

We are dedicated to manufacture products that satisfy our customers and are safe to use.



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ISO 9001 certificate acquisition
Tokyo office · Osaka office



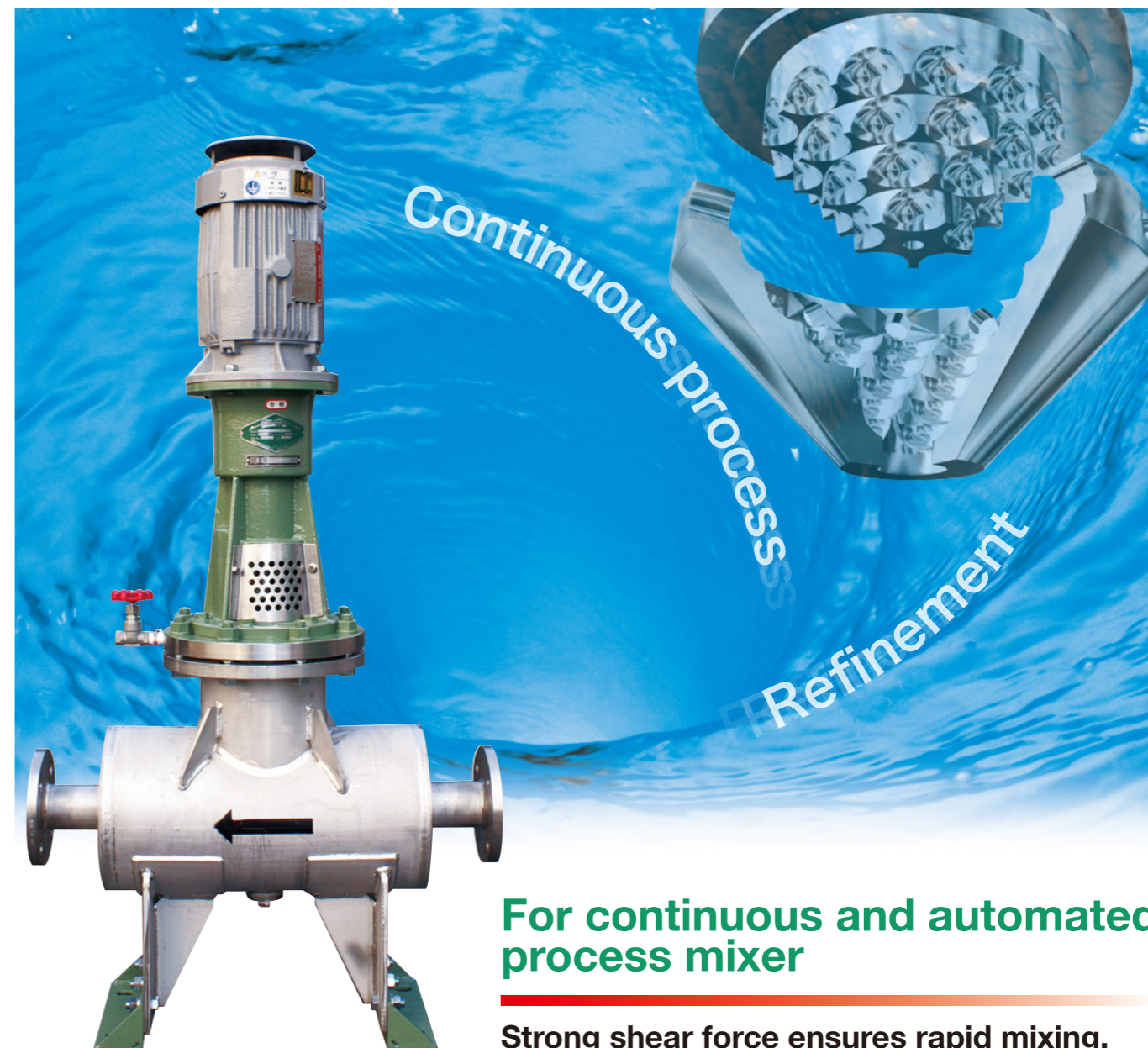
ISO 14001 certificate acquisition
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Scope of review:
Development, design, manufacture, repair, and sales management of mixing devices

Super Shear Mixer® is registered trademarks of Satake Chemical Equipment MFG., Ltd.

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The Satake Line Mixer is a mixer with new possibilities that can be installed in the middle of a plant pipeline to automate continuous high-speed mixing, continuous additive blending, and the formation of various mixing processes according to the application.

This is a built-in oriented plant mixer with a long track record that has earned its reputation as "indispensable for the latest plants" in various fields.

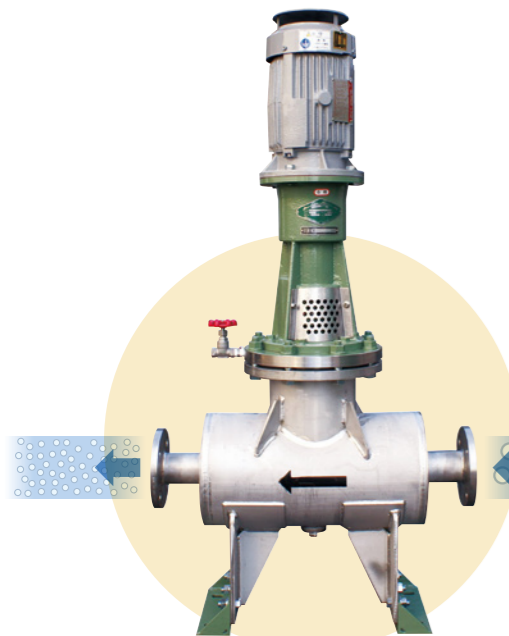
Furthermore, it can be used in combination with other equipment to obtain optimum mixing process for each application.

