

GEAR UP FUTURE



DESIGN

ENGINEERING

MANUFACTURING

COMMISSIONING



Rational Customized Catalytic Reactor Systems :

R L Solutions LLP (RLS) is a team of dedicated individuals with more than 15 years of the hands on experience in the field of the lab scale as well as pilot scale customized catalytic reactor systems.

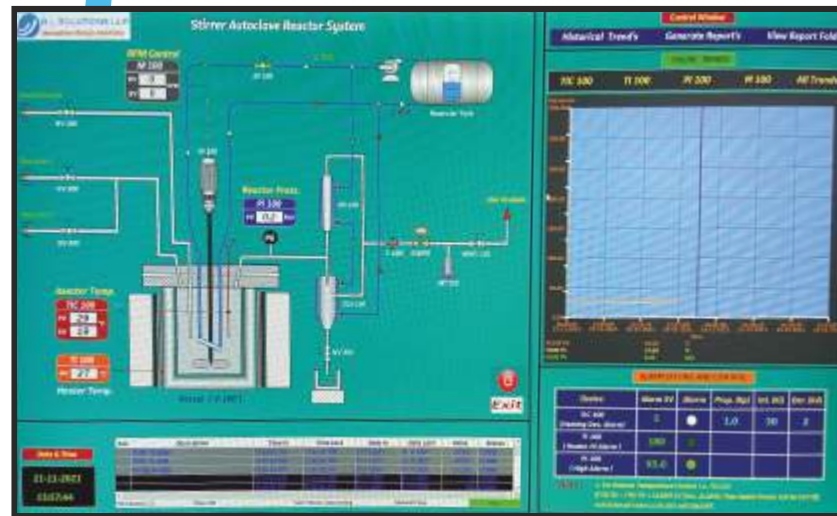
We work responsibly and believe in quality work for building a trust on RLS. Our mission to become a trusted supplier/partner with end-users for such niche area of working.

General Specification :

- Type of reactors : Bench Top mounted reactor with oven or without, Floor Mounted reactor
- Mode of operation : Upflow/Downflow/Series/Parallel
- Reactant gas flow range is 1 ml/min to 50000 ml/min
- Liquid flow ranges from 0.01 mL/min to 100 mL/min
- Reactor volume capacity ranging from 1 cc upto 500cc volume
- Maximum Allowable Working Pressure 300 bar@ amb temp
- Reactor Tube MOC : SS316/316L/304, HC276, INC625, INC800 & INC800HT
- Custom Process Control & Data Acquisition Systems



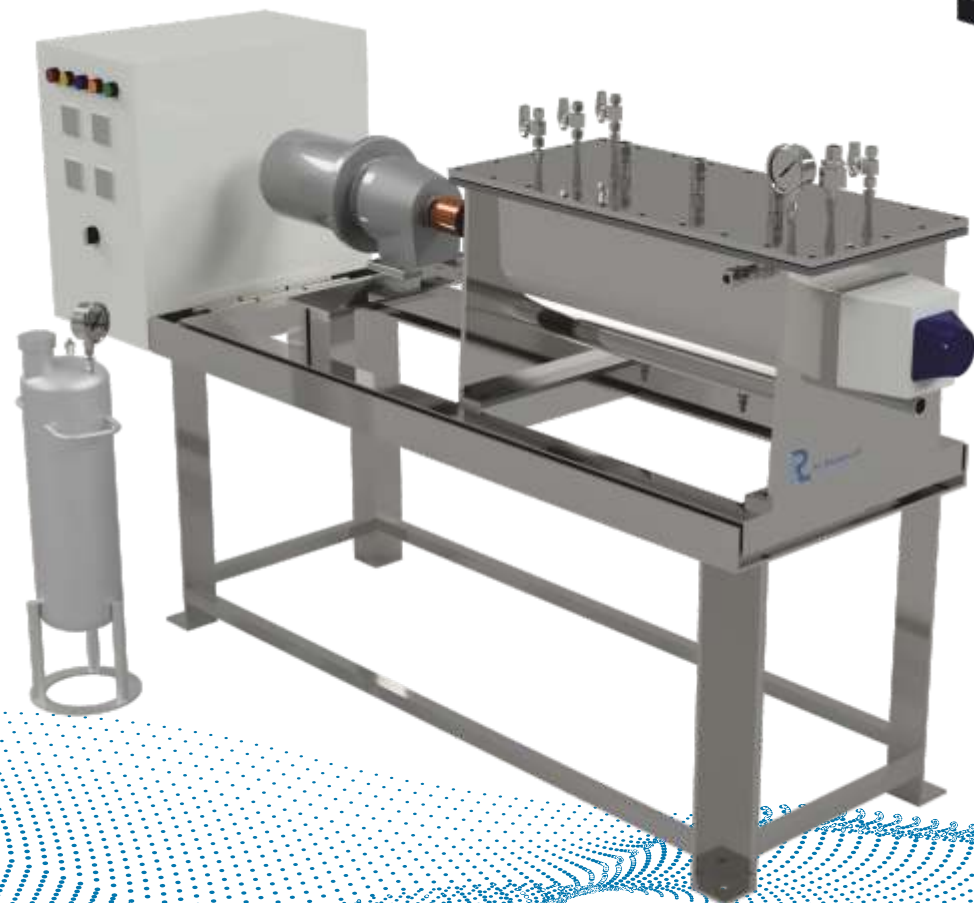
Scada Screen for Stirrer Reactors System :



