two options for desiccant system to create desired ambient conditions. This system gives flexibility to operate 4 different features of an AHU along with variable VCR system in a single setup. This gives a possibility of studying 19 combinations of psychrometric processes. Each of this configuration can be operated at the desired compressor speed. Data acquisition and controlling is made seamless with the use of HMI. The entire operation of the system is automated with PLC controls and data logging via USB. The system can also be remotely operated by an Ethernet connection and also remotely operated by wi-fi.

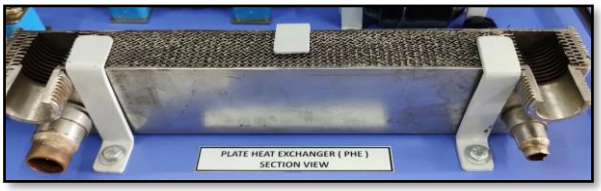
Technological innovations:

- Fully automatic HMI controlled system
- Can meet variable load demand
- Remotely Operated using Wi-Fi is available
- Flexibility to choose one or more AHU processes in combination
- Variable range of the compressor speed

REFRIGERATION SYSTEM WITH INTER-CHANGEABLE MODULES

This training equipment is designed as an educational system with interchangeable modules (modules are as listed below) , offering straightforward and comprehensible experiments. Its primary purpose is to provide a fundamental introduction to refrigeration components, tools, and systems, as well as an understanding of how these systems are constructed and operated.





- **Module 1:** Air Cooled Condenser (Fin & Tube)
- **Module 2:** Water Cooled Condenser (Submerged coil)
- **Module 3:** Sight glass with filter/dryer
- **Module 4:** Pressure Gauges and HP-LP Switch
- **Module 5:** Compressor
- **Module 6:** Fin & Tube evaporator
- **Module 7:** Submerged Coil based evaporator
- **Module 8:** Data Display and Control Panel
- **Module 9:** Different expansion devices (Capillary, Thermostatic, expansion valve , and Electronic Expansion Valve)

AUTOMATIC CO_2 CAPTURE PILOT PLANT

This pilot plant assesses the sustainability of absorption/desorption technology for capturing CO2 from industrial waste incineration. Its goal is to examine how synthetic flue gas interacts with solvents and impacts process performance. Laboratory experiments also explore the influence of specific degradation products on the process. The setup focuses on gas absorption and desorption, creating varied inlet conditions for studying different solvent performance. Designed for mobility, the pilot plant includes an automatic control panel with an HMI for flexible testing in batch or continuous modes, recording data to analyze solvent performance under different conditions.

HMI ensures effortless data acquisition and control, with the added convenience of operation data logging through USB. Additionally, the plant can be remotely managed using both Ethernet and Wi-Fi connectivity.





MULTI PUMP TEST RIG

This test rig is designed to facilitate the comparative analysis of various pump sets, specifically focusing on variations in pressure and flow. Additionally, it enables the investigation of how different impellers of centrifugal pump impact factors such as torque, flow rate, and pressure within the system.

Technological innovations:

- The inclusion of an HMI-PLC based system renders the entire system fully automated in every aspect.
- The globe valve utilized in this setup is of the proportional type, allowing for precise adjustments in its opening or closing .
- Parameters data are automatically recorded and stored on a USB drive via the integrated USB port. system is also Operated by Ethernet as well as Wi-Fi.

MULTI HEAT EXCHANGER TEST RIG

A multi-heat exchanger experimental setup has been established to conduct comparative tests on various types of heat exchangers by varying different parameters and operating conditions.

This setup allows for the systematic evaluation and comparison of the performance of these heat exchangers under varying conditions, making it a valuable tool for research and testing purposes.

Technological innovations:

- The system is designed to accommodate testing of various External heat exchangers simply by connecting to the available inlet and outlet ports.
- It offers complete flexibility in altering water flow by straightforwardly selecting the appropriate valves for the desired flow path.
- Each heat exchanger within the system is equipped with individual inlet and outlet sensors to enable the detailed study of their performance.
- the system incorporates a Variable Frequency Drive (VFD) to precisely adjust the pump speed, enhancing control and accuracy during testing and experimentation.