LINE MIXERS

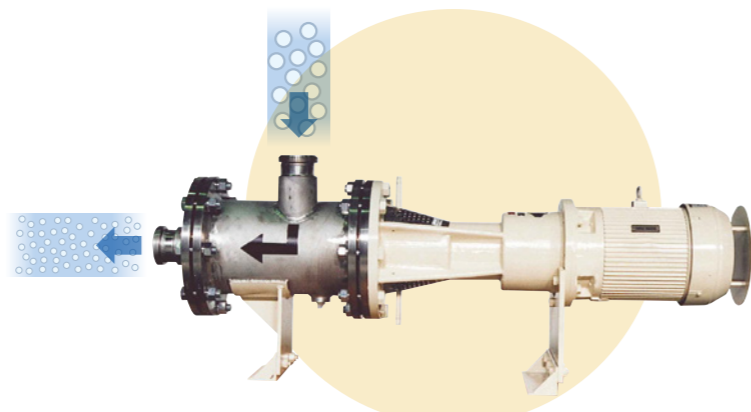
For continuous and automated mixing process

Applications:

- Continuous additive blending in oil refineries, etc.
- Mass emulsification and blending in food and oil industries
- Dilution of water-soluble paints and rapid dissolution of resin powder
- Continuous blending of mixed fuel oils
- Manufacturing of water-oil emulsion products
- Continuous gas-liquid reaction
- Slurry preparation and combustion preparation of CWM
- Continuous neutralization treatment of liquid waste in various factories
- Continuous chemical treatment and addition in water treatment
- Rapid dilution of various high-viscosity liquids and other continuous mixing operations

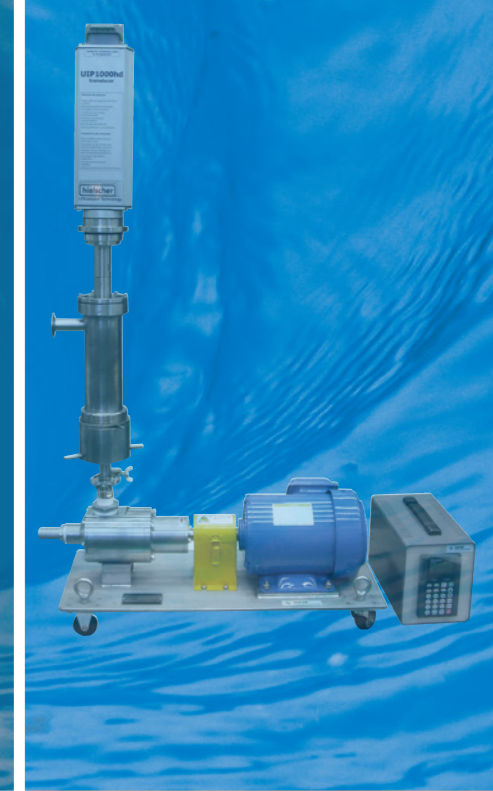


Top-mount type line mixer



Side-mount type line mixer

Strong shear force ensures rapid mixing.

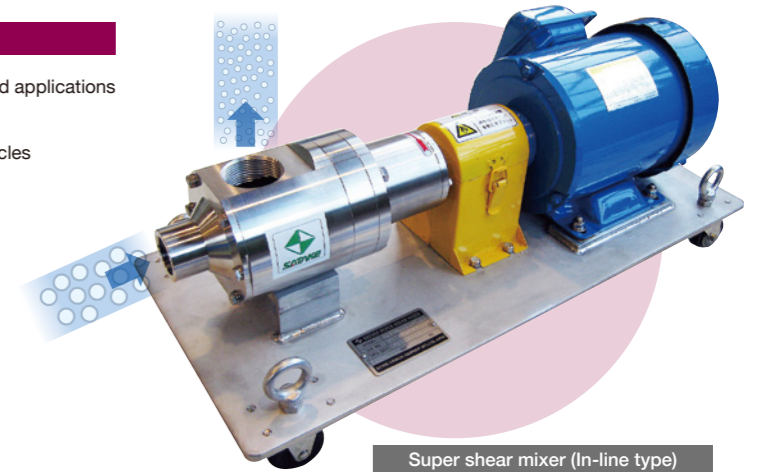


For more powerful dispersion

SUPER SHEAR MIXERS

Applications:

- Stronger dispersion for the left mentioned applications
- Premixing of nanoparticles production
- Redispersion of agglomerated nanoparticles



Super shear mixer (In-line type)

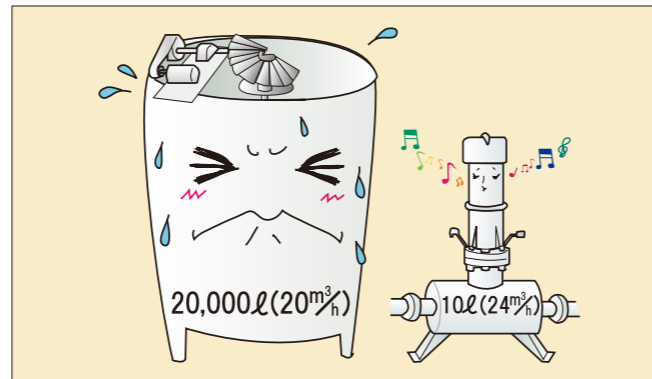
LINE MIXERS

Line mixer (pipeline blending) ideally for large volume and continuous process

It is 1/2000 of the conventional batch type, if to be replaced by a container with similar processing mixing volume

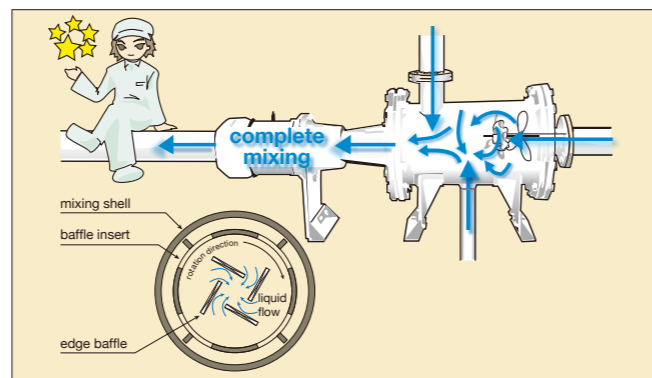
Waste-free of high-speed mixing is developed in a remarkably short time, and several liquids supplied in fixed quantities can be processed in extremely large quantities at high-cost performance by adjusting the composition and flow rate in a small mixing shell (mixing tank).

Therefore, a small device can process similar volume as a batch mixing tank with 2000 times the capacity (in the case of low viscosity, easy soluble materials) through continuous processing and powerful mixing.



