

## PS - High Shear Mixer

### Introduction:



When you want to produce stable emulsions and creams, wet and dissolve sticky powder (gums, thickeners, stabilizers), deagglomerate and disperse micro-phase solid ingredient (silicon dioxide, bentonite, titanium dioxide) into liquid without fish-eyes, or other similar tricky tasks, a traditional agitator is usually not able to achieve the expectation. However, the high shear mixer is what you should choose to do the job.

PerMix PS series High Shear Mixers present a solution for dispersing one or several solid, liquid phase into another continuous liquid phase in a fast and efficient way, while the phases are normally immiscible.

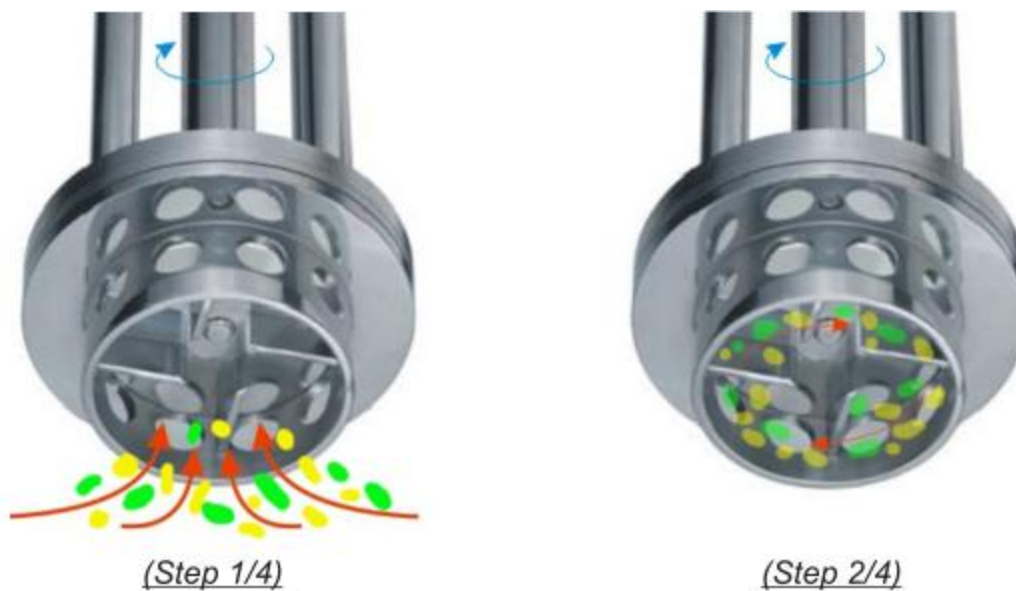
Unlike conventional mixing, PS Mixer is structured with an innovative stator-rotor. This special design makes PS Mixer not only simply mix, but also disperse, suspend, emulsify, homogenize and disintegrate liquid and solid. PerMix PS Mixers are used to handle a wide range of products in the food-processing, cosmetics, pharmaceutical and fine chemistry industries.

## Working Principles:

High Shear Mixers work with a special designed stator/rotor working head. When it works, this stator/rotor head is able to draw the solids and liquids around it into its center, and then push them radially through the stator openings back to the tank.

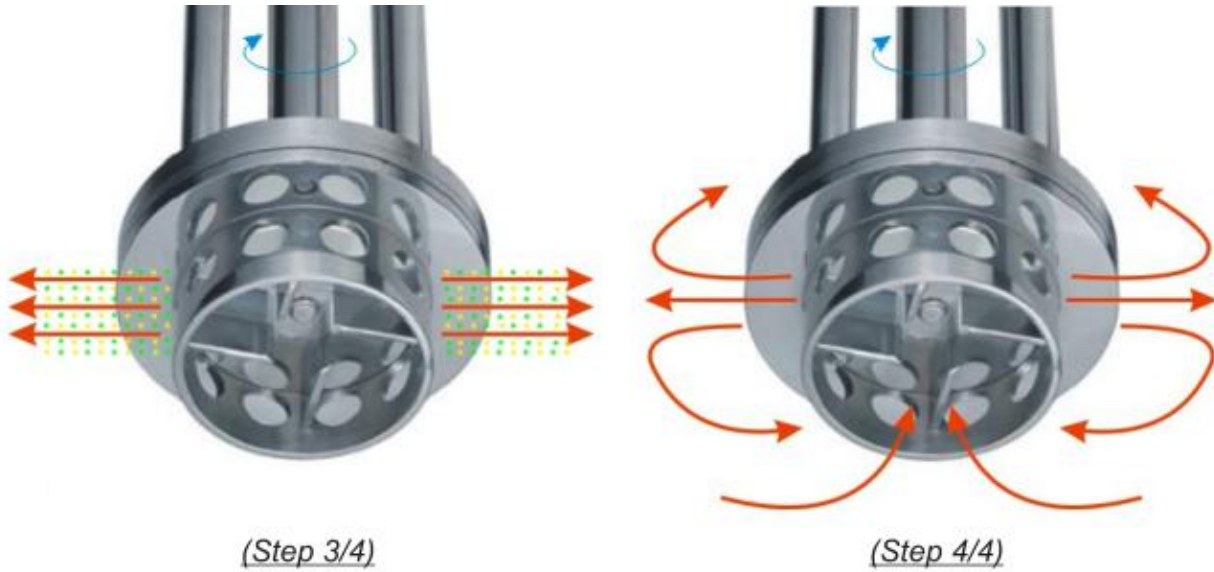
During this period, the solids and liquids are subject to an action of milling and shearing which is so intensive that they are deagglomerated, homogenized and dispersed into each other even though they are immiscible by traditional agitation.

