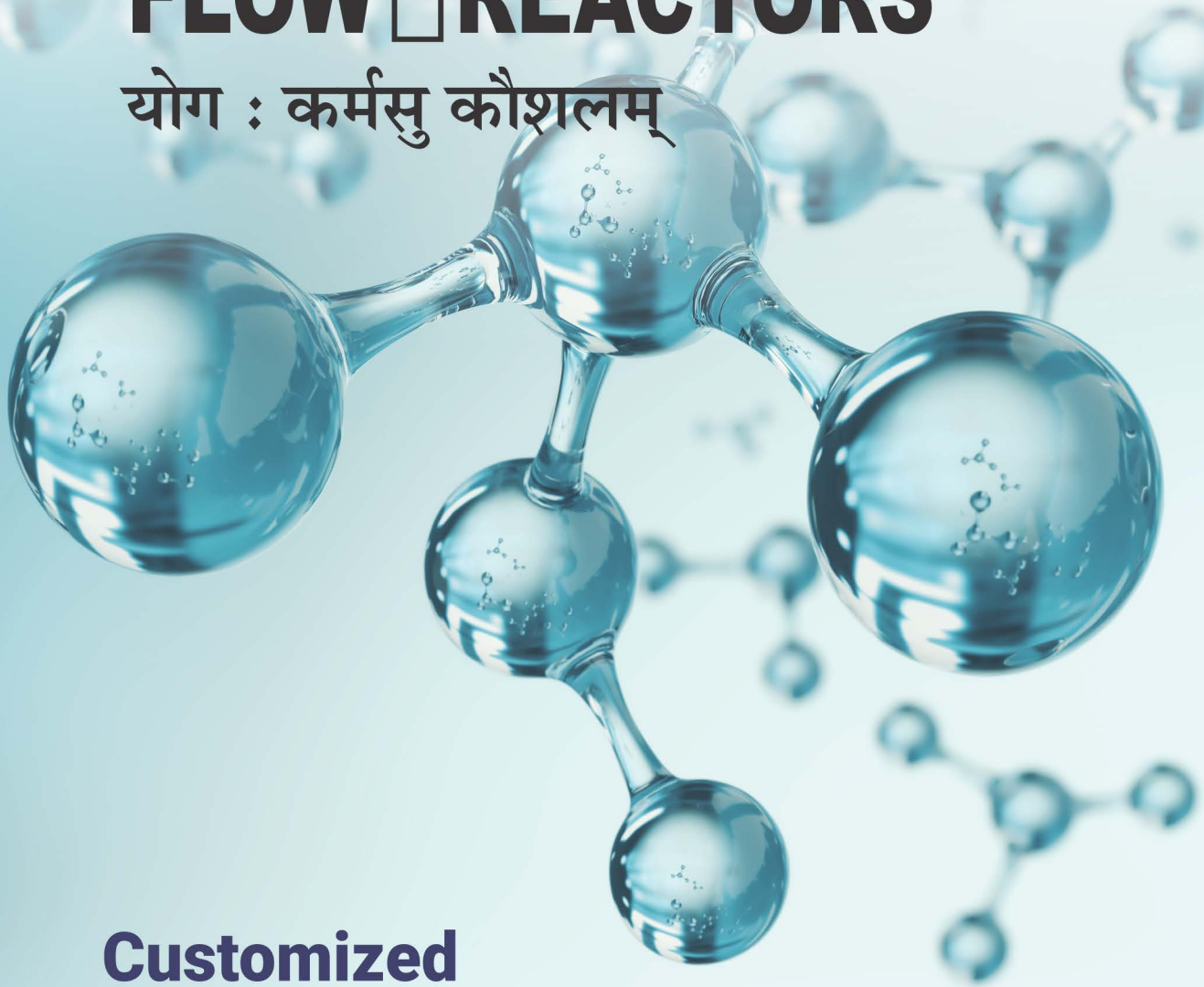
Unity
FLOW REACTORS

योग : कर्मसु कौशलम्



Customized Turnkey Engineering Solutions

Manufacture of Plant & Machinery
with Total System Integration.