Double and triple calculated unique mixing mechanism that eliminates loss of efficiency

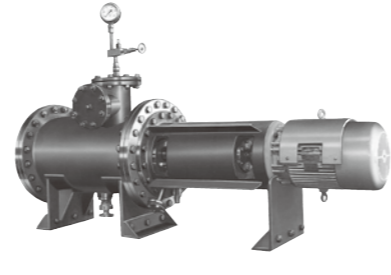
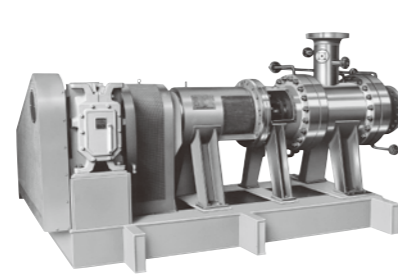
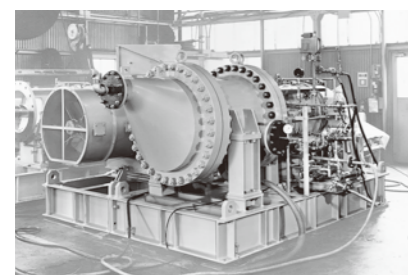
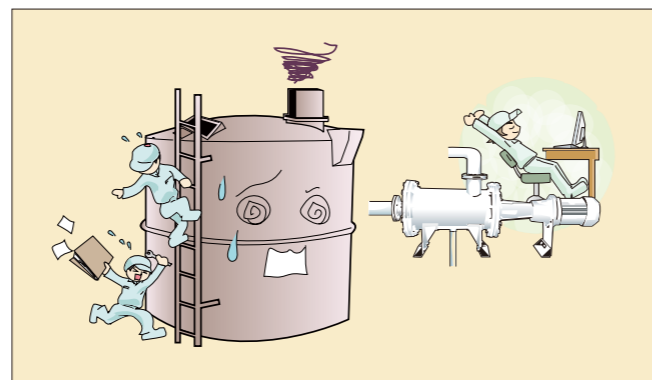
The strong swirling liquid flow generated by the impeller in a small space causes insignificant separation due to centrifugal force. To achieve complete mixing, the baffle insert is equipped with an edge baffle that concentrates the liquid flow to the center of the baffle insert for efficient remixing. Subsequently, the liquid flow maintains this mixing state and passes through a narrow channel, thereby eliminating nearly all short passes. In addition, unlike static mixers, this mixer does not homogenize in radial direction only, but in axial direction also.



High level of continuous automated operation and maintenance-free oriented with labor-saving and economic efficiency

The system is perfectly suitable for remote automatic operation of continuously supplied liquid with composition adjustment, quantitative ratio, and flow rate adjustment set at the front of the inlet. Furthermore, it is also reliable, maintenance-free structure with extremely few failures.

It is a sealed type, which inessential pouring, draining or liquid level control, etc. and can be installed in a pipeline. Since it is a continuous high-speed mixing system that can easily maintain temperature, the residence time in the plant can be reduced significantly, and energy-saving effects can be expected. Thus, it is a reliable design equipped with rationality and economic efficiency in all aspects.



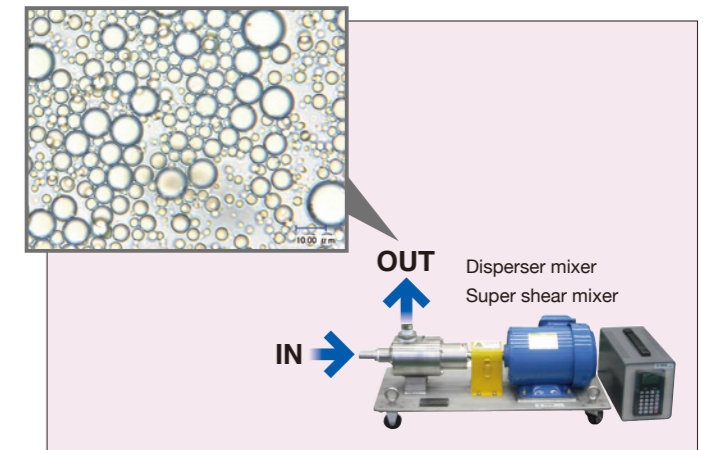
SUPER SHEAR MIXERS

Super shear mixer for more finer and higher dispersion

Dispersion in the order of several microns is possible in a single pass of continuous process.

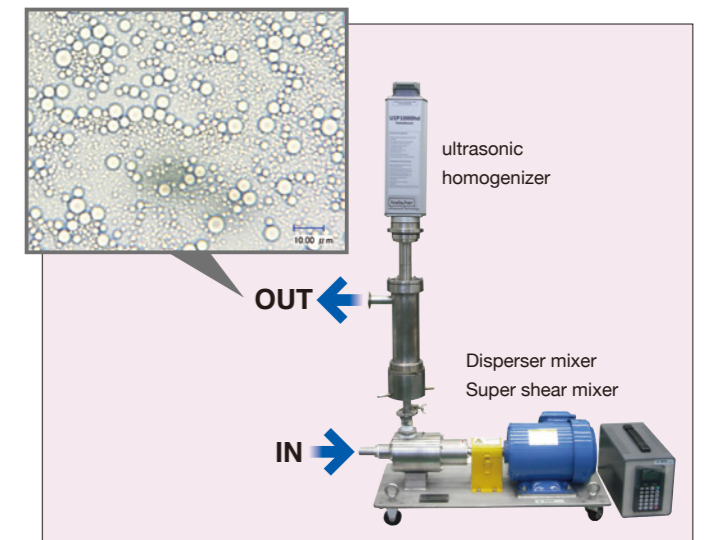
The Super Shear Mixer can be mounted on the outside of the container (tank), not only to generate a circulation line for powerful dispersion, but also good shearing and refining effects can be obtained by its powerful dispersion in a single pass. Subsequently, it can be transferred to the next process.

In the case of Oil-Water system (liquid-liquid), dispersion in several microns order is possible in continuous process.



Moreover, dispersion to submicron (100 nano order) is possible by integrating with an ultrasonic disperser.

Pre-dispersion and ultra-finishing steps were required in Oil-Water system (liquid-liquid). Even though the "Super Shear In-line Mixer" can disperse up to several microns in a single pass, dispersion up to submicron order (100 nano order) is made possible if an ultrasonic homogenizer is used together. In addition, an extremely high degree of fineness has been achieved by integrating the Dr. Hielscher's ultrasonic homogenizer into the in-line type of highly efficient high-dispersion "Super Shear Mixer".