There are four steps to explain the working principle:



Step 1. When the rotor is driven by the motor, it rotates at a very high speed of several thousands rpm. A powerful suction is generated at its center and draws both solids and liquids from the bottom of the tank into the central zone.

Step 2. Centrifugal force leads the materials to the periphery. Materials are subjected to intensive squeezing and milling at the precision machined clearance between rotor and stator. High pressure is created there too due to the gathering of materials, which makes the impact between particles more remarkable.



Step 3. Followed is another intense hydraulic shear as the materials are forced out through the openings in the stator at very high velocity. When material particles arrive outside of the stator, they tend to explode into thousands of even smaller ones as the pressure drops down sharply.

Step 4. Fresh materials are continually drawn into the stator-rotor maintaining the mixing cycle. Due to the vortex in the tank, materials in every corner of the tank can pass through the stator-rotor system again and again, resulting in fine droplet size.

### **Stator/Rotor System:**

We offer two types of Stator & Rotor systems: V and K, and both have several sub-types. The reason to have so many designs of stator & rotor systems is to offer more selections for our customers to choose the most suitable one to deal with their specific liquids and solids.

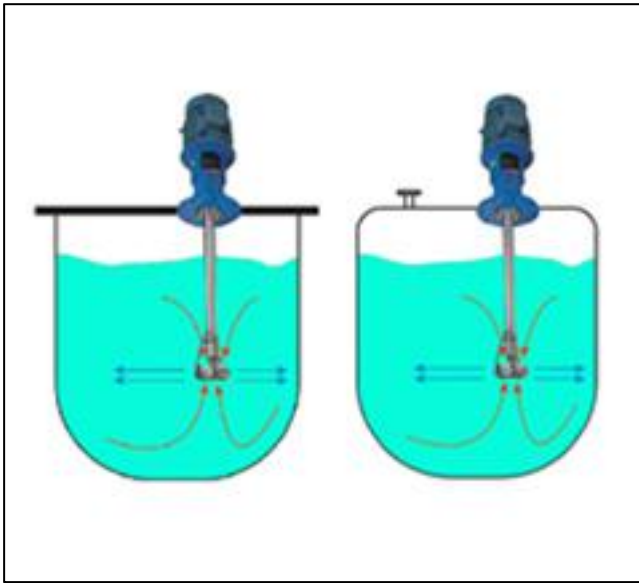


**V type**

**K type**

## **Installation and Set-up:**

In the Batch process, the mixer is immersed into the liquid. There are many installation methods for the batch mixer. It can be lifted up by a lifting stand (hydraulic or electric), or it can be installed with flange on the top of a tank, or from its side, or at its bottom. For the vacuum or pressurized tank, the mixer must be equipped with a mechanical shaft sealing.

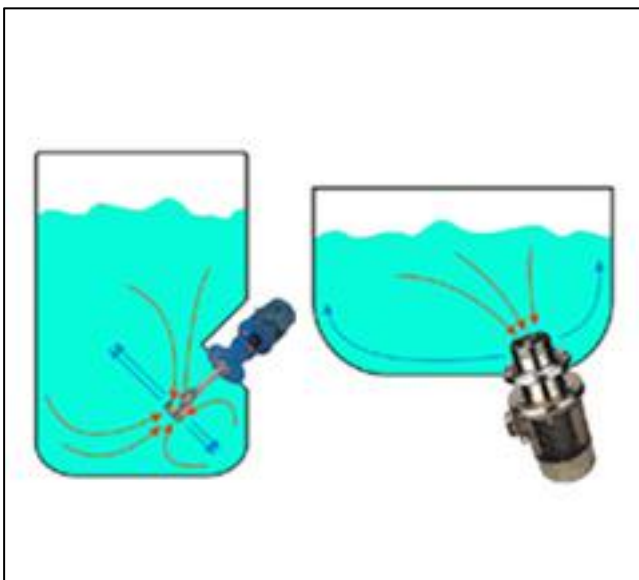


### **- Top entry, open vessel**

These mixers are used in an open vessel, that is, a vessel with normal pressure. They are top entry mixers, can be installed onto a lifting stand, or directly onto the vessel by a flange or traverse. A coupling between the motor and shaft is optional for low noise and stable running.