UNITY FLOW REACTORS - VADODARA

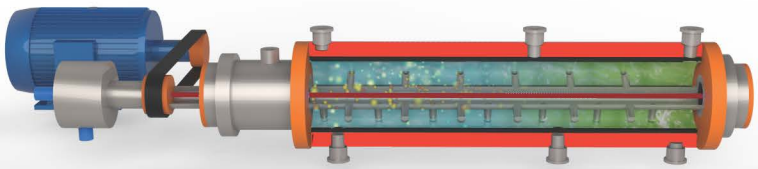
Unity Flowreactors is an engineering company based at Vadodara, Gujarat engaged in offering Customized Turnkey Engineering Solutions for process industry and manufacture of Plant & Machinery with total System integration for more than 3 decades.

We offer customized solutions for the chemical & Pharmaceutical industries with our wide range of FLOW REACTORS for various processes viz. Sulfonation, Chlorination, Hydrogenation, Halogenation, Nitration, Oxidation etc.

CONTINUOUS STIRRED TUBULAR REACTOR (CSTUR)

The CSTUR Reactor is used in manufacture of Flexible Polyurethan Foam. The system has capability of accurately dosing 7 different liquids having wide range of density, viscosity etc. as well as gas for attaining the precise chemical reaction. This principle is applied for variety of chemical reactions.

REACTOR MOC: Austenitic Stainless Steel, Hastelloy, Inconel, Monel etc.
Heating / Cooling: Limpet/External Jacket with optional heating/cooling from the shaft.
Chemical Processes: Halogenation. Reactions where gas is produced during reaction.



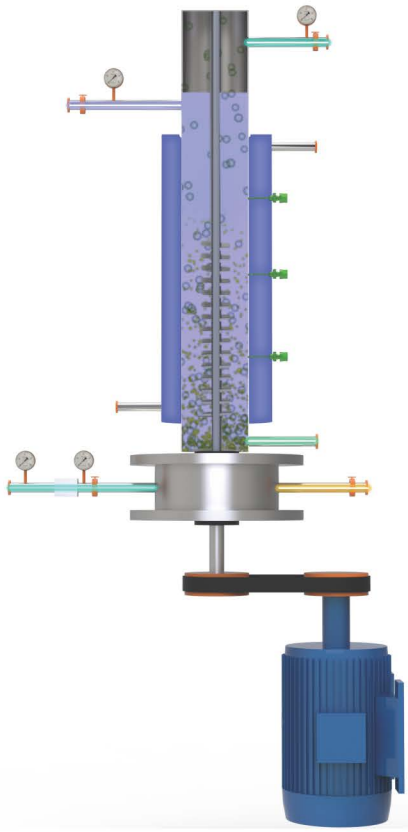
ADVANTAGES:

1) Can handle liquids / slurries with ease.
2) Reaction times from a few seconds to few hours.
3) Excellent mixing.
4) High throughput rate.
5) Heat transfer area of the order of 50-100 m2/m3
6) Flexibility of availing extra feed/ sampling/sensing points anywhere along the axis.
7) Feasibility of providing catalyst packs in the flow line or along the reactor wall.

FLUIDIZED BED REACTOR

Ideally suited for hydrogenation as well as ammonolysis.

REACTOR MOC: Austenitic Stainless Steel; Hastelloy, Inconel, Monel etc.
Heating / Cooling: Limpet/External Jacket with option to provide heating/cooling from the shaft.



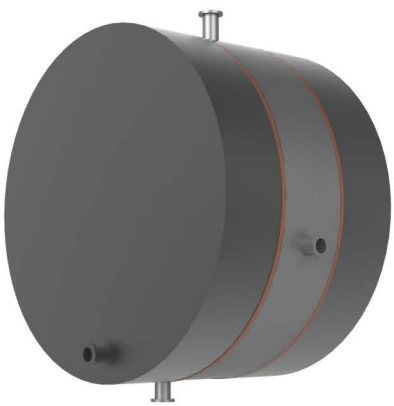
ADVANTAGES:

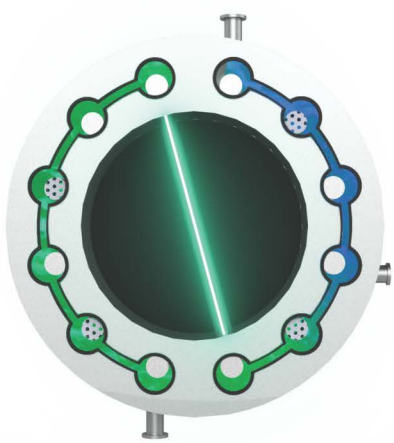
1) Can handle liquids / slurries / gas with ease.
2) Reaction times from a few seconds to few hours.
3) Excellent mixing.
4) Ability to carry out high pressure reactions up to 100 Bar.
5) Heat transfer area of the order of 50-100 m2/m3
6) Flexibility of availing extra feed/ sampling/sensing points anywhere along the axis.