Rational Lab Scale Stirrer Reactors :



Rational Horizontal Lab Scale Stirrer Reactors :



Rational Lab Scale Stirred Reactors :

RLS's first step towards indigenous product with assured quality that will serve for Indian market as well globally. We are introducing one of the model and others are in development for batch as well as continuous mode with the multiple attachments.

Key Features :

- Customize Bench top as well as floor mounted
- Customize vertical as well as Horizontal Reactors
- Fixed head type
- Hassle free vessel opening for quick accessing the reactor internals
- Elastomer seals to carry the multiple reactions with same seal
- Integration with latest computers & software's



Rational Stirred Reactors :

Model #	RSR-50	RSR-100	RSR-250	RSR-500	RSR-1000
Design Pressure	150 Barg				
Operating Pressure	120 Barg				
Design Temp.	200 °C				
Operating Temp.	190 °C				
Volume	50 mL	100 mL	250 mL	500 mL	1000 ml
Reactor Skid	Aluminium				
Electric Heater	Ceramic Band Heater				
Thermocouple	K type				
Impellers	Anchor/Paddle/Helical/Propeller				
Magnetic Drive With Motor	Leak proof Magnetic Drive assembled with DC Motor				
Contact Part M.O.C.	SS 316L/SS 316 Hastelloy (C-276)				
Seals	FKM, FFKM				
Standard Accessories	Pressure gauge: 01 No (Range 0-160 Barg, 63 mm Dial Size)				
	Pressure Transmitter: 01 No (Range Atm-150 Barg)				
	Gas Inlet Valve: 01 No				
	Liquid Sample Valve with Filter or without Filter : 01 No				
	Rupture Disk : 01 No				
	Liquid cooling line with automatic control				
*Accessories	Computer with SCADA				
	Circulator				
	Agitator impeller i.e. Anchor impeller, Paddle Impeller, Helical Impeller, Agitator Propeller				
	Manual or Automatic BPR, MFC integration with BPR, SS jacket for heating or cooling, Vessel lifting mechanism				

Rational Hydrothermal Reactor with Teflon Liner :

Model #	Capacity	M.O.C.	Operating Pressure	Liner/ Inner Vessel
RHTR-25	25 mL	SS 316, SS 304,	ATM to 100 Barg @ 180°C	Teflon Maximum Temperature 200 °c
RHTR-50	50 mL			
RHTR-100	100 mL			
RHTR-200	200 mL			Operating Temperature 180 °c
RHTR-250	250 mL			
RHTR-300	300 mL			
RHTR-500	500 mL			



Rational Pressure Vessels :

Model #	Capacity	M.O.C.	Operating Pressure	Seal
RLPV-25	25 mL	SS 316/ 316L, SS304, HC- C276	ATM to 100 Barg @ 200°C	Elastomer Seals
RLPV-50	50 mL			
RLPV-100	100 mL			
RLPV-200	200 mL			
RLPV-300	300 mL			
RLPV-500	500 mL			



