

AGITATOR

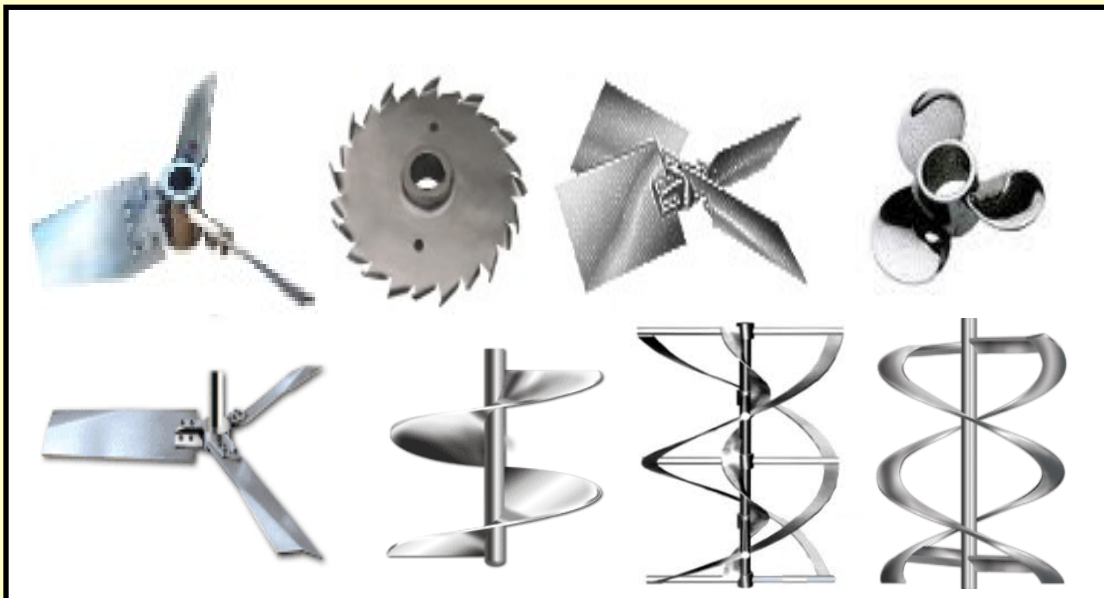
1) APPLICATIONS :

Industrial agitators are machines, which is used in industries like chemical, food, pharmaceutical and cosmetics to process product in a view of:

- Mixing of liquids having wide range of viscosity.
- Mixing of Liquids with Solid powder.
- Promote the reactions of chemical reactants.
- Increase heat transfer by heating or cooling.
- Homogenization of bulk storage liquids.
- Dispersion of immiscible liquids.
- Gas Liquid Contacting.
- Gas-Gas Mixing.
- Mixing of Liquids of extreme Viscosity ratio.
- Turbulent Mixing of miscible low Viscosity liquid.

2) TYPES OF IMPELLERS :

- Four-bladed, Pitched-blade Turbine.
- Three-bladed Axial Turbine.
- Propeller
- Hydrofoil
- High Shear
- Screw
- Double Ribbon
- Counter Rotating (Paddle + Anchor)



3) MATERIAL OF CONSTRUCTION :

- Carbon Steel
- Carbon Steel + FRP
- Carbon Steel + PVC
- Carbon Steel + Rubber Lined
- Carbon Steel + Epoxy Coating
- Stainless Steel (SS 304,SS 304L,SS 316,SS 316L)
- Special Alloys.
- Hastelloy
- Titanium

4) MOUNTING ARRANGEMENT :

- Foot mounted Motor with Gear Box.
- Flanged mounted Geared Motor.
- With and Without Bottom Bush
- Wall mounted
- Side entry with retracting type Mechanical Seal.
- Chain / Hoist mounted.
- Portable clamp mounting
- Detachable coupling.

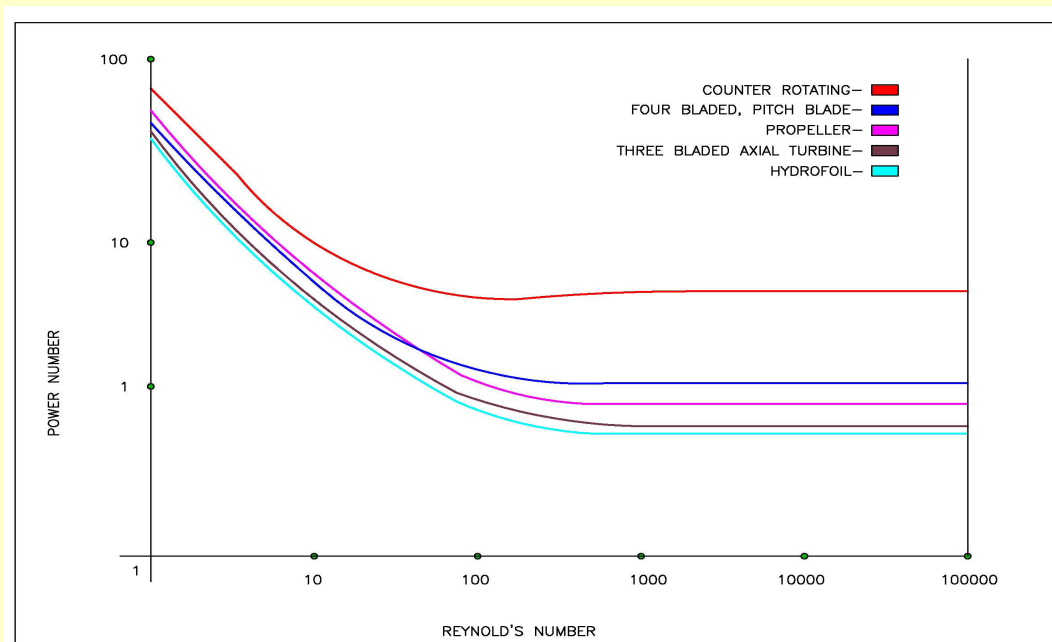


5) SELECTION :

Selection of Agitator depends upon Application and more importantly the physical properties of the materials. Simplistically, at first one calculates the Reynolds Number

$$\begin{aligned} \text{Re} &= d^2 N \rho / \eta \text{ where} \\ d &= \text{Diameter of impeller (m)} \\ \rho &= \text{Density of Fluid (kg/m}^3\text{)} \\ N &= \text{Rotational Speed (RPS)} \\ \eta &= \text{Viscosity (Pa.S)} \end{aligned}$$

For higher Reynolds Number one goes for Turbines and Propeller and for Low Reynolds one goes for Helical Ribbon or Screw. Next to this one calculates the power requirement using a plot. Detailed selection should have criteria of lowest Energy Consumption for the application under consideration.



$$\text{Power No. : } P_o = \frac{P}{\rho N^3 d^5}$$

$$\begin{aligned} P_o &= \text{Power No. (Unitless)} \\ P &= \text{Absorbed Power (hp)} \\ \rho &= \text{Density of Fluid (kg/m}^3\text{)} \\ d &= \text{Diameter of Impeller (m)} \\ N &= \text{Rotational Speed (RPS)}. \end{aligned}$$

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