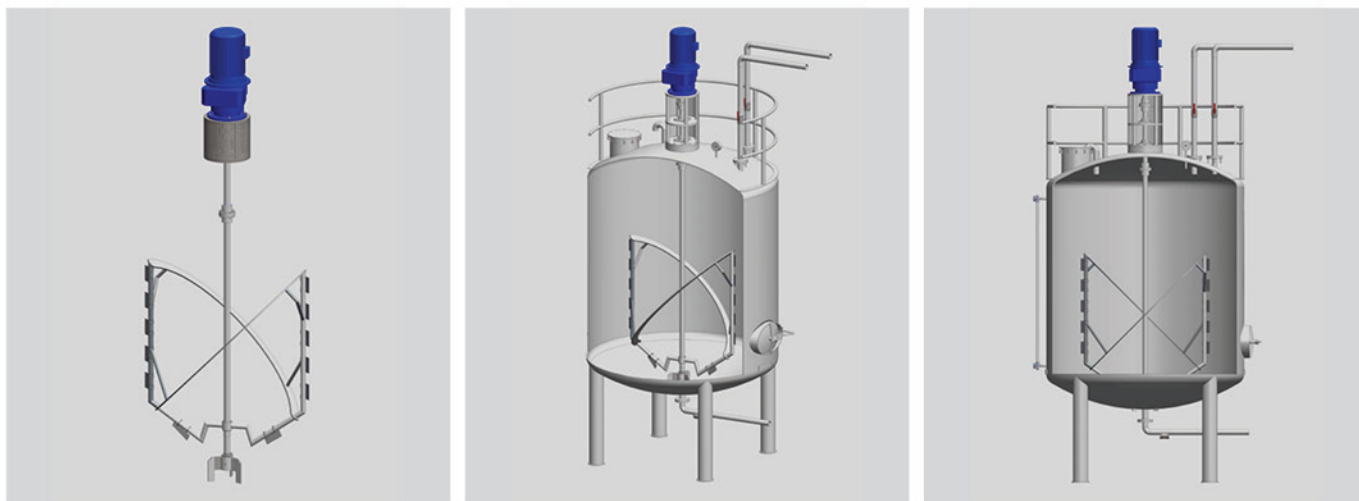




Close-Clearance Impellers Types

Helical Ribbon Impeller



The mixing of fluids is a common operation encountered in productions of polymer, food, paint, and greases, to name a few. Poor mixing may result in formation of dead zones, hot spots, and temperature and concentration gradients, which will affect the quality of the final products. The selection of mixing systems depends on operating conditions such as agitation speeds and fluid properties. When the viscosity of the fluid is low, the rotational speed of the agitator can be high enough to produce turbulent flows. Most of these systems involve the use of turbine impellers such as Rushton turbines or pitched blades. For highly viscous liquids, the flow is more likely in the laminar regime because, otherwise, an extremely high demand of power is required. The use of small turbine impellers becomes inefficient as stagnant zones may be formed in the region at far distance from the impeller. To obtain adequate mixing under laminar flow conditions, closeclearance impellers are usually adopted. Impellers such as anchors, gates, or paddle impellers, which produce mainly circumferential flow, perform poorly in mixing because of lack of axial flow to sweep through the entire vessel. In an agitating system with helical ribbon impellers, mixing proceeds first in the region near the blades and the vessel wall where the fluid is subject to high shear strains. Fluid homogenization is then fulfilled by the axial vortex flow induced by the rotation of the ribbon impeller. It has been shown that this kind of impeller is very effective in mixing high viscous fluids.

Advantages

- Helical ribbon impellers are designed especially axial movement of the liquid (in the process of 'replacement of liquids'). Such an impeller can be designed with an additional inner helix used to pumping in the opposite direction. This is needed for the mixing of high viscosity materials.
- These impellers can also have two outer helices. The quality of the final mixed product in these applications can be very important economically.
- Wall scrapers can be mounted on the impeller blades to improve heat transfer and homogeneity in sticky products.

Technical features

- Suitable for very high viscosity up to 25,000,000 cps

Applications

- Most chemical process industry plants for high viscosity mixing applications: polymer industries and food industry plants for high viscosity mixing applications such as creams, lotions, ink, paint, sauces, pastes, adhesive, etc.