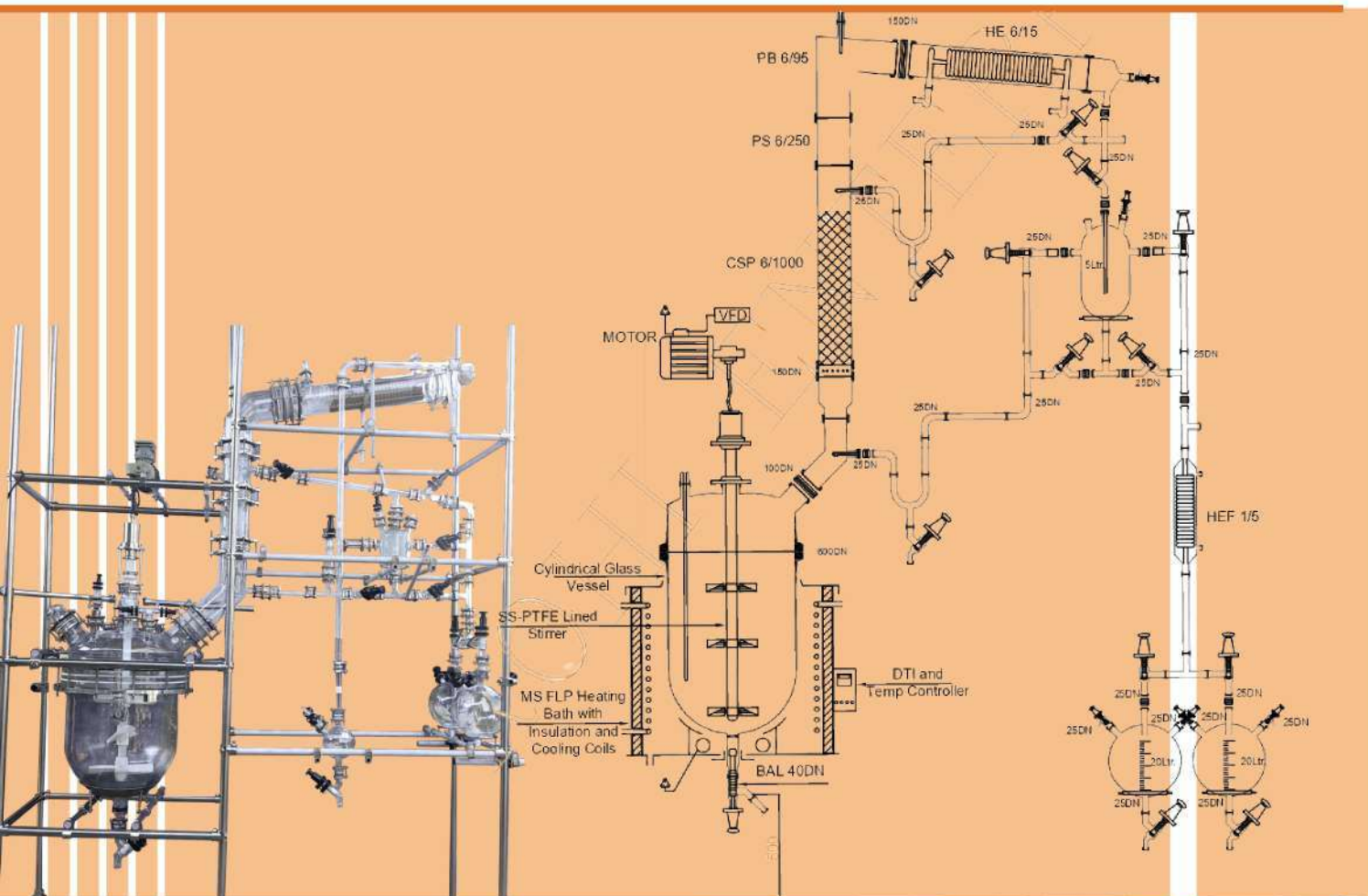


PRODUCT CATALOG





STANDARD UNITS

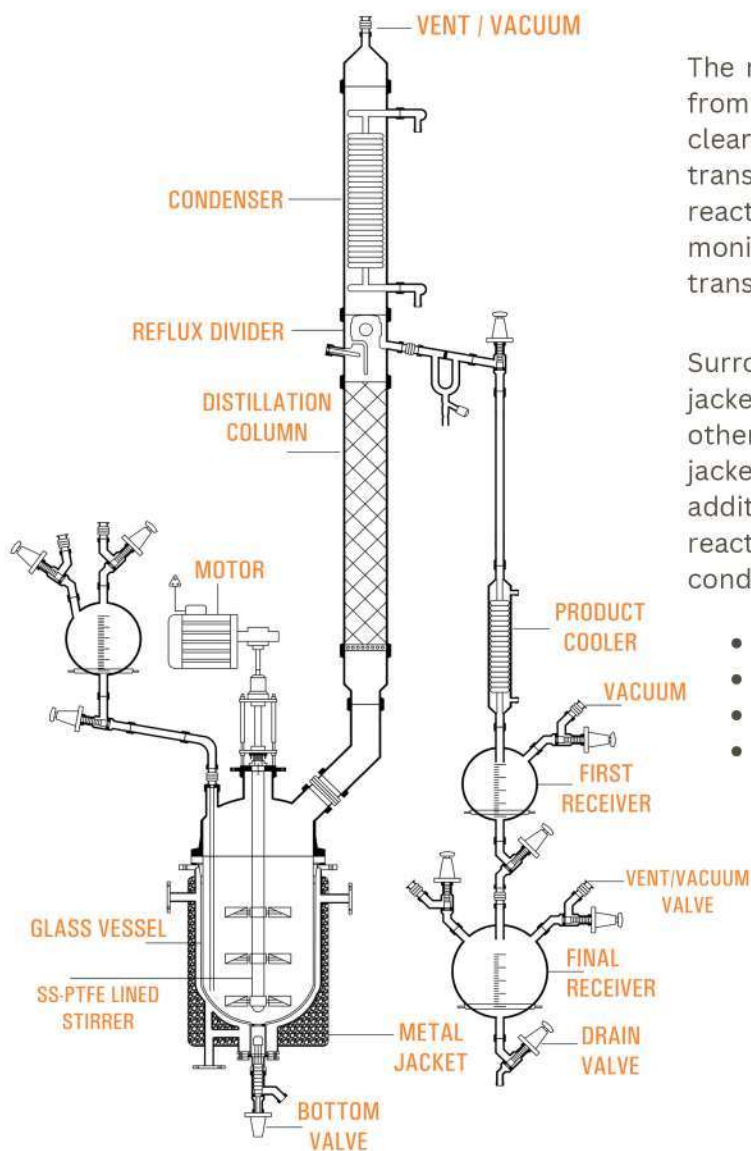


- GLASS REACTOR WITH METAL JACKET
- SIMPLE DISTILLATION UNIT
- REACTION UNIT
- FRACTIONAL DISTILLATION UNIT
- REACTION DISTILLATION UNIT
- ASSEMBLIES OVER GLASS LINED REACTOR
- GAS SCRUBBER



STANDARD UNITS

GLASS REACTOR WITH METAL JACKET



The main vessel of the reactor is constructed from high-quality borosilicate glass, offering clear visibility of the reaction process. This transparency enables researchers to observe reactions as they occur, allowing for real-time monitoring of factors like color changes, phase transitions, and gas evolution.

Surrounding the glass reactor body is a metal jacket, typically made of stainless steel or other corrosion-resistant metals. The metal jacket serves as a protective layer, providing additional strength and durability to the reactor while enhancing its thermal conductivity.

- **Glass metal Jacketed Reactor:** 5 - 200Ltr
- **Temperature:** -50°C to +200°C
- **Pressure:** Up to 1 bar
- **Material:** Borosilicate glass 3.3/ PTFE/SS 316

The combination of glass and metal construction provides the reactor with high-pressure resistance, making it suitable for a wide range of reactions, including those requiring elevated pressures or vacuum conditions.

We offer Glass Reactor with Metal Jacket for chemical & pharmaceutical Industries for process development. Glass reactor will have metal jacket and metal insulation.