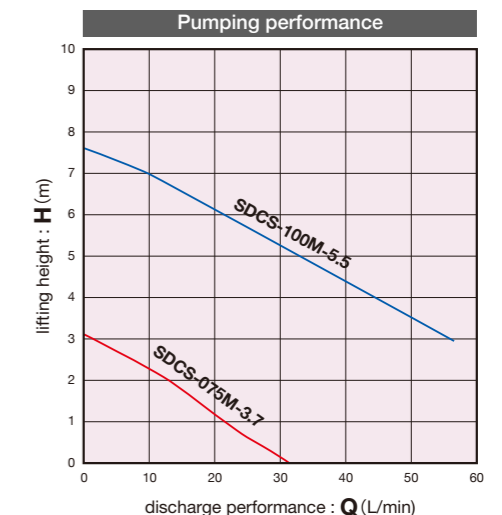


* Picture shown is Dr. Hielscher's ultrasonic homogenizer UPI1000

External tank circulation and tank-to-tank transfer dispersion are possible by using self-discharge capability.

A conventional line mixer requires the use of a pump because it has no pumping action. However, the In-line Super Shear Mixer generates pumping effect by its trapezoidal-shaped multi-stage rotor/stator to pump the liquid under pressure.

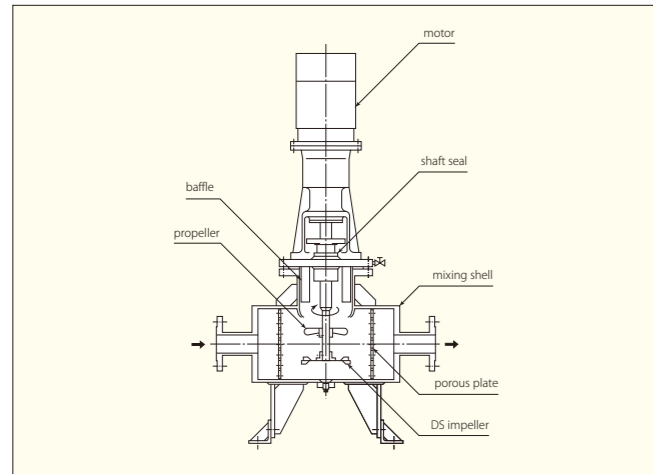
In addition, it can be used as a stand-alone mixer in a system that requires shearing action, since the liquid is forced to pass through the narrow gap between the rotor and stator while being subjected to strong shearing action.



LINE MIXERS

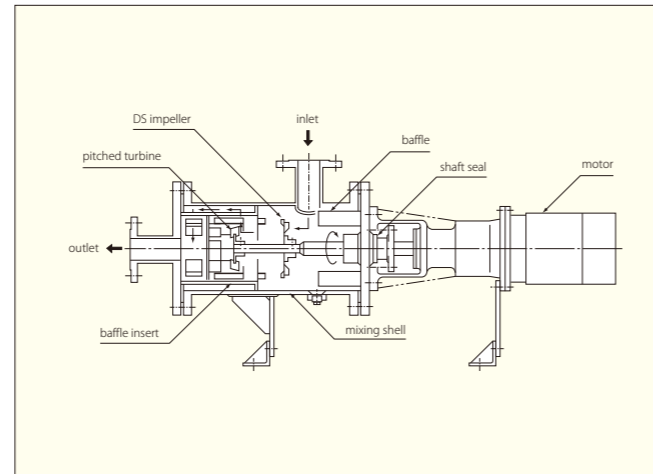
Good reputation for its durability and high efficiency based on high technology!

Top-mount type



The top-mount type has porous baffles in the mixing shell to form a strong mixing chamber. This system is designed to prevent short pass as much as possible while minimizing any flow loss. The impeller blades are equipped with a unique two-stage of DS impeller and 3-bladed propeller to utilize cavitation and turbulence effects. It is ideal for liquid-liquid mixing in high flow rate processing and low-viscosity liquid.

Side-mount type



The side-mount type has inlet nozzles mounted to the shell perpendicularly and eccentrically. The inlet liquid becomes swirling flow due to the liquid velocity, and the baffles protruding from the end faces of the shell create turbulent flow in the swirling flow. Meanwhile, since the DS impeller is rotating in the opposite direction to the swirling flow, its relative velocity to the liquid is enhanced markedly, causing the liquid to mix rapidly. Simultaneously, cavitation at the periphery of the impeller has a strong effect on the liquid, resulting in rapid microscopic mixing. Following this, the liquid is guided by the disc-shaped partition wall into the baffle insert, where it is subjected to secondary mixing by the axial inclined turbine, and then further re-mixed by hitting the end face baffle. In short, it is designed for complete mixing. For instance, water and oil can be instantly emulsified into a large volume and discharged without any surfactant.

Impellers

An impeller is one of the most important parts of a mixer. This is because, it is the only part that converts mechanical power into mixing energy. As the only part which directly mixes the liquid, thereby every single part from the shape to the twists and the rotating balance becomes a major element that affects the mixing efficiency.

3-bladed propeller

The 3-bladed propeller is the most common type of impeller with high discharge flow and low shear type derived from marine propeller. The high-speed axial flow with a swirling component creates a large circulation flow in the tank by generating a companion flow.



Pitched turbine

By providing axial flow and radial flow with the plate blade having inclination and sweep-back angle, the inhomogeneity at the top and bottom parts of the tank, which has been a disadvantage of the disk, has been eliminated by adding holes. Thereby, efficient mixing, blending and dispersing effect can be obtained by the unique flow pattern.



DS impeller

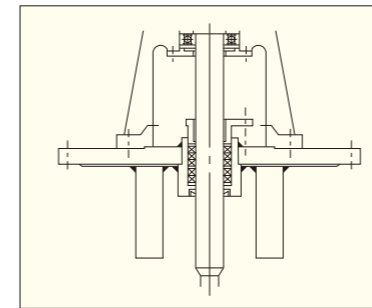
The disc of the DS impeller has a saw-tooth edge on its periphery, which creates a powerful shearing and dispersing effects by high-speed rotation. Simultaneously, sufficient circulation flow in the tank is provided by the axial flow generated.