### **- Top entry, closed vessel**

These top entry high shear mixers are with a mechanical seal, which enables them to be working in a pressurized or vacuum vessel. Single seal or double seals are available.



### **- Side entry**

The side entry mixers are very useful when the tank is deep but narrow, or when the top space of the vessel is limited for the top entry ones.

### **- Bottom entry**

The bottom mixers are outstanding when the liquid level in the tank can get very low during operation, or there is very limited space above or around the tank for either top or side mounted ones. What is more, strong vortex as well as aeration is greatly reduced with the PERMIX bottom mounted mixers.

## **Applications:**

High Shear Mixers are widely used by a variety of industries in different stages of the processing. They are highly efficient to save a lot of energy and time compared with traditional mixing methods.

### **- Food & Beverage**

Reconstituted milk, Salad dressing, Mayonnaise, Ice cream, Cheese, Yogurt, Fruit juice

### **- Pharmaceuticals & Biology**

Drug synthesis, Vaccine, Fat emulsion, Injectable suspension, Veterinary medicine, Cell extraction

### **- Cosmetics & Daily Care**

Detergent, Body gel, Shampoo, Cream, Lotion, Tooth paste, Soap

## Specifications:

### Top Entry Mixer:

Model	Watts, kW	RPM, @50Hz	Max. Capacity, L		Shaft Length, mm
			@1 cPs	@3,000 cPs	
PS-X/080	1.5	3000	50	20	350
PS-X/100	2.2		100	50	600
PS-X/120	4		300	150	700
PS-X/140	7.5		800	500	800
PS-X/160	11		1500	750	820
PS-X/180	18.5		2000	1000	1100
PS-X/200	22	1500	4000	2000	1150
PS-X/220	30		5000	2500	1200
PS-X/240	37		6500	3200	1300
PS-X/270	55		10000	5000	1500
PS-X/290	75		12000	6000	1550
PS-X/300	90		15000	7500	1600

- 1) PS-C, PS-D, PS-M share the same specifications.
- 2) Actual liquid capacity will vary depending on the liquid type and different stator rotor system.
- 3) PerMix offers bigger capacity according to customer requests.
- 4) PerMix reserves the right to modify the design without notice.

### Bottom Entry Mixer:

Model	Watts, kW	RPM, @50Hz	Max. Capacity, L		Shaft Length, mm
			@1 cPs	@3,000 cPs	
PS-B/80	1.5	3000	50	20	80
PS-B/100	2.2		100	50	100
PS-B/120	4		300	150	150
PS-B/140	7.5		1000	500	150
PS-B/160	11		1500	750	150
PS-B/180	18.5		2000	1000	180
PS-B/200	22	1500	4000	2000	180
PS-B/220	30		5000	2500	190
PS-B/240	37		6500	3200	200
PS-B/270	55		10000	5000	210
PS-B/290	75		12000	6000	210

- 1) Actual liquid capacity will vary depending on the liquid type and different stator rotor system.
- 2) PerMix offers bigger capacity according to customer requests.
- 3) PerMix reserves the right to modify the design without notice.



**Gallery:**



PS Mixer with 1.8m Shaft Length



Bottom Entry PS-B High Shear Mixer



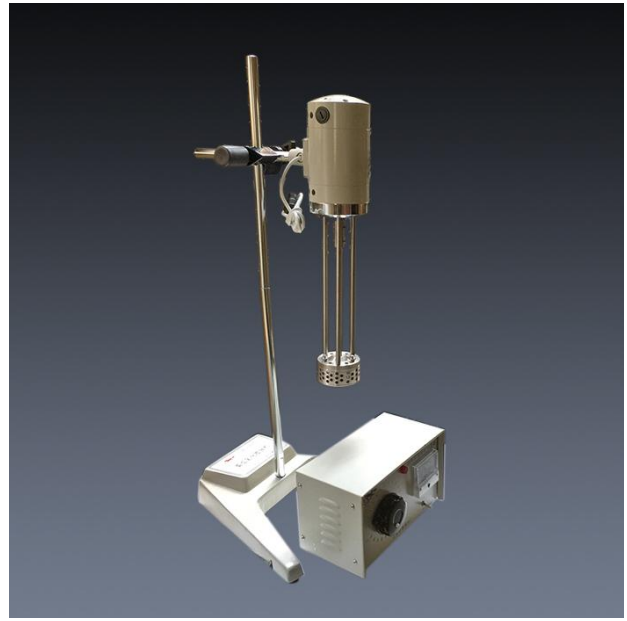
PS-D Mixer with Lifting Hanger



V-type Stator Rotor of PS-B Mixer



PS-B Bottom Mounted Mixer



Lab-size PS High Shear Mixer