

ORCINUS PROCESS TECHNOLOGIES PRIVATE LIMITED

Reactors and Agitators



PROCESS DESIGN, ENGINEERING AND MANUFACTURING OF THE PROCESS
EQUIPMENTS IN CHEMICALS, PETROCHEMICALS AND PHARMACEUTICAL INDUSTRIES

REACTORS

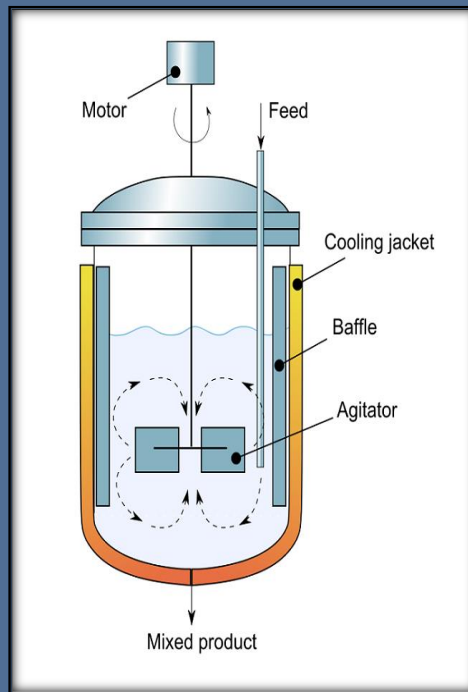
In chemical engineering it is generally understood to be a process vessel used to carry out a chemical reaction which is one of the classic unit operations in chemical process analysis.

Types: 1) Batch Reactor 2) Continuous Stirred Tank Reactor (CSTR) 3) Catalytic Reactor

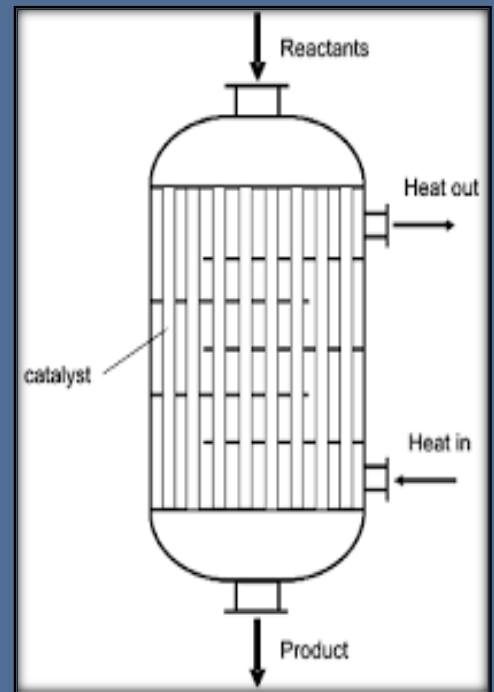
The simplest type of reactor is a batch reactor. Materials are loaded into a batch reactor and the reaction proceeds with time. In a CSTR one or more fluid reagents are introduced into a tank reactor which is typically stirred with an impeller to ensure proper mixing of the reagents while the reactor effluent is removed.



Limpet Coil Reactor



Jacketed Type Reactor



Tubular Reactor

A tubular reactor can often be a packed bed. In this case the tube or channel contains particles or pellets usually a solid catalyst. The reactants in liquid or gas phase are pumped through the catalyst bed. It is also called the fluidized bed.



Limpet Coil Reactor with Agitator



Jacketed Vessel



Reactor with Body flange & Limpet Coil

INDUSTRIAL AGITATORS AND MIXER

Agitation is a means mixing of phases can be accomplished and by which mass and heat transfer can be enhanced between phases or with external surfaces. the process of mixing is concerned with combinations of phases.

- Gases with gases.
- Gases into liquids such as dispersion.
- Gases with Granular solids such as fluidization, pneumatic conveying, drying.
- Liquids into gases such as spraying and atomization.
- Liquids with liquids such as dissolution, emulsification, dispersion.
- Liquids with granular solids such as suspension.
- Pastes with each other and with solids.
- Solids with solids such as mixing of powders.

Hydraulically, mixers behave like pumps. Mixing applications can be either a batch or a continuous process. Although the terms agitation and mixing are often used interchangeably, there is a technical difference between the two.