Shaft Sealing Systems

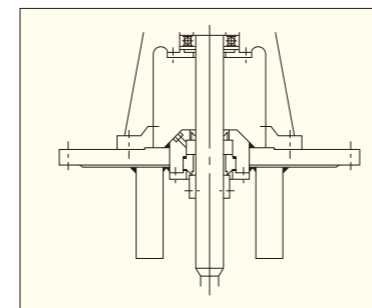
The shaft sealing system is one of the important elements that support safety and durability of a mixer. An appropriate shaft seal is required depending on the purpose of use and operating conditions.

Gland packing seal



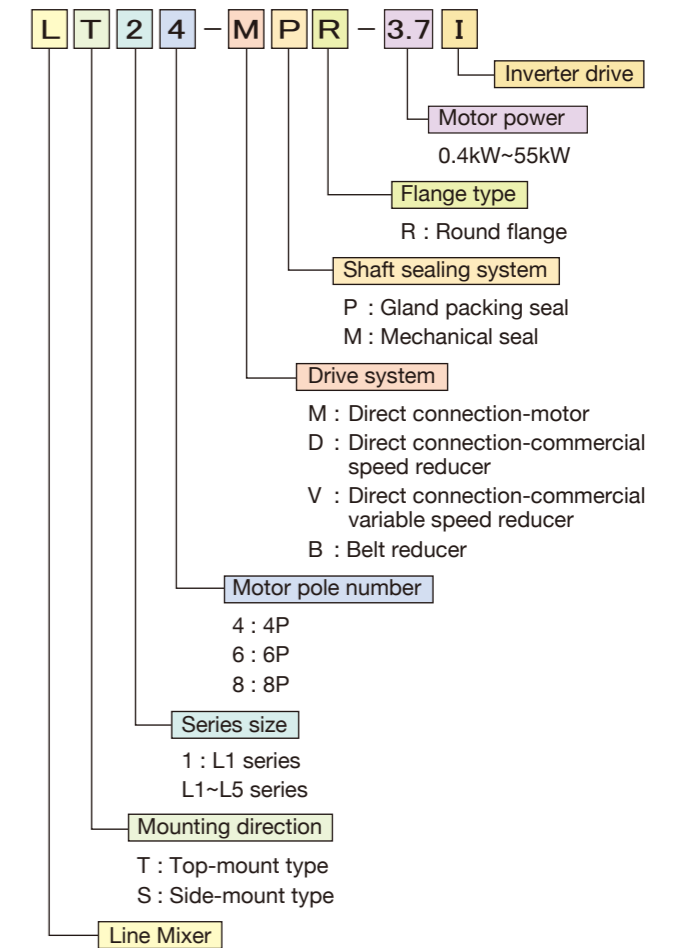
- ◆ Design temperature : Below 100°C
 - ◆ Design pressure: Below 0.1 MPaG (1 kgf/cm²G)
- It is not designed for a pressure-tight seal, but it is ideal as a simple seal.

Mechanical seal



- Single mechanical seal**
- ◆ Design temperature: Below 100°C
 - ◆ Design pressure: Below 0.5 MPaG (5 kgf/cm²G)
- Double mechanical seal**
- ◆ Design temperature: Below 200°C
 - ◆ Design pressure: Below 0.99 MPaG (9.9 kgf/cm²G)
- It is generally used in applications where leakage is not tolerated and provides excellent sealing performance. (Please consult us if the pressure is higher than indicated as above)

Model Coding



(Standard paint color is Munsell 7.5GY6/3)

Model Variations for Line Mixer

Model type	Motor		Applicable viscosity range		Rating flow rate m ³ /h
	Pole number (P)	Power supply (kW)	mPa·s(cP)		
LT14 . LS14	4	0.4	1,450	1,750	1 ~ 3,000
		0.75			1 ~ 10,000
		1.5			1 ~ 20,000
LT24 . LS24	4	2.2	1,450	1,750	1 ~ 30,000
		3.7			1 ~ 50,000
LT26 . LS26	6	5.5	960	1,150	1 ~ 50,000
LT26 . LS36 LT36 . LS46	6	7.5	960	1,150	1 ~ 50,000
		11			160 ~ 2.0
LT38 . LS48 LT48 . LS58	8	15	730	880	300 ~ 4.0
		18.5			370 ~ 4.8
		22			450 ~ 6.0
* 1	8	30	730	880	540 ~ 7.0
		37			600 ~ 8.0
		45			720 ~ 9.5
		55			800 ~ 10.0
		1 ~ 50,000			

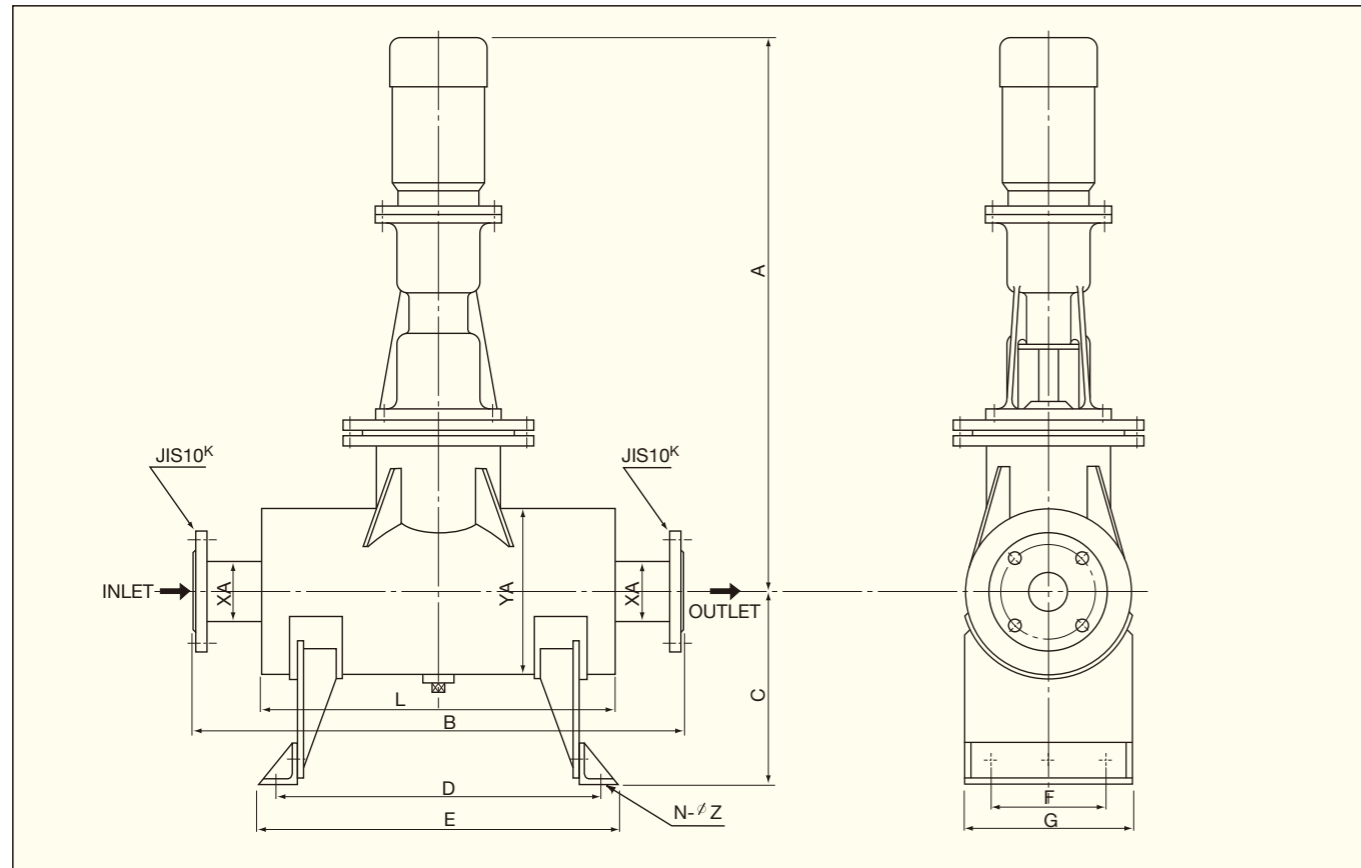
*The above specifications are for mixing of soluble solutions and liquids. Please consult us for powder dissolution, liquid-liquid emulsification and special applications.