PIN MILL REACTOR

Pin Mill Reactor can facilitate quick chemical reactions with flexibility to carry out small volume to high volume reactions.

REACTOR MOC: Austenitic SS, Martensitic SS, Hastelloy, Inconel, Monel, Glass etc.
MEDIA: Ceramic, Hastelloy, SS etc. Catalyst packed media also possible.
Heating / Cooling: Single/ Double side jacket with annular chamber.
Chemical Processes: Suitable for UV light reaction, Sulfonation, Nitration.

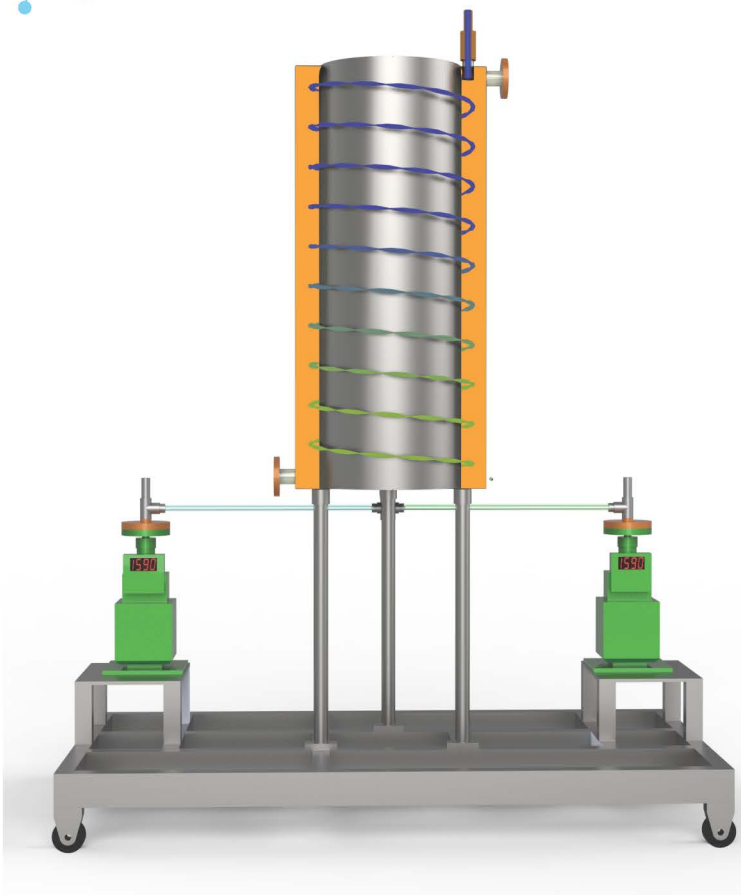




ADVANTAGES:

1) Can handle liquids / slurries with ease.
2) Reaction times from a few seconds to few hours permissible.
3) Circular agitation movement for a more efficient mixing performance.
4) Feasibility of providing catalyst packs in the flow line within the Stirring Media.
5) No rotating seals.
6) Feasibility to provide visual observation of reaction process through glass windows.
7) Heat transfer area of the order of 100-200 m2/m3

PINCHED TUBE REACTOR



The reactants (liquid/slurry) enter the tube reactor from a common inlet. Constrictions provided in the flow passage at designed intervals produce desired mixing while maintaining the PLUG flow.

REACTOR MOC: Austenitic SS, Hastelloy, Inconel, Monel, Titanium etc
Heating / Cooling: SOLENOID JACKET
Chemical Processes: Nitration, Sulfonation, N-Alkylation, Halogenation,

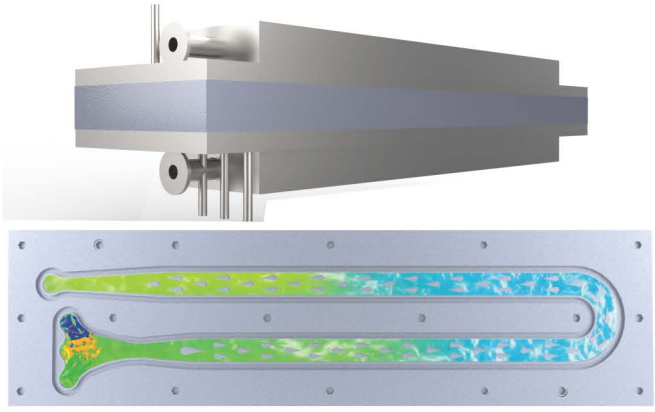
ADVANTAGES:

1) Good heat transfer area per unit volume. 500 – 1000 m2 /m3 easily achievable.
2) Low pumping energy requirement.
3) Ability to generate Plug flow thereby avoiding mixing of reacted, unreacted and semi reacted material.
3) Easy Scalability of Process.
4) Ability to handle high pressure with assured safety.