LAB SKID SYSTEM FOR SPIRAL WOUND NF/RO MEMBRANE TESTING UNIT

This is specialized laboratory setup designed for conducting experiments and tests on spiral-wound nanofiltration and reverse osmosis membranes. It allows researchers and scientists to evaluate the performance and characteristics of these membranes for various applications, such as water purification and desalination.

NF/RO Testing Unit

Flat Sheet Test rig

ADSORPTION UNIT FOR EFFLUENT CHARACTERIZATION AND TREATMENT

Adsorption is a wastewater purification method used to eliminate various substances from industrial wastewater. It's primarily used for removing non-degradable organic compounds in groundwater, drinking water production, process water, or as a final step after biological water treatment.

BOD,COD,TSS Tester

Adsorption Plant

Mini Adsorption Test rig

HYDROLOGICAL INVESTIGATIONS (RIVER FLOW & RAIN FALL) TEST RIG

The Mobile Bed Flow Visualization and Rainfall Hydrographs unit is a versatile tool for showcasing key processes in hydrology and fluvial geomorphology.

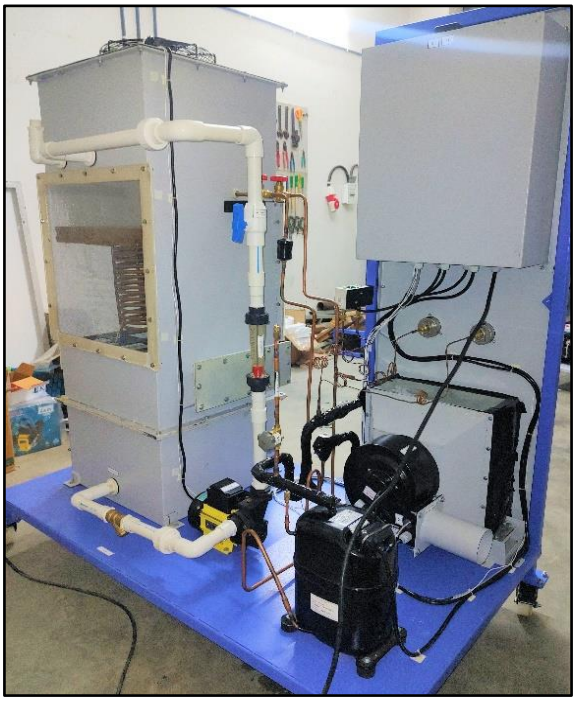
It offers insights into the generation of rainfall hydrographs in catchment areas with different permeability levels, the formation and features of rivers, the consequences of sediment transport, and the abstraction of groundwater through drains, with or without surface recharge from rainfall.

Technological innovations:

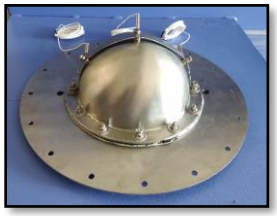
- This unit allows demonstrating on a small scale, the hydrological principles of ground water flow and the applications of these principles in some engineering constructions. Moreover, it allows to study the use of drains for water abstraction, de-watering and drainage of lakes, and demonstration of flood risks linked to land drainage works.

NANO-PARTICLE BASED VCR SYETM

The “Nano particles based Vapour compression refrigeration (VCR) system” improves the heat transfer characteristics of the vapour compression refrigeration cycle using Nano refrigerant (R134a and Al2O3).



STEFAN-BOLTZMANN TEST RIG



This testing apparatus comprises a semi-sphere enveloped by hot water, sourced from a well-insulated water-heating tank. When the test specimen is inserted at the center of the semi-sphere, heat is transferred to the disc through radiation, causing its temperature to gradually increase. The rate of temperature rise is monitored and recorded, and all temperature data, as indicated in the schematic diagram, is displayed on a temperature scanner.