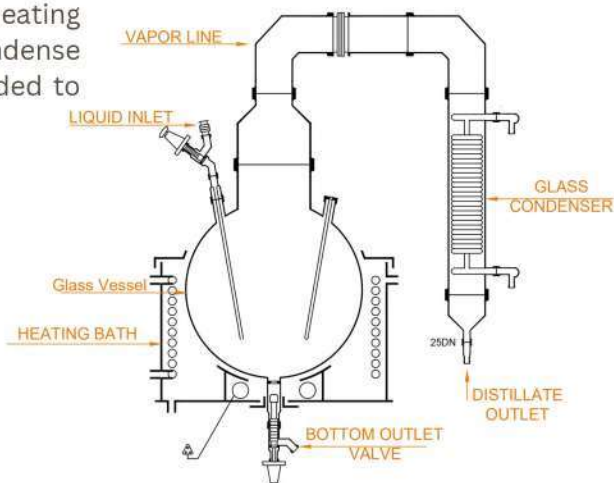
STANDARD UNITS



SIMPLE DISTILLATION UNIT

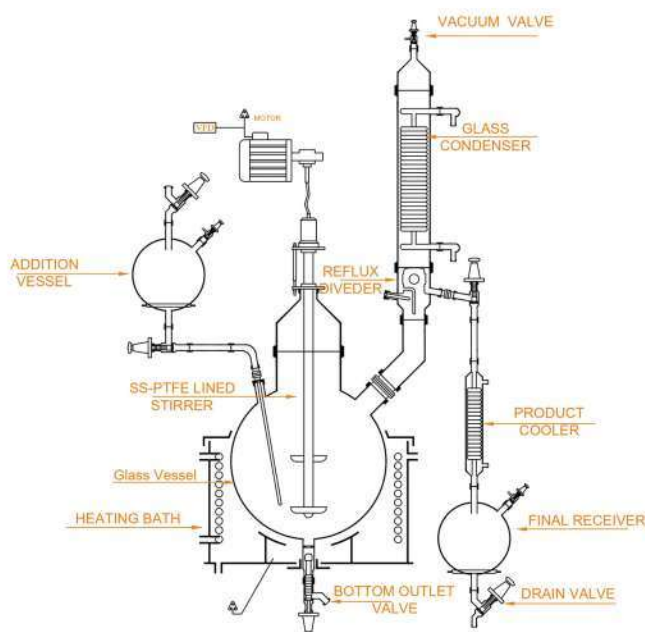
The setup includes a vessel placed within a heating bath and equipped with a condenser to condense vapors. A receiver with a drain valve can be added to collect the condensate.

Unit	Reactor Capacity	vapour Line	Bath KW	Condenser M ²
SDU20	20L	80DN	4	0.35
SDU50	50L	100DN	6	0.5
SDU100	100L	150DN	9	1.5
SDU200	200L	150DN	12	1.5
SDU300	300L	225DN	18	2.5
SDU500	500L	300DN	24	4



Suitable for operation under atmospheric pressure and full vacuum

REACTION UNIT



This unit is designed for conducting reactions under stirred conditions, with the capability for simple reflux distillation. The reaction vessel is positioned within a heating bath and is equipped with an addition vessel, a motor-driven stirrer, and a condenser for refluxing. The final product is cooled and collected in a receiver.

Unit	Reactor Capacity	Bath KW	Additional Vessel	Condenser M ²	vapour Line	Cooler HTA M ²	Receiver Side
RDU20	20L	4	2L	0.35	80DN	0.1	5L
RDU50	50L	6	5L	0.5	100DN	0.2	10L
RDU100	100L	9	10L	1.5	150DN	0.35	20L
RDU200	200L	12	20L	1.5	150DN	0.35	20L
RDU300	300L	18	20L	2.5	225DN	0.5	20L
RDU500	500L	24	50L	4	300DN	0.7	50L

Suitable for operation under atmospheric pressure and full vacuum

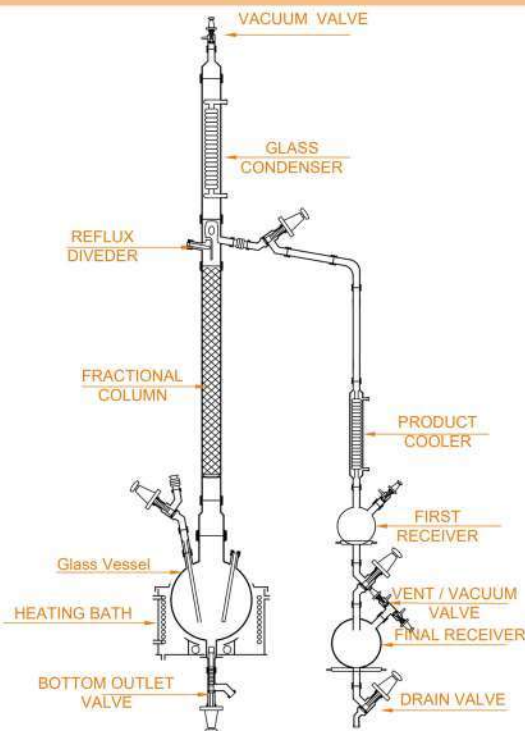


STANDARD UNITS

FRACTIONAL DISTILLATION UNIT

This is a compact, batch-style fractional distillation system. It features a reboiler that is a vessel placed in a heating bath, topped with a packed column. The vapors generated are condensed at the top and can be refluxed as needed. Based on the principles of fractional distillation, this unit utilizes differences in boiling points to separate components of complex mixtures with unparalleled precision and efficiency.

