

## PSG - Sigma Mixer

### Introduction:



The PerMix PSG series Sigma Mixer, which is also known as the Double Sigma Mixer, or Double Z Blade Mixer, is used for the mixing-kneading of materials with very high viscosity (over 500,000 cps).

With its unique design of Z-shaped mixing tools installed in two semi-cylinders, the PerMix PSG series Sigma Mixer is able to provide a combined functions of compressing, stretching, folding, kneading & mixing, which makes it widely used in the chemical, food, sealing compound and paint industries, among others. If a screw extruder is applied for discharging, the mixer is also called Sigma Mixer Extruder, or Mixtruder.

### How It Works:

In the PerMix PSG series Sigma Mixer, there are two special designed Z-shaped rotating elements installed in a W-shaped chamber, the intersection of which forms a saddle piece and meeting tangentially just above the saddle. They rotate at different speeds (usually in the ratio of 3:2) and in opposite direction.



The mixing action is a combination of bulk movement, smearing, stretching, folding, dividing, and recombining as the material is pulled and squeezed against blades, saddle, and side walls. Continually new layers of material are compressed and folded over one another and are subjected to shearing forces. New surfaces are formed and the components can penetrate.

The blades, which are ground and polished, successively sweep all points of the trough surface during each revolution, at the same time dividing the batch continuously across the saddle piece and thereby rapidly affecting a perfectly homogeneous mix.

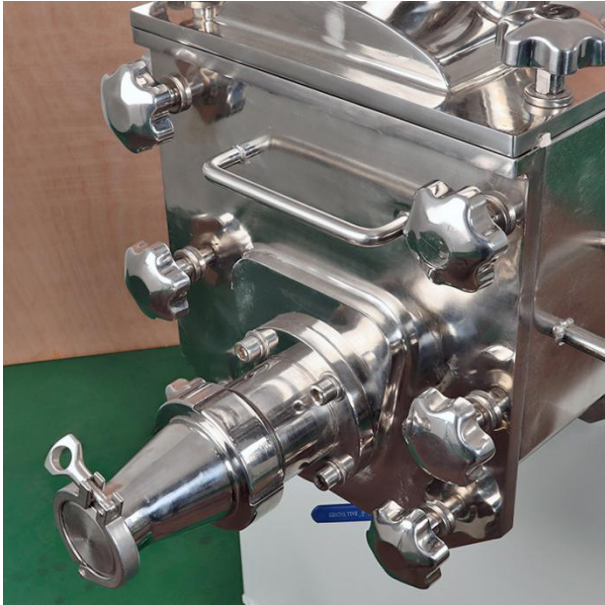
### **Discharge Arrangement:**

For PerMix PSG Sigma Mixers, There are mainly two ways for discharging the product after mixing:



**(1) Tilting Tank**

For small machines (PSG-1 to PSG-15), tilting can be done manually with a mechanical type (handlever or handwheel). For greater machines, electro-mechanically or hydraulically powered tilting system is supplied. PerMix supplies the feature that at tilted position, the blade will rotate at low speed (usually 20% of full speed) in reverse direction to aid the discharge by pushing two buttons with both hands.



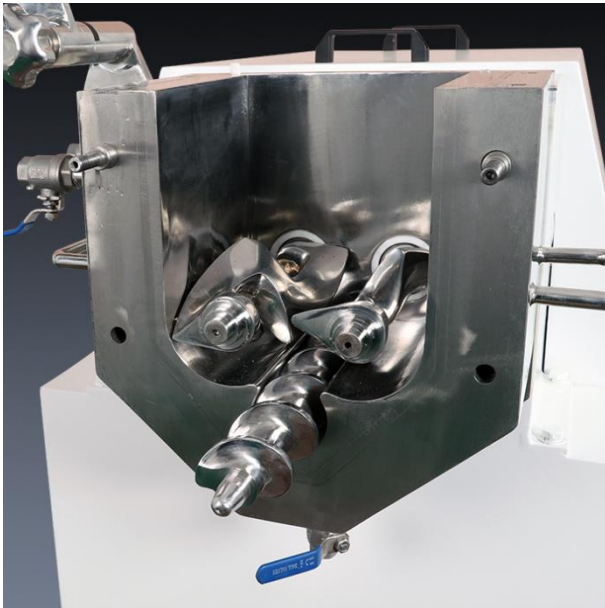
## **(2) Extrusion Screw**

The extrusion-discharge screw is located in the saddle section and runs in a cylindrical trough tangential to, and below the 2 mixing blades. During the mixing cycle the screw moves the material within the reach of the mixing blades, thus assuring a thorough blending of all the ingredients, and, at the same time, accelerating the mixing process. At discharge time, the direction of rotation of the screw is reversed and the mixed material is extruded through suitable die openings in the side of the machine. The extrusion screw has its own separate drive so that blades and screw operate independently.

Other discharging options are available against request, such as regular ball valves mounted at the trough bottom.