VACUUM CURING OVEN

This vacuum curing oven uniformly maintain the temperature of the chamber and makes perfect environment for the curing. The primary purpose of vacuum curing is to remove moisture or other volatile substances from materials without subjecting them to high temperatures, which can cause damage or undesirable chemical reactions. They find applications where precise control over curing or drying is crucial to the quality and performance of the final product.

Technological innovations:

- Maintain uniform temperature of the curing chamber.
- Sight glass provided to see Object while system is in operation.

HDH & FLASH CHAMBER DESALINATION SYSTEM

Humidification-Dehumidification (HDH) is a method for turning salty or brackish water into fresh water. It works by making air humid (moist) to collect water vapor and then cooling it to turn that vapor into fresh water droplets

HDH & Flash chamber Combine

HDH System

GEOTHERMAL BASED SYSTEMS

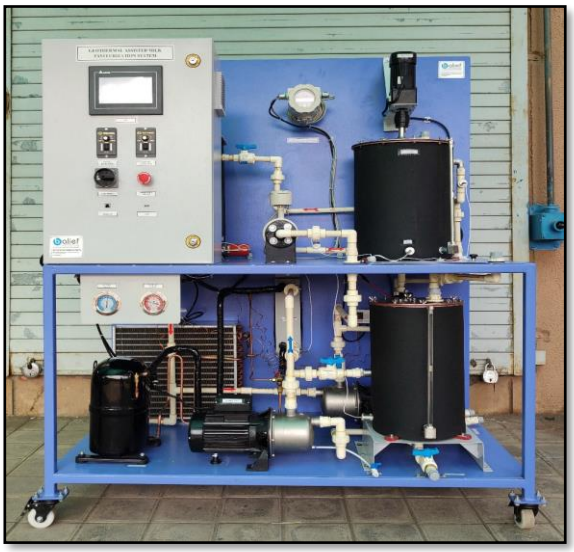
GEOTHERMAL ENERGY ASSISTED FOOD DRYER

The Geothermal food dryer uses geothermal hot water energy to remove moisture from food to aid in its preservation.

GEOTHERMAL WATER DISALINATION SYSTEM

The Geothermal water desalination systems produce safe drinking water from geothermal water through water treatment; suitable for any kind of environment in which safe and consistent water quality is essential.

GEOTHERMAL ENERGY BASED MILK PASTEURIZATION SYSTEM



This System is fully automatic HMI & PLC based System with touchscreen. It has Two tanks for milk : one for heating and another for cooling. Heating is done by hot water circulation in jacket of hot tank and cooling is provide by Plate Heat Exchanger (PHE) of VCR cycle. Hot tank has the stirrer with low rpm motor assembly for continuous mixing process. This motor has regulator in the control panel for the speed regulation

RECIPROCATING PUMP TEST RIG

A reciprocating pump test rig is a specialized apparatus or setup used in engineering and fluid mechanics laboratories to test and evaluate the performance of reciprocating pumps. Reciprocating pumps are a type of positive displacement pump that operate by moving a piston or plunger back and forth within a cylinder to displace and transfer fluid.

VCR CYCLE BASED MILK PASTEURIZATION

This setup is primarily employed to rapidly lower the temperature of milk to 5°C or below, effectively inhibiting the growth of microorganisms for a temporary period.

CHEMICAL REACTOR FOR LABORATORIES

High, low and vacuum pressure chemical reactors design and fabrication with SS316L based on customer requirements. Swagelok and competitive brands components used for the process execution. Also used in setup for CO2, N2O absorption and desorption experiment at laboratory scale, pilot scale. Measuring instruments are Honeywell and competitive brands. Reactor for catalyst reaction is also available.

PLANETARY BALL MILL

Amaze make Planetary Ball Mill has four grinding tanks installed on one turntable. When the turntables rotate, the tank axis make planetary movement, the ball and samples inside the tanks are impacted strongly in high speed movement, and samples are eventually ground into powder. Various kind of different materials can be ground by the mill with dry or wet method. Minimum granularity of ground powder can be as small as 0.1um.