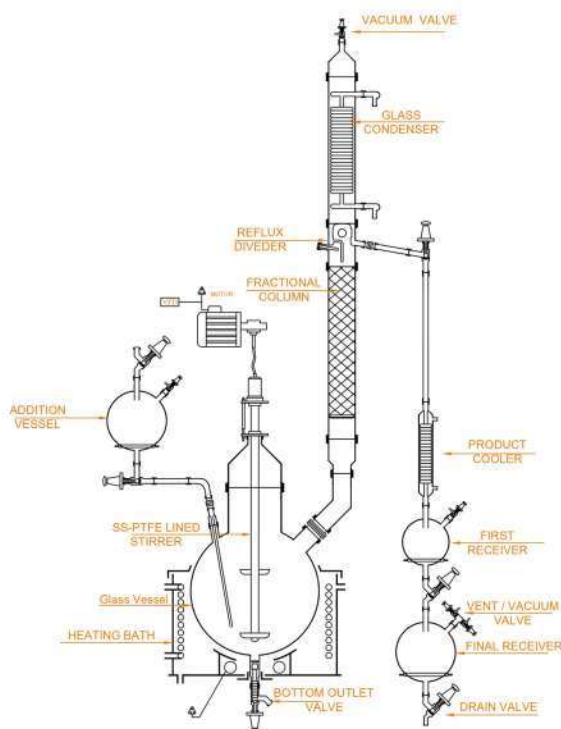
Unit	Reactor Capacity	Bath KW	Additional Vessel	Condenser M ²	vapour Line	Cooler HTA M ²	Receiver Side
FDU20	20L	4	2L	0.35	80DN	0.1	2L,5L
FDU50	50L	6	5L	0.5	100DN	0.2	5L,10L
FDU100	100L	9	10L	1.5	150DN	0.35	10L,20L
FDU200	200L	12	20L	1.5	150DN	0.35	20L,20L
FDU300	300L	18	20L	2.5	225DN	0.5	20L,20L
FDU500	500L	24	50L	4	300DN	0.7	50L,50L



Available units.
20L, 50L, 100L, 200L, 300L, 500L

REACTION DISTILLATION UNIT

Combining reaction vessels with distillation components, the Reaction Distillation unit enables simultaneous synthesis and purification of chemical compounds in a single apparatus, streamlining workflow and maximizing efficiency. This versatile system can be used as reaction distillation, fractional distillation or combination of both.



Unit	Reactor Capacity	Bath KW	Additional Vessel	Condenser M ²	vapour Line	Cooler HTA M ²	Receiver Side
FRU20	20L	4	2L	0.35	80DN	0.1	2L,5L
FRU50	50L	6	5L	0.5	100DN	0.2	5L,10L
FRU100	100L	9	10L	1.5	150DN	0.35	10L,20L
FRU200	200L	12	20L	1.5	150DN	0.35	10L,20L
FRU300	300L	18	20L	2.5	225DN	0.5	20L,20L
FRU500	500L	24	50L	4	300DN	0.7	50L,50L