## **Options:**

The large number of options available for the PerMix PSG series Sigma Mixer enable it to perform particular functions or operate as a general kneader:



- Quick disassembly & Easy cleaning design
- Lab-size for R&D applications (Full volume of 1, 3, 5, 15L)



- Overlapping arms
- Special 'Duplex' kneading arms for intensive kneading
- Variable speed drive
- Hydraulic powerpack for tiltable trough
- Vacuum execution
- Welded jacket to the trough for heating & cooling
- Bored shaft / arms for heating & cooling

## Special 'Duplex' Kneading Arms



PerMix offers PSG-D series 'Duplex' Sigma Mixer which is specially designed for even more intensive kneading applications. They are twin basin kneading machines with two horizontally arranged kneading blades, which are deeply geared into one another and strip themselves reciprocally. The kneading blades are turning acc. to a ratio 1:2.

Because of their different speeds, the blade sides approach and withdraw alternately. This causes high pressure tensile and shearing rates and therefore heavy friction in the kneading medium, which creates excellent dispersing and homogeneity. The shape of the kneading blades enables a steady flow of material from the side walls of the kneading trough to the middle of the kneading trough.

## Specifications:

Model	Total Capacity (liters)	Working Capacity (liters)	Power (kW) [Arms]	Speed (rpm) [Arms]	Length (mm)	Width (mm)	Height (mm)
PSG-1	1	0.6	1.1	45/30	550	450	700
PSG-3	3	2	1.1	65/40	650	500	700
PSG-5	5	3.5	1.1	65/40	700	550	730
PSG-10	10	6	1.5	50/35	900	580	691
PSG-15	15	10	2.2	50/30	1053	623	861
PSG-50	50	30	1.5-5.5	42/27	1330	910	1350
PSG-100	100	60	2.2-7.5	42/27	1588	984	1452
PSG-150	150	90	3-7.5	42/27	1780	990	1600
PSG-200	200	120	4-11	42/27	1988	1000	1829
PSG-300	300	180	4-15	33/22	2730	1930	1745
PSG-400	400	240	5.5-18.5	33/22	2850	1950	1800
PSG-600	600	360	11-37	33/22	3070	2080	1870
PSG-800	800	480	11-45	33/22	3270	2250	1950
PSG-1000	1000	600	15-55	33/22	4080	1560	2055
PSG-1500	1500	900	18.5-75	28/19	4600	1700	2330
PSG-2000	2000	1200	30-75	28/19	5100	1850	2600

- 1) All specifications are as accurate as is reasonably possible, but they are not binding.
- 2) Arms speed can be specified by the customer.
- 3) Customized sizes are available against request.
- 4) PerMix reserves the right to modify the design without notice.