BERNOULLI'S APPARATUS

Bernoulli's apparatus is an experimental device used in fluid mechanics.

- Venturi length: 450+ mm
- Diameter: 2 inch
- piezometer tubes: 9
- Supply water tank: 40 Liters
- Water pump: 0.5 hp

The objective of this experiment is to investigate the validity of the Bernoulli equation when it is applied to a steady flow of water through a tapered duct.

MULTI-PURPOSE CONTROL PANEL

A multipurpose control panel is designed to be used for multiple research projects for data logging. Ex. Temperature, Energy, Pressure, Flow. It can read the output of 4-20 mA, 0-10 V, Modbus, and Pt-100. It is handy for easy movement and can be integrated with IOT and can be used for multiple research projects simultaneously.

WATER CAVITATION TEST RIG

The test rig comprises the following objectives

1. Investigation of cavitation processes demonstrated through a Venturi nozzle.
2. Measurement of differential pressure using orifice plates.
3. Analysis of flow in both series and parallel configurations using Venturi nozzles and orifice plates.

SOLAR TREE

A Solar Power Tree is essentially a structure resembling a tree, constructed with mild steel branches to support photovoltaic panels.

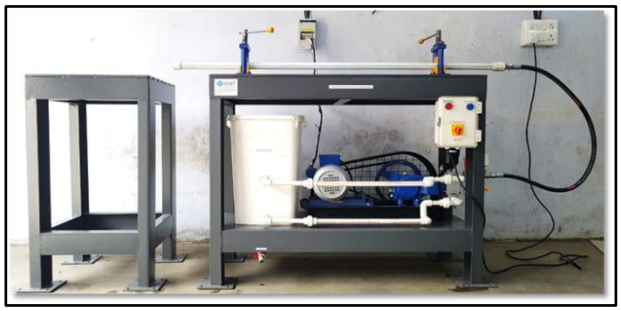
SOLAR STILL (FLAT TYPE AND STEPPED TYPE)

A Solar Still is a valuable device for distilling brackish water to make it suitable for drinking. It's a straight Forward method of water distillation harnessing the sun's heat.

Technological innovations:

- From comparison, it can be seen that the productivity of the stepped solar still is higher than that of the conventional.
- PCM can be filled inside the steps of the stepped solar still to improve its performance.

OTHER PROJECTS

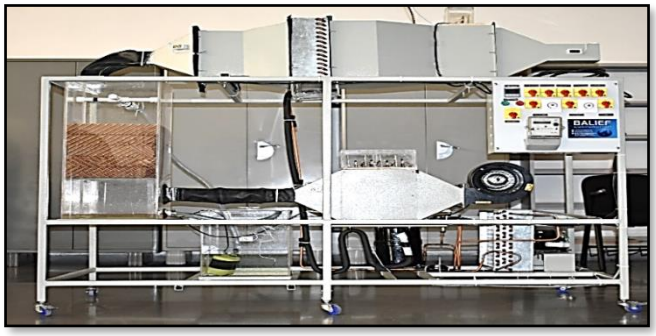


Vibration Based Crack Detection in Pipe Test Rig

High Speed Blender For Biodiesel

Atmospheric Water Generator (AWG)

Propeller Type Water Current Meter



Liquid Desiccant Based VCR System

Customized Magnetic Stirrer

Solar Assisted Hybrid Heat Pump For Food Drying

Flash Chamber Based Water Desalination System

OTHER PROJECTS

Vapour Absorption Refrigeration (VAR) System Test Rig

Desiccant Based Evaporative Cooling System

Humidification & Dehumidification (HDH) Water Desalination System

Vacuum Bagging System For Composite Material

Solar Air Heater

Impact Testing Machine

RESEARCH CLIENTS

ISHRAE

SAICAD Centre
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INDUSTRIAL CLIENTS

MechCiv® Group of Companies

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INNOSOL™

SALTECH DESIGN LABS

Spectrum

FLYING Eagle SINCE 1974

EAGLE® SCALE MANUFACTURING WORKS

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