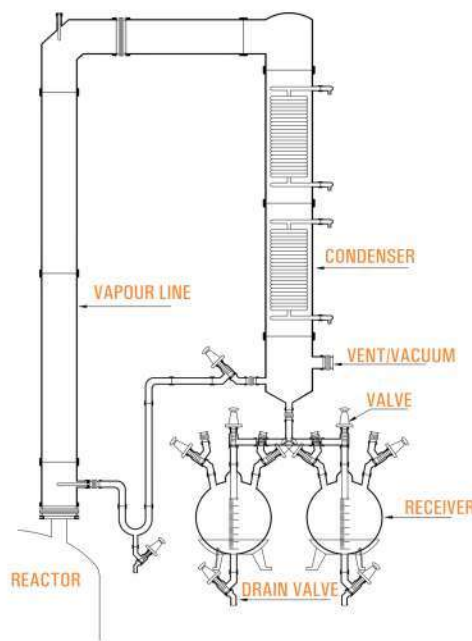
STANDARD UNITS



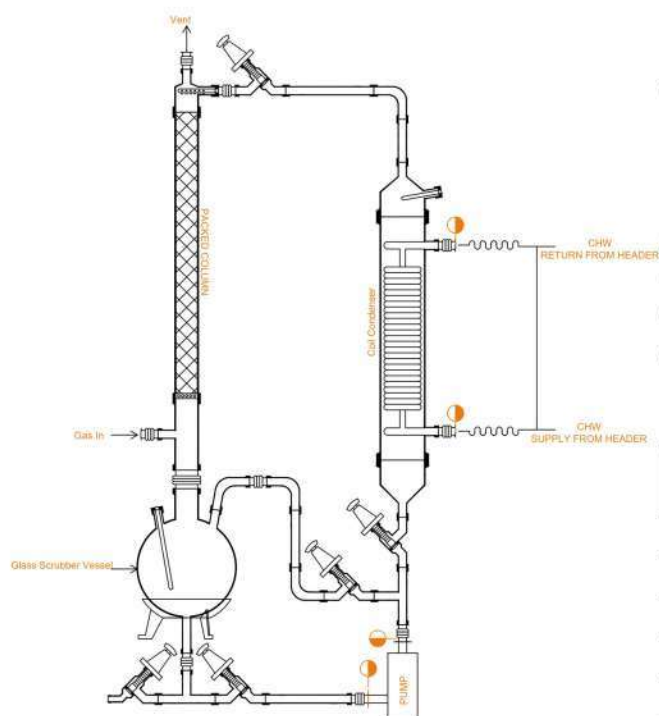
ASSEMBLIES OVER GLASS LINED REACTOR

Glass-lined reactors are used instead of standard glass reactors, particularly in large-scale operations where high-pressure steam is used for heating. These reactors often support assemblies such as Simple Distillation Units, Reaction Distillation Units, and Fractional Distillation Units. Although the fundamental design of these assemblies is consistent, a glass shell and tube heat exchanger is typically favored for larger operations.

Unit	Reactor Capacity	Vapour Column	Condenser HTA M ²
GRU 250	250 L	80mmX1.5m	1.5X2
GRU 500	500 L	100mmX2m	1.5X2
GRU 1000	1000 L	100mmX2m	2.5X2
GRU 2000	2000 L	150mmX3m	2.5X2
GRU 3000	3000 L	150mmX2m	4.0X2



GAS SCRUBBER



We provide pilot plant gas scrubbers designed to handle a range of gases such as HCL, Cl₂, SO₂, Br₂, HBr, NO_x, and other corrosive gases. These scrubbers utilize media such as water, aqueous NaOH, or other appropriate solvents to neutralize the exhaust gases. Our pilot plant scrubbers are available with vessel capacities ranging from 20 liters to 500 liters, and scrubber diameters from 80 DN to 300 DN.

Unit	Size	Vessel	Condenser M ²
GS3	80DN	20 L	0.5
GS4	100DN	50 L	1.5
GS6	150DN	100 L	2.5
GS8	200DN	200 L	5
GS12	300DN	300 L	8