PLATE TYPE REACTOR

The reactants enter the plate reactor from different inlets and converge into a single laminar flow. Obstructions configured in the flow passage at designed intervals produce desired mixing while maintaining PLUG flow as well as avoiding any dead zones.

REACTOR MOC: Austenitic SS, Martensitic SS, Hastelloy, Inconel, Monel, Titanium, Filled PTFE , Borosilicate Glass for Photochemical reaction
Heating / Cooling: External jacket, Ceramic Heaters, Induction Heating.
Chemical Processes: Sulfonation, Chlorination, Hydrogenation, Photo Halogenation, Nitration, Oxidation, Sulfoxidation etc.



ADVANTAGES:

1) Very good heat transfer area of the order of 2000 m2 /m3.
2) Flexibility to introduce feed / sampling / sensing points anywhere in the matrix.
3) Easy Scalability of Process.
4) Feasibility to undertake photo chemical reactions.

If you are looking for following.....

1. Better product quality, higher production yield and lower capital cost.
2. Continuous reaction process with uniform reaction.
3. Solution for high pressure reaction with enhanced safety and lower space requirement.
4. Lower process waste and higher product yields.
5. Reduction in down stream process.
6. Better energy efficiency.
7. Accurate pumping solution.

.....we can help you find a viable solution.

Advantages of Flow Reactor

- Flow reactors offer higher yields due to better control & consistency of process variables like temp, pressure, concentration and mixing within the reaction matrix.
- The distinct technical advantages include:

1) High heat transfer area per unit volume of reactor.
2) Rapid mass transfer.
3) High Interfacial Area.
4) Minimum interaction of reacted, unreacted and semi reacted mass.
5) Enhanced safety as very high pressure can be very safely accommodated.
6) Much lower space requirement.
7) Lower generation of waste resulting in better yields.
8) Reduction in downstream process.
9) Greater Energy efficiency.

Projects Executed

CONTINUOUS STIRRED TUBULAR REACTOR (CSTUR)

PINCHED TUBE REACTOR

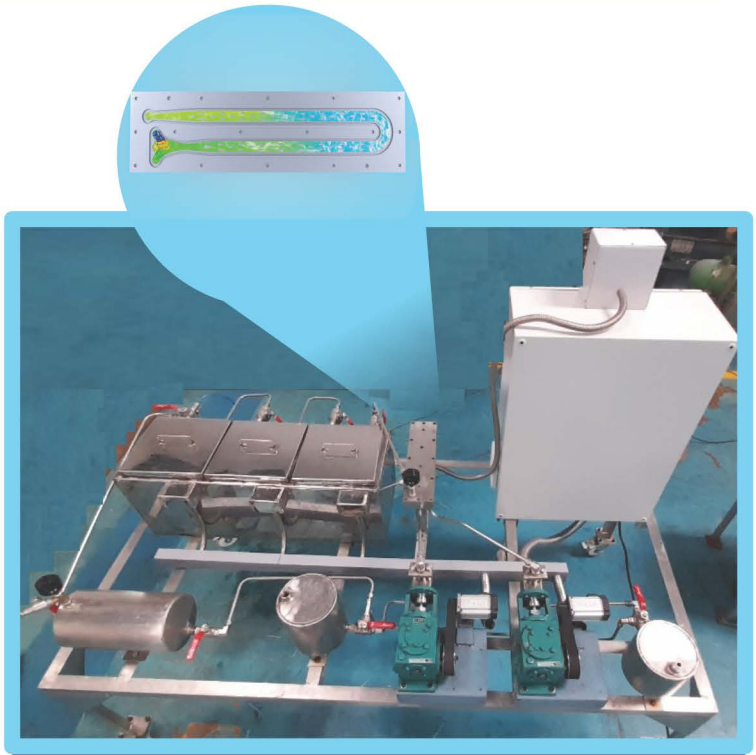


PLATE TYPE REACTOR

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