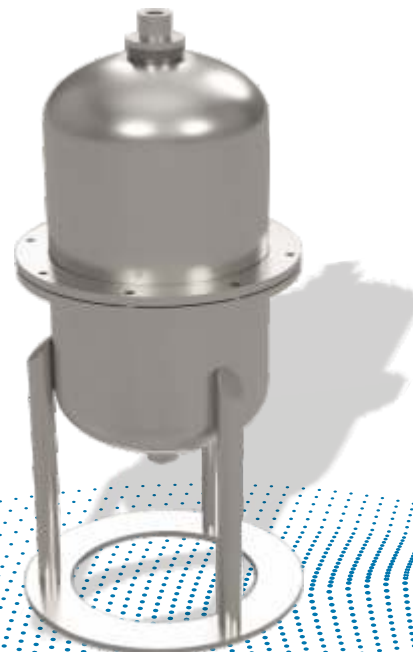
Membrane Reactor :

With the help of hands on experience of machining of various components, we can able to machine the customize reactor assembly for lab scale tubular as well as circular disc type membrane.

Rational Lab Scale Filtration Unit:

Type	: Sparkling Type
Mounting	: Vertical
Contact part MOC	: SS304, SS316
Number of plates	: 04 to 08 Nos
Diameter of Plate	: 03, 04 & 05 inches
Operation	: Single or multipass with pump
Inlet	: Bottom
Inlet & Outlet Connections	: 1/4" OD Compression

- Can filter suspended solid size of 5-10 µm.
- Pump can be provided to pass the liquid.
- Complete unit can be dismantle for cleaning



Images owned by R.L Solutions

Rational Split Type Tubular Furnaces :

RLS has developed indigenous tubular furnaces with different sizes with assured quality that will serve for Indian market as well globally.

- Rational Lab Scale Furnaces suitable for Tubular Reactor Tube
- Maximum Operating Temperature : Amb to 1000 °C
- Reactor Tube sizes 1/4 inch to 2 inch
- Power Supply of 230 VAC, 50 Hz



Furnace Element Details :

Heating Element Size	Wattage for 1000 °C	Supply
100 mm Height X 50 mm Width	400	230 VAC, 50 Hz
200 mm Height X 50 mm Width	800	
300 mm Height X 50 mm Width	1200	
400 mm Height X 50 mm Width	1600	
100 mm Height X 100 mm Width	500	
200 mm Height X 100 mm Width	1000	
300 mm Height X 100 mm Width	1500	
400 mm Height X 100 mm Width	2000	

Bench Top Furnace Systems :

R L Solutions LLP (RLS) offers an extensive line of Lab-Scale Bench Top Furnace Systems with the commitment of utmost reliability and quality. Our top-of-the-line control systems and safety interlocks ensure safe and effortless functioning for your process requirements.

Customization of furnace for wide range of reactor sizes, heating lengths and custom multi-zone arrangement is possible.

Features & Specifications :

- Customize lab scale as well as pilot scale split type tubular furnaces
- Vertical as well as horizontal mounting
- SS outer structure for safe, reliable and safe working atmosphere
- Standard heating elements
- Low temperature at outer surface of furnace for safe handling with the help of the branded insulations
- Multiple zones of heating is possible
- Control Unit with the provision to connect the latest computer or software's

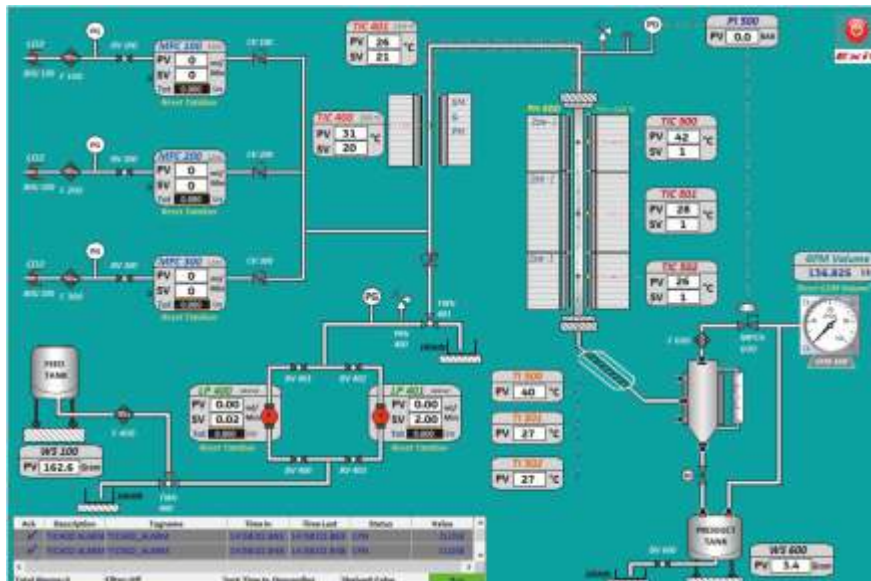
Accessories :