STANDARD UNITS



MULTI PURPOSE UNIT

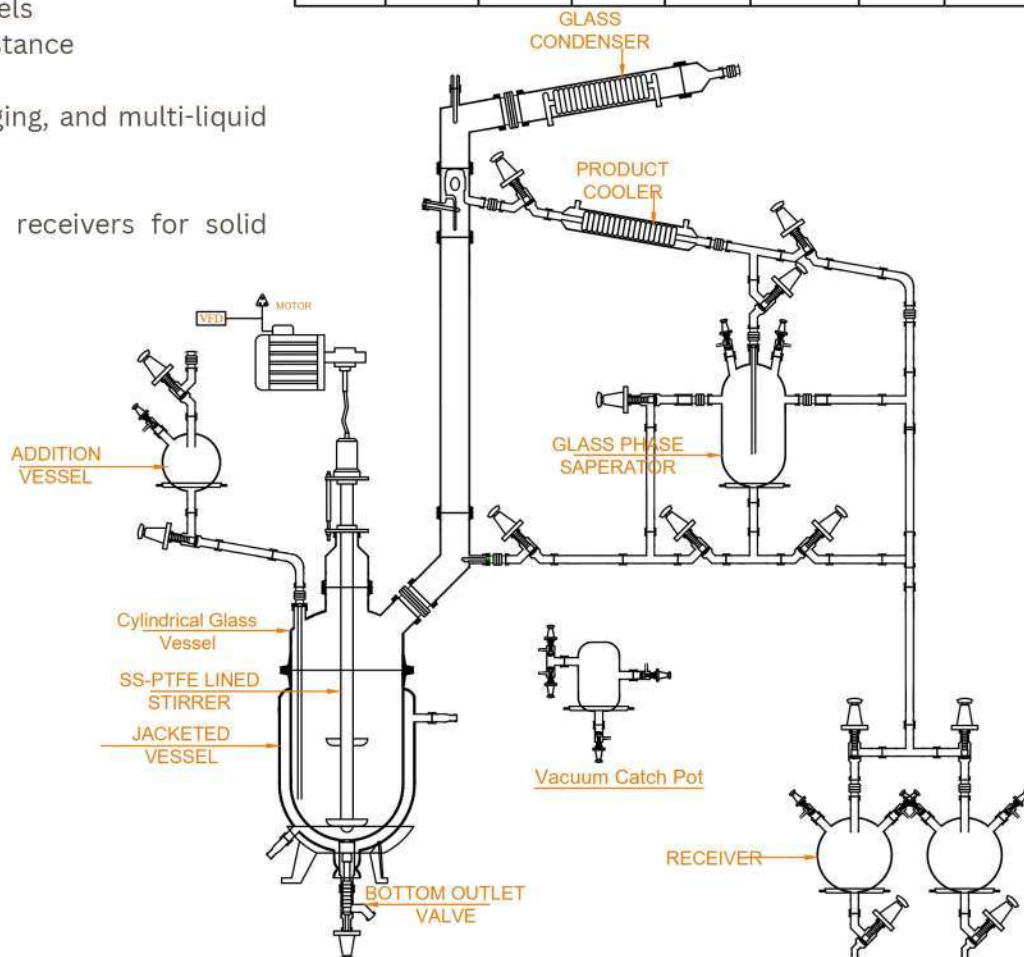
We provide a versatile pilot plant for the chemical and pharmaceutical industries, ideal for process development, scale-up, process simulation, and kilo-scale cGMP production, both in batch and semi-batch operations. Our pilot plant accommodates various chemical processing tasks, including solid and liquid charging, reaction, heating/cooling, rectification, auto/manual reflux, layer separation, product cooling, vacuum catch pot, and vacuum header.

The design of our multipurpose pilot plant allows for easy modifications based on specific process requirements.

Features include:

- Jacketed full glass reactor, cylindrical full glass reactor with oil heating/cooling bath, or spherical full glass reactor with oil heating/cooling bath
- Multipurpose glass distillation overhead
- Frame options: stainless steel, epoxy-coated MS, or painted MS
- Available in flame-proof, non-flame-proof, cGMP, or non-GMP models
- Excellent corrosion resistance
- Temperature controller
- Gas purging, solid charging, and multi-liquid addition capabilities
- Vacuum/exhaust piping
- Additional feeders and receivers for solid feeding

Unit	Reactor Capacity	Bath Kw	Addition Vessel	Vapour Column	Condenser HTA M ²	Product HTA M ²	Receiver Capacity
MPU 20	20 L	4	2 L	80 DN	0.35	0.10	2L, 5L
MPU 50	50 L	6	5 L	100 DN	0.50	0.20	5L, 10L
MPU 100	100 L	9	10 L	150 DN	1.50	0.35	10L, 10L
MPU 200	200 L	12	20 L	150 DN	1.50	0.35	10L, 20L
MPU 300	300 L	18	20 L	225 DN	2.50	0.50	20L, 20L
MPU 500	500 L	24	50 L	300 DN	4.00	0.70	50L, 50L



STANDARD UNITS

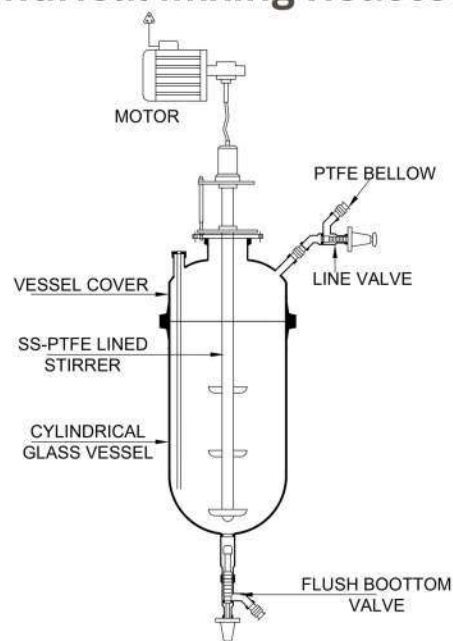


Glass reactors are well-suited for a variety of applications in laboratories, pilot plants, and small-scale production. They minimize the need for permanent installations and help reduce pressure and temperature losses associated with pipeline setups.