Agitation creates a flow or turbulence as follows:

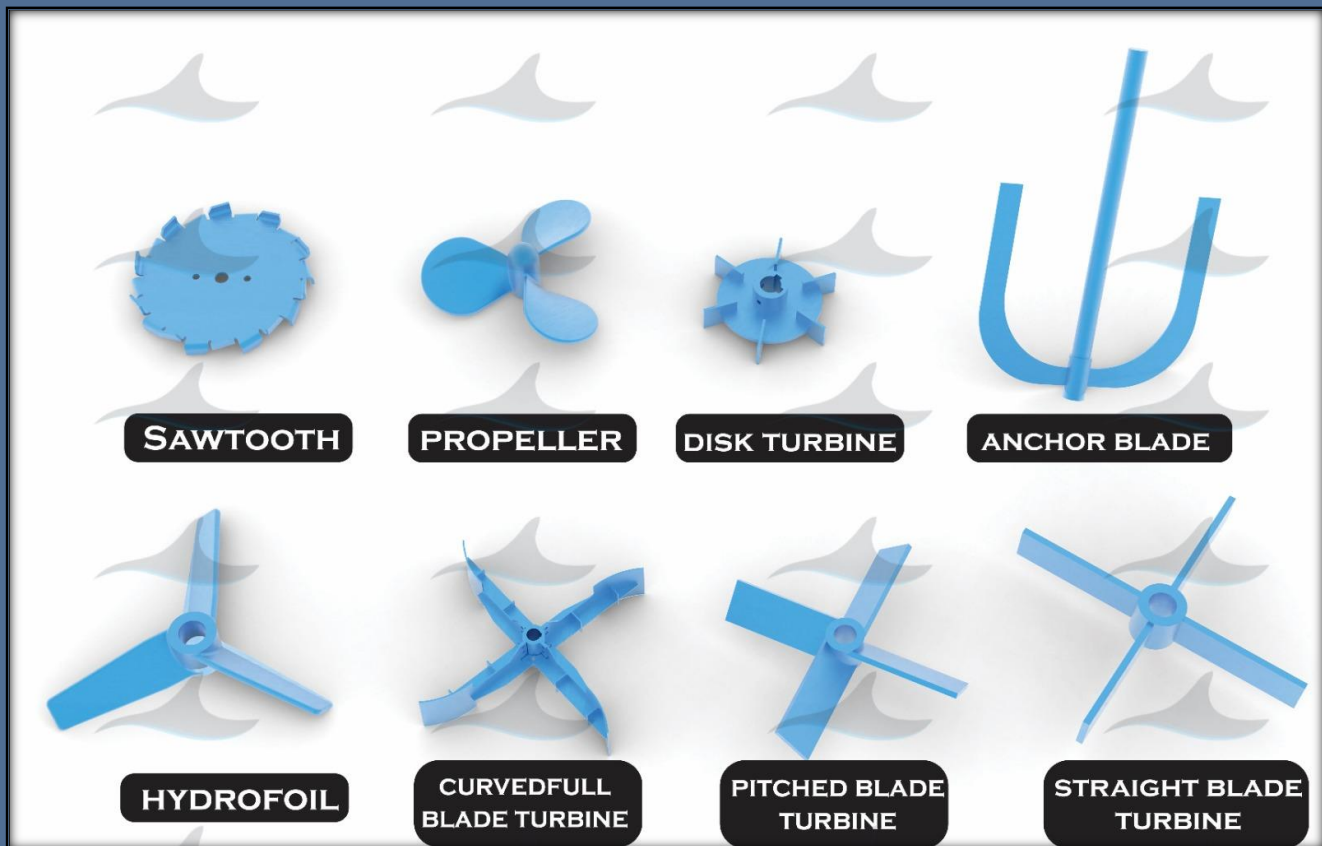
- Mild agitation performs a blending action.
- Medium agitation involves a turbulence that may some gas absorption.
- Violent agitation creates emulsification.

Mixers are Designed to achieve one of the following:

- Blending: combines miscible materials to form a homogeneous Mixture.
- Dissolving: the dissipation of a solid into a liquid.
- Dispersion: the mixing of two or more non-miscible materials.
- Solid Suspension: suspends insoluble solids within a liquid.
- Heat Exchange: promotes heat transfer through forced convection.
- Extraction: separation of a component through solvent Extraction.

Agitator or Mechanical Mixer usually consists of a shaft-mounted Impeller connected to a drive unit.