- Temperature/Heat control system with microprocessor based controllers or PLC based
- Computer / SCADA controlled heat systems
- Single point or multi-point thermocouples
- Custom Reactor Tube with Gas ports of MOC quartz, SS316/316L, INC625/800/800HT

Rational Automation Services

We had an experience of more than 100 system, we are able to cater a niche solution for automation for all equipment's. We are capable to handle different type of hardware from different manufacturer, with PLC/HMI or Microprocessor based SCADA System.

- Compact & Safe
- Panel Design IP41 ,IP55 or customize
- Easy handling
- Quick post services



Key features :

Data Logging	All process parameters i.e. temperature, Pressure, Level, Flow is logged in SCADA and saved the data in its server.
On Line Trending	Process parameters can be monitored in graphically for its current values of specified time frame.
Historical Trending	It is a feature to view the earlier process parameters in graphical trends.
Report Generation	It is a tool to generate the process parameters in tabular format either the current or past sessions.
Recipe	It is a tool to operate the system in sequential manner for its given time frame.

Services:

- Revamping of old systems.
- Supply of the spares for indigenous systems or third party instruments.
- Annual Maintenance Contract for indigenous systems or third party instruments.

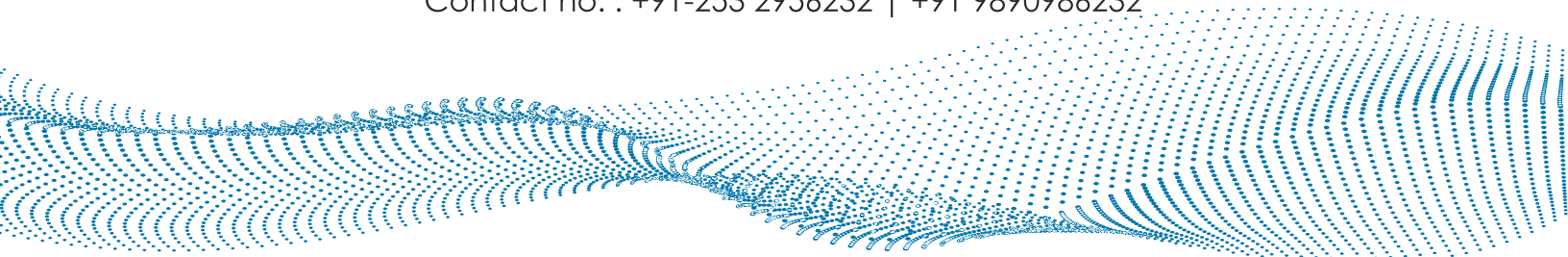


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About Us

Extensive Experience in Designing and Building Customised Systems for Oil & Gas Applications.

We specialize in engineering, developing, and commissioning high-performance laboratory and pilot-scale systems tailored for a wide range of applications in the Oil & Gas sector includes:

- Activated Carbon Test Unit (Adsorption Study for CO₂, H₂ and Propane / Methane)
- Pressure swing Adsorption Units (Gas Purification Applications)
- CO₂ Absorption / Desorption in solvent followed by regeneration
- Amine CSTR Reactor System (Two step reactions with legends)
- Auto thermal Reforming (ATR) Unit and Steam and Methane Reformer unit
- Catalyst Activation [All FBR reactor initial steps involve this step at atm pressure and at increased temp. Gradually in presence of H₂ and helium/N₂]
- Catalytic Reforming (Dehydrogenation)
- Chemical Reactor Throughput [Six Parallel Reactors]
- FBR-CSTR [polymerization] Reactors
- Diesel Hydrogenation [Hydrotreater setup]
- Corrosion Testing Setup
- Fischer-Tropsch Catalyst Testing Unit.
- Gas Purification Setup [Hallow Fiber Membrane Setups]
- Ebullated Bed Reactor for Residue Hydro-cracking.
- High Throughput Experimentation [4 Semi batch reactor]
- Hydro-cracking (HCU) [Twin Reactor setups]