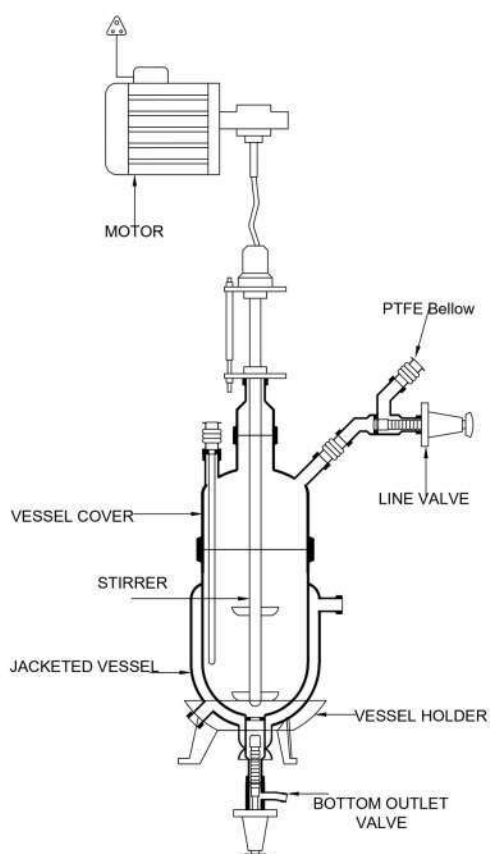
These reactors come in both spherical and cylindrical shapes, and cylindrical models are also available with jackets.

Unit	Vessel Ref.	Reactor Capacity
CMR 20	VZ 20/12	20 L
CMR 50	VZ 50/16	50 L
CMR 100	VZ 100/18	100 L
CMR 200	VZ 200/18	200 L
CMR 300	VZ300/24	300 L

Cylindrical Mixing Reactor



Jacketed Mixing Unit



Our systems come with various options tailored to different sizes and uses.

- **Stirrer Drive:** Choose between a non-flameproof or flameproof motor, operating at 192 RPM with a speed regulator.
- **Stirrer Material:** Available in glass or PTFE-lined options.
- **Stirrer Shape:** Options include glass impeller stirrer with PTFE blades, vortex stirrer, propeller stirrer, and anchor stirrer.
- **Stirring Assembly:** Can be equipped with a bellow seal or a mechanical seal.
- **Supporting Structure:** Available in carbon steel, epoxy-coated carbon steel, stainless steel 304, and stainless steel 316. Structures can also be mounted on trolleys.
- **Closing Valve:** Options include a drain valve or a flush bottom outlet valve.

Unit	vessel Ref.	Reactor Capacity
JMR 5	VZD 5/6	5
JMR 10	VZD 10/9	10
JMR 20	VZD 20/12	20
JMR 30	VZD 30/12	30
JMR 50	VZD 50/16	50

STANDARD UNITS



Essential Oil Distillation

An essential oil is a highly concentrated, hydrophobic liquid that contains volatile chemical compounds derived from plants. These oils, which are also referred to as volatile oils, ethereal oils, or simply as the oil of the specific plant from which they are extracted, can be produced using several methods.

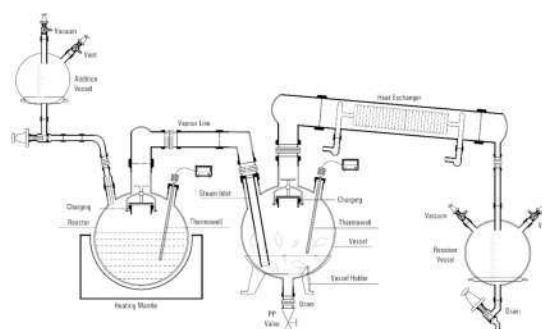
The most common method of extracting essential oils is through distillation, often employing steam as the medium. We offer two primary methods for the production of essential oils: the Steam Distillation Unit and the Vacuum Distillation Unit.

1. Steam Distillation Unit

These units are available in various vessel sizes, including 10, 20, 50, 100, and 200 liters, and can operate under both atmospheric pressure and full vacuum.

Steam distillation is a separation process where water is heated in a separate vessel to generate steam. This steam is then introduced into a reactor containing plant material, where it interacts with both volatile and non-volatile components. The steam carries the volatile compounds in vapor form to a condenser, where they are cooled and transformed back into liquid or solid form. The non-volatile residues are left behind in the reactor.