TYPES OF IMPELLERS USED AS AGITATORS:



- **Agitator:** The assembly consisting of impeller, impeller shaft and drive including other parts such as gland, and bearing used in conjunction with the above.
- **Impeller:** The actual element which imparts movement to the charge (fluid).
- **Propeller:** A high speed impeller which essentially imparts axial thrust to the fluid.
- **Turbine:** An impeller with essentially constant blade angle with respect to a vertical plane, over its entire length or over finite sections, having blades either vertical or set at an angle less than 90° with the vertical.
- **Paddle:** – An impeller with four or fewer blades, horizontal or vertical, and essentially having a high impeller to vessel diameter ratio.
- **Anchor:** Basically, a paddle type impeller which is profiled to sweep the wall of the containing vessel with a small clearance.
- **Baffle:** An element fixed inside the vessel to impede swirl.
- **Draught Tube:** A tubular fitting which is arranged to direct the liquid flow produced by the impeller.
- **Filling Ratio:** The ratio of liquid depth in the Vessel-to-Vessel Diameter.
- **Swirling:** The Continuous Rotation of liquid about a Fixed Axis.
- **Vortex:** A depression in the surface of a liquid produced by swirling. **Fully Baffled Condition:** A condition when any further increase in baffling causes no significant increase in power consumption, this may be considered as a state where the liquid swirl in the vessel has become negligibly small and when all the power input to the impeller expended to create turbulence.

SNAPS OF OUR SUPPLIED AGITATORS & REACTORS



Limpet Coil Reactor



Hydrofoil Impeller (Ø2.0 mtr)



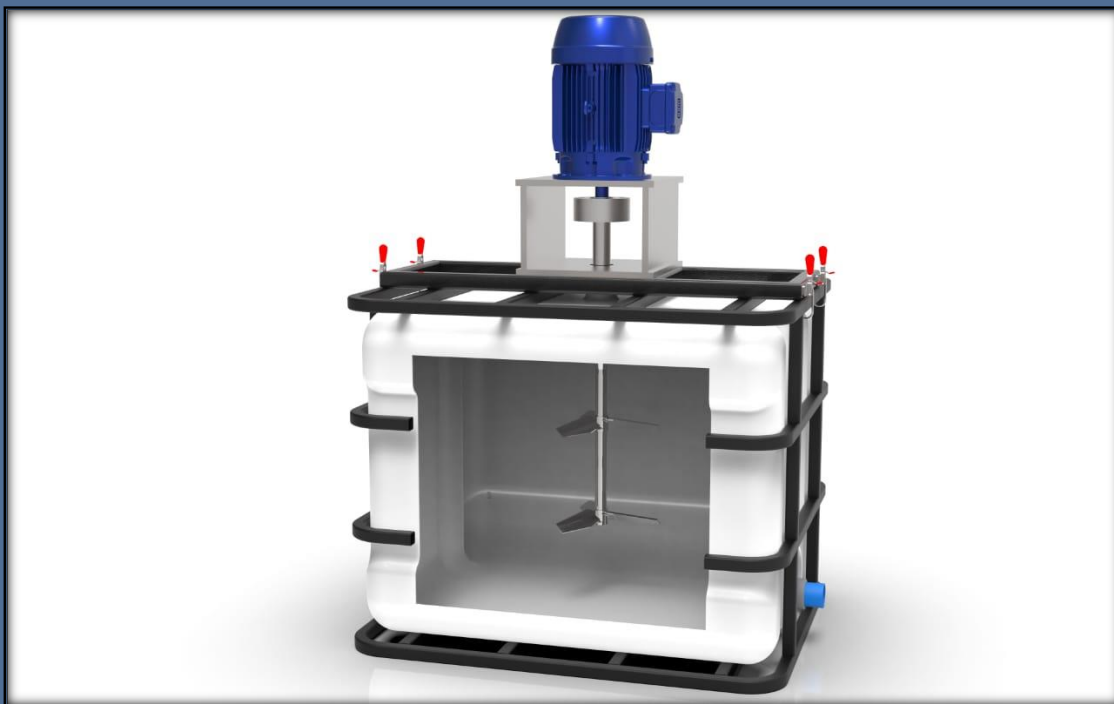
Anchor Agitator Assembly (Pharma Application)





IBC TANK AGITATORS AND DRUM AGITATOR:

Orcinus expertise in manufacturing of IBC Tank Agitator and Drum Agitators as per Customer requirement. Mixing products inside an IBC and Drum can be easy and reliable with the use of a practical design and experience that comes with knowing the technology and application.



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