*We can also manufacture other types with 2-pole motors on request.

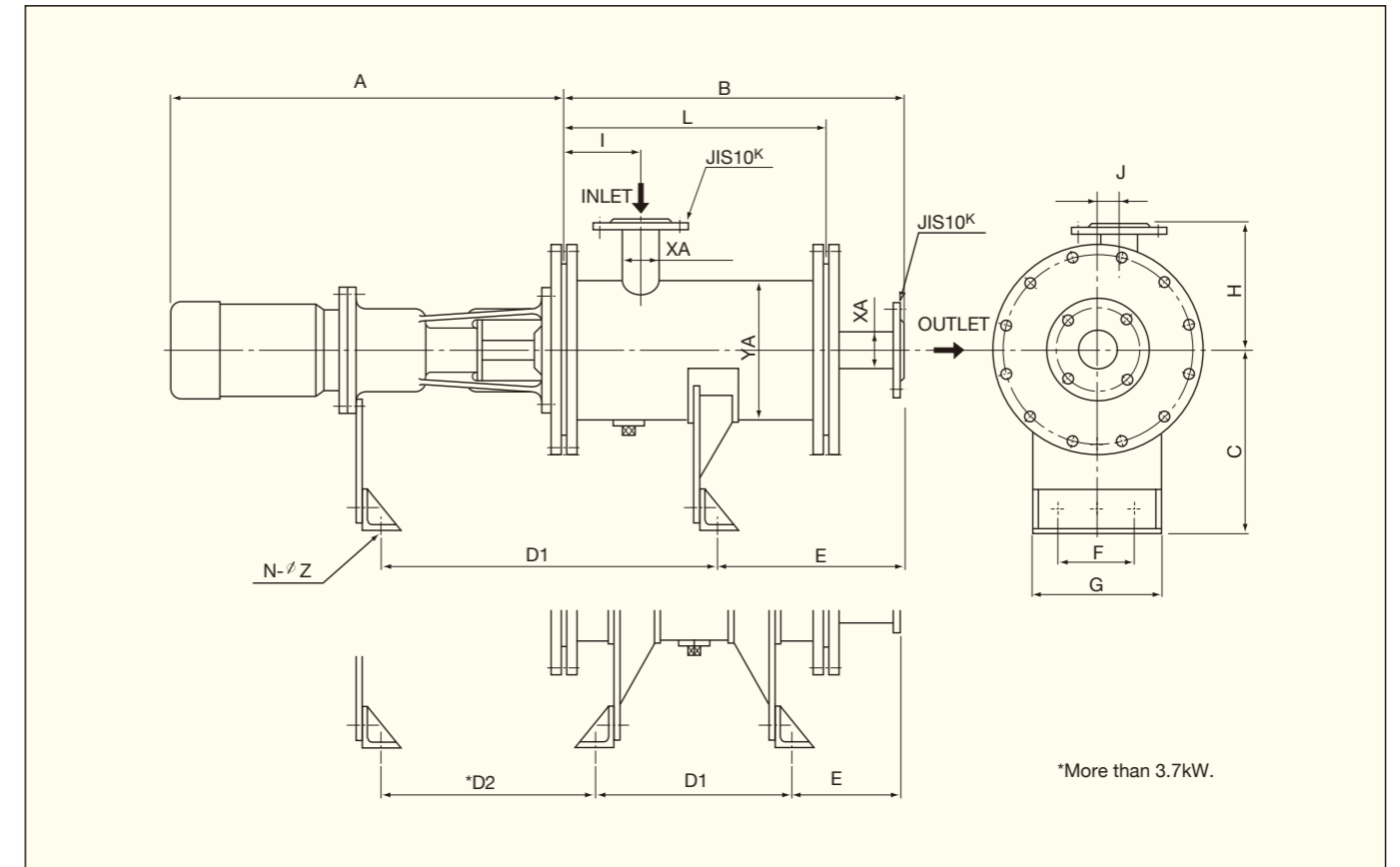
*We manufacture up to 400 kW of power as a special specification.

*The model marked with *1 is a line mixer with a power of 30 kW or more.