Unit	Reactor Capacity	Mantle KW	Addition Vessel	Condenser HTA M ²	Receiver Vessel
EOSD 10	10 L	1	5	0.35	5 L
EOSD 20	20 L	1.8	5	0.50	5 L
EOSD 50	50 L	3.6	20	1.50	20 L
EOSD 100	100 L	5.4	20	1.50	20 L
EOSD 200	200 L	8.1	50	2.25	50 L



2. Vacuum Distillation Unit

Vacuum distillation is a process of distillation conducted under reduced pressure, which enables the purification of compounds that are challenging to distill at standard atmospheric pressure or when there is a need to conserve time and energy. This method works by separating compounds based on their differing boiling points. It is particularly useful when the boiling point of a target compound is too high to be achieved easily, or when high temperatures might cause the compound to break down. By lowering the pressure, the boiling point of the compounds is reduced, allowing the distillation to occur at lower temperatures. The vaporized compounds are then carried by steam to a condenser, where they are cooled and transformed back into their liquid or solid states.

Unit	Reactor Capacity	Mantle KW	Addition Vessel	Condenser HTA M ²	Receiver Vessel
EOVD 10	10 L	1	5 L	0.35	5 L
EOVD 20	20 L	1.8	5 L	0.50	5 L
EOVD 50	50 L	3.6	20 L	1.50	20 L
EOVD 100	100 L	5.4	20 L	1.50	20 L
EOVD 200	200 L	8.1	50 L	2.25	50 L

TECHNICAL PACKAGES



NUTSCHE FILTER

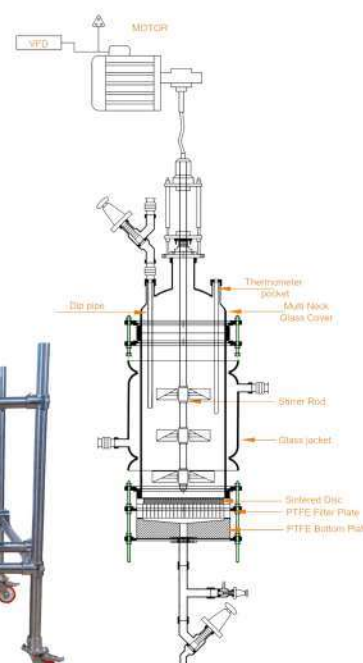
The Agitated Glass Nutsche Filter is a sealed vessel used for vacuum filtration to separate solids and liquids. This enclosed setup guarantees an odorless, contamination-free, and environmentally friendly work environment, maintaining the purity and hygiene of the product. Widely utilized in the production of herbal products, chemical research, kilo lab operations, pharmaceutical manufacturing, agrochemicals, and the food industry.

PROCESS STEPS OF AGITATED NUTSCHE FILTER WITH AGITATOR :

- 1) Filtration.
- 2) Washing of Filter cake.
- 3) Repeat mix or washing of the cake.
- 4) Convection drying of the cake.
- 5) Smoothing with compression of the cake
- 6) Discharge of the wet or dried cake.



DESCRIPTION



A typical unit consists of a dish-shaped vessel with a perforated plate, ensuring a leak-proof design suitable for vacuum or pressure operations. The vessel's temperature can be regulated using a mixer/agitator and jacket. The base plate is equipped with bolting bars to secure the filter cloth. Offering choices for various nozzles like Manhole and Side discharge. PTFE Lined Stirrers and solid PTFE blades are used for efficient solid discharge and re-slurring. The drive assembly comprises a Motor with VFD and a Mechanical Seal for vacuum applications. The Borosilicate Glass Vessel is equipped with different nozzles, and a Manual/Hydraulic system facilitates the movement of the agitator and bottom plate. Additionally, a PTFE Filter Support Plate is provided.

Advantages of Glass Nutsche Filter

- Vacuum filtration is achievable with our equipment.
- The transparent glass allows for clear visibility of the processes.
- An inert gas atmosphere can be maintained.
- Minimal contamination of the cake and very high solvent recovery.
- Since the solvents are contained within closed systems, no toxic vapors are released into the environment.
- Personal safety is prioritized, and heat transfer surfaces can be incorporated to regulate the filtration temperature.

Cat. Ref.	Working Vol (ltr)	Filter area (m2)	Vessel Dia	Vessel height	Motor Capacity HP
ANFD10	10	0.03	225	300	0.5
ANFD20	20	0.06	360	325	0.5
ANFD50	50	0.12	400	450	0.5
ANFD200	200	0.31	600	775	1
ANFD300	300	0.31	600	1150	1

Note: We provide Glass ANF ranging from 2 liters to 200 liters for kilo lab operations. These vessels are available with or without jackets and with or without stirrers.



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