**Gallery:**



**PSG-5 Lab Mixer by Manual Tilting**



**PSG-10X Sigma Mixtruder**



**PSG-50 Sigma Mixer with Electric Control**



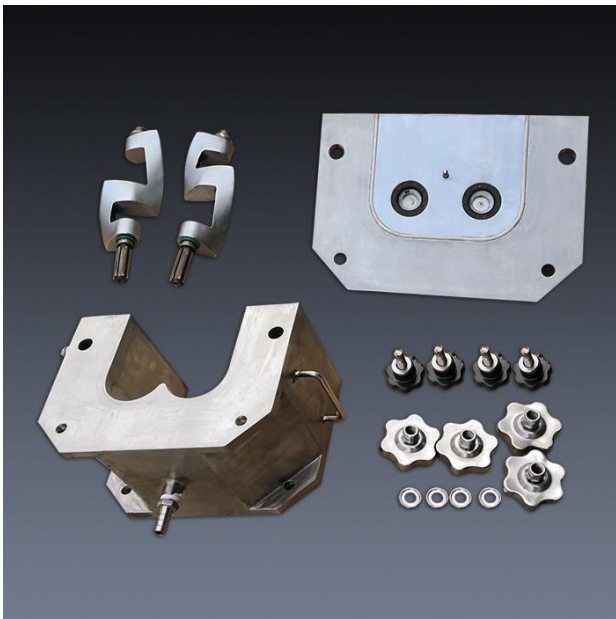
**PSG-2500X Heavy Duty Mixtruder**



PSG-3 Lab Sigma Mixer



PSG-300X Sigma Mixer with Extruder

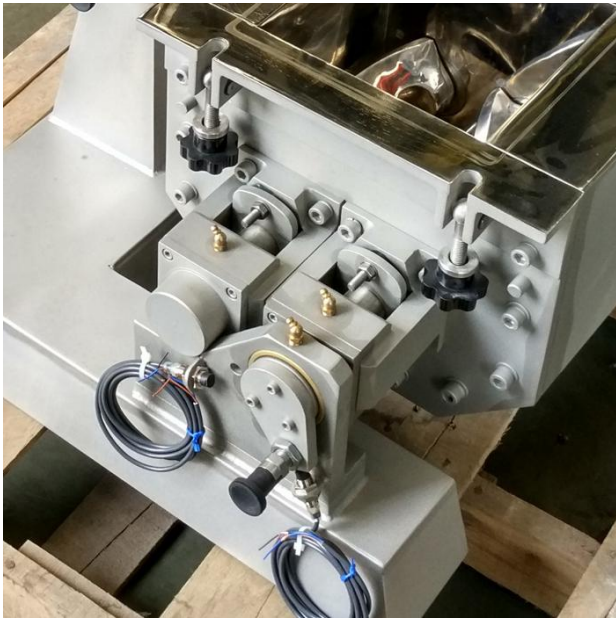


Quick Disassembly & Easy Cleaning Design

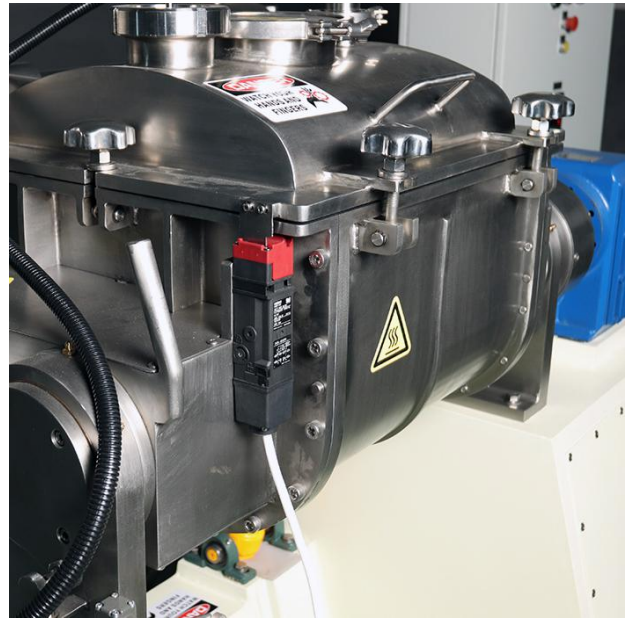


Temperature Probe of PSG Mixer

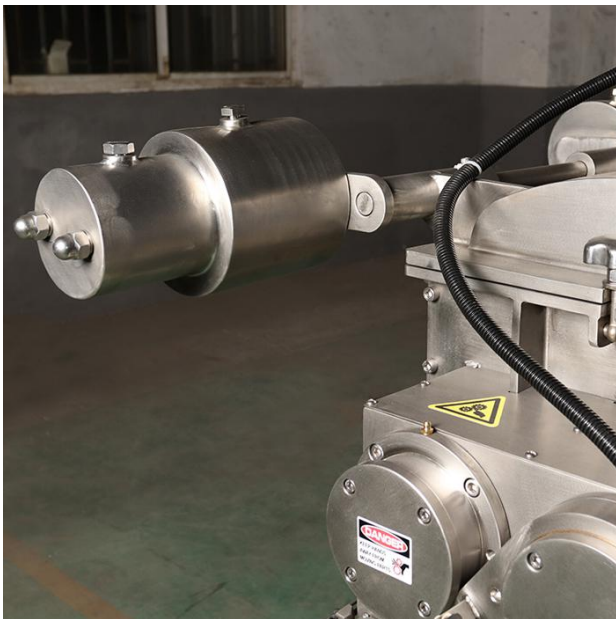




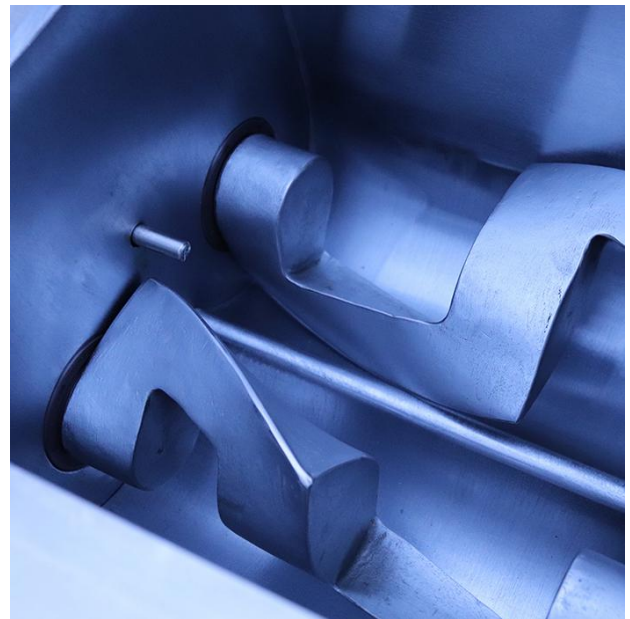
Safety Switches of PSG-5 Lab Mixer



Safety Door Lock of PSG-50 Mixer



Counterweight of PSG Sigma Mixer



3D Printed Blades of PSG-3 Mixer