Standard Dimensional Drawings-Top-mount type



Standard Dimensional Drawings-Side-mount type



Standard Dimensions-Top-mount type

Unit (mm)											
Model type	A	B	C	D	E	F	G	XA	N-φZ	YA×L	Volume (ℓ)
LT14-MPR-0.4	780	560	280	330	370	140	220	50A	4-φ12	200A- 360L	12
LT14-MPR-0.75	820	620	280	390	440	140	220	50A	4-φ15	200A- 420L	14
LT14-MPR-1.5	910	770	300	520	570	180	260	80A	4-φ15	250A- 550L	28
LT24-MPR-2.2	1100	770	350	500	560	220	320	100A	4-φ19	300A- 530L	39
LT24-MPR-3.7	1200	770	380	500	560	300	400	100A	4-φ19	400A- 530L	63
LT26-MPR-5.5	1350	960	450	650	730	350	450	125A	4-φ24	450A- 700L	108
LT2□-MPR-7.5	1600	1130	450	780	860	350	450	150A	4-φ24	450A- 830L	127
LT3□-MPR-11	1700	1100	550	740	820	450	550	150A	4-φ24	550A- 800L	185
LT3□-MPR-15	1780	1410	550	980	1060	450	550	200A	4-φ24	550A-1050L	243
LT4□-MPR-18.5	2200	1290	650	880	980	580	700	200A	4-φ28	650A- 930L	303
LT4□-MPR-22	2200	1510	650	1100	1200	580	700	200A	4-φ28	650A-1150L	375

*The A dimension in the table (top-mount and side-mount types) is calculated based on the totally-enclosed-fan-cooled motor for outdoor use. Also, this dimension may vary depending on the motor brand.
 *Other dimensions are subject to change depending on specifications.
 *Gland packing seal (P) and mechanical seal (M) are standard for the shaft seal.

Standard Dimensions-Side-mount type

Unit (mm)															
Model type	A	B	C	D1	D2	E	F	G	H	I	J	XA	N-φZ	YA×L	Volume (ℓ)
LS14-MPR-0.4	575	470	280	470	-	300	90	160	210	120	35	50A	4-φ12	200A- 360L	12
LS14-MPR-0.75	610	540	280	535	-	292	90	160	210	120	35	50A	4-φ15	200A- 420L	14
LS14-MPR-1.5	670	670	300	600	-	359	140	220	250	160	50	80A	4-φ15	250A- 550L	28
LS24-MPR-2.2	800	650	350	730	-	319	180	260	270	160	65	100A	4-φ19	300A- 530L	39
LS24-MPR-3.7	830	820	380	590	453	178	220	320	300	170	65	100A	6-φ19	350A- 700L	63
LS26-MPR-5.5	950	1030	420	760	528	203	220	320	300	210	80	125A	6-φ19	400A- 900L	108
LS3□-MPR-7.5	1130	980	450	720	655	208	300	400	370	220	80	150A	6-φ24	450A- 830L	127
LS4□-MPR-11	1180	950	550	690	655	208	350	450	430	220	90	150A	6-φ24	550A- 800L	185
LS4□-MPR-15	1320	1230	550	900	725	253	350	450	430	250	90	200A	6-φ24	550A-1050L	243
LS5□-MPR-18.5	1380	1110	650	780	725	253	450	550	500	250	120	200A	6-φ28	650A- 930L	303
LS5□-MPR-22	1440	1330	650	1000	765	253	450	550	500	250	120	200A	6-φ28	650A-1150L	375

*The A dimension in the table (top-mount and side-mount types) is calculated based on the totally-enclosed-fan-cooled motor for outdoor use. Also, this dimension may vary depending on the motor brand.
 *Other dimensions are subject to change depending on specifications.
 *Gland packing seal (P) and mechanical seal (M) are standard for the seal.

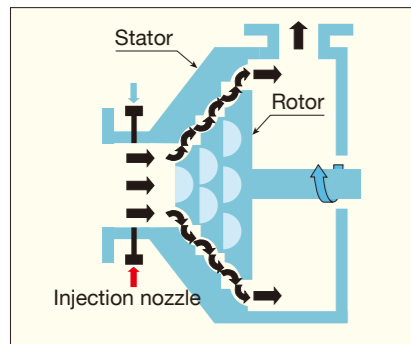
SUPER SHEAR MIXERS

The system is built into the pipeline for continuous dispersion and discharge.

Super Shear Mixer® (In-line Dispenser Mixer)



The Super Shear Mixer®(In-line dispenser mixer) is a compact type of In-Line Mixer designed for Nanotech applications, which demands high dispersion and refinement. The small size of the In-Line mixer provides high dispersion and excellent pumping action, which enables continuous processing of large volumes.



Rotor and Stator

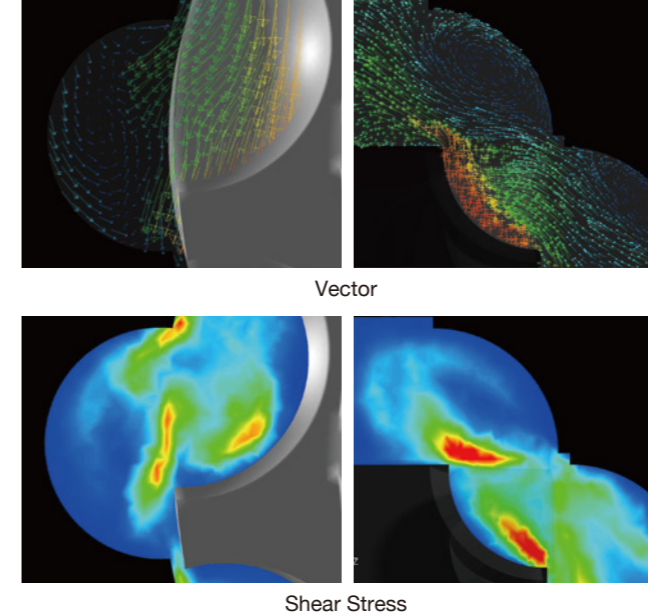


The mixing head is composed of rotor and stator. The rotor and stator are cone-shaped with a multi 1/4 spherical cavities (hollows) as the main feature for both. The liquid is sucked from the small diameter side of mixing head by rotor's high speed and passes through the narrow gap between the rotor and stator while being sheared. Additionally, the strong vortices inside the cavities formed from the gap of both sides generate a large number, each rotating in opposite direction. These vortices collide intensely with each other, resulting in powerful dispersing and breaking action, achieving highly efficient mixing, refinement, and homogenization. Furthermore, the rotor and stator feature an axial superposition structure, which make it simple and easy to disassemble and clean.

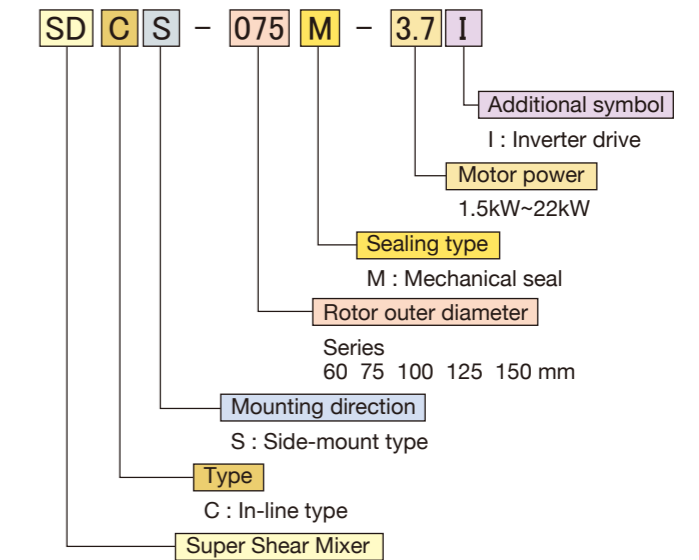
Super Shear Mixer (In-line Dispenser Mixer)

Model type	SDCS				
	060M-1.5	075M-3.7	100M-5.5	125M-15	150M-22
Material	Wetted parts SUS304 or SUS316				
Rotor diameter (mm)	60	75	100	125	150
Rotor stage number	4	4	4	4	4
Stator stage number	4	4	4	4	4
Suction inlet size (inch)	1	1	1 1/2	2	2 1/2
Discharge outlet size (inch)	1 1/2	1 1/2	2	2 1/2	3
Rotor peripheral velocity (m/s)	~ approx. 16	~ approx. 20	~ approx. 19	~ approx. 23	~ approx. 23
Power (kW)	1.5	3.7	5.5	15	22
Power supply	3 Phase 50/60Hz 200/400V				
Maximum rotational speed (min ⁻¹)	~5,000		~3,600		3,000
Viscosity range (mPa·s)	0.1~1,000				
Process volume [1mPa·s] (m ³ /hr)	1.9	3.8	6.5	8.4	12
Shaft seal	Single mechanical seal (Design temperature: Below 80°C/Design pressure: Below 0.5MPaG)				

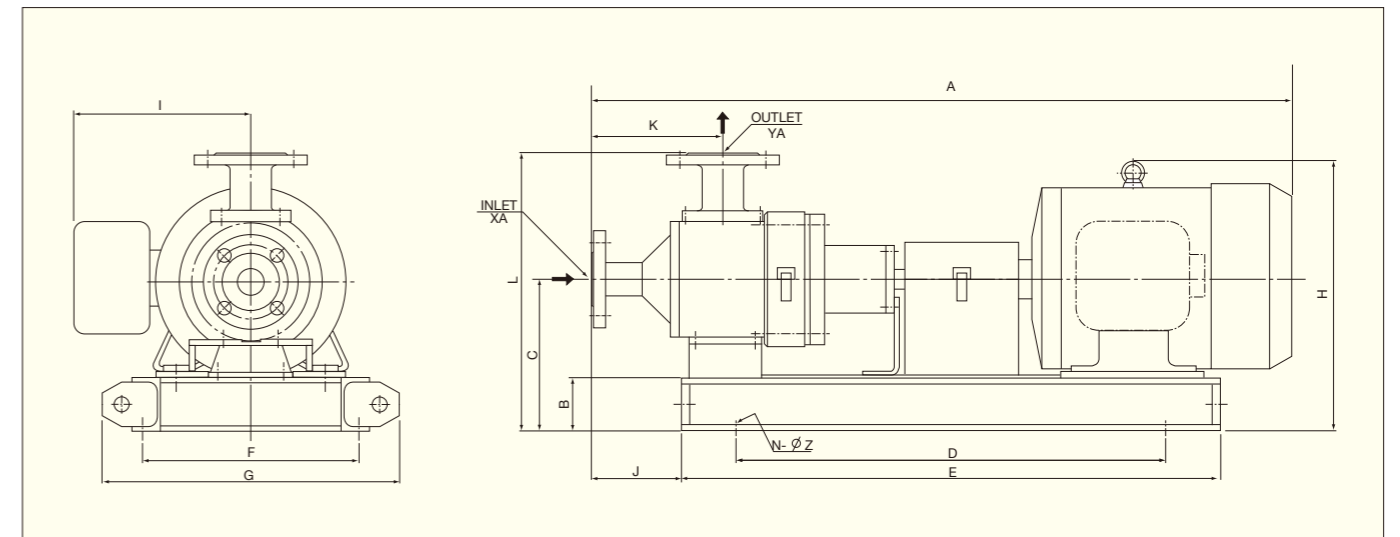
CFD Analysis Results Inside Rotor and Stator



Model Coding



Dimensional Drawings and Dimensions for Super Shear Mixer (In-line Dispenser Mixer)



Model type	A	B	C	D	E	F	G	H	I	J	K	L	N	Z	XA	YA
SDCS-060M-1.5	613	65	172	-	700	-	280	268	174	-9	78	224	-	-	Rp1B	Rp1 • 1/2B
SDCS-075M-3.7	740	75	197	450	600	270	380	353	212	65	84	264	4	12	Rp1B	Rp1 • 1/2B
SDCS-100M-5.5	976	75	217	600	750	300	410	387	245	125	180	397	4	12	JIS10K 40A RF	JIS10K 50A RF
SDCS-125M-15	1203	100	273	790	940	360	490	503	285	143	201	492	4	15	JIS10K 50A RF	JIS10K 65A RF
SDCS-150M-22	1326	100	293	880	1030	370	500	553	355	166	233	528	4	15	JIS10K 65A RF	JIS10K 80A RF

*The A dimension in the table is calculated based on the totally-enclosed-fan-cooled motor for outdoor use. Also, this dimension may vary depending on the motor brand.

*Other dimensions are subject to change depending on specifications.

*The 1.5kW is a caster type (removable).

*Mechanical seal (M) is standard for the seal.

We are constantly committed to improve the quality of our products, thereby the design and specifications of our products may differ from those shown in the catalog. Please understand this in advance.