

Hado Product Guide

 KOREA

 Ministry of SMEs and Startups |  KBIZ Korea Federation of SMEs

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Mixers and Related
Equipments for Industrial Use



ISO 9001-14001-45001 CERTIFIED

Products Unexcelled in Accuracy and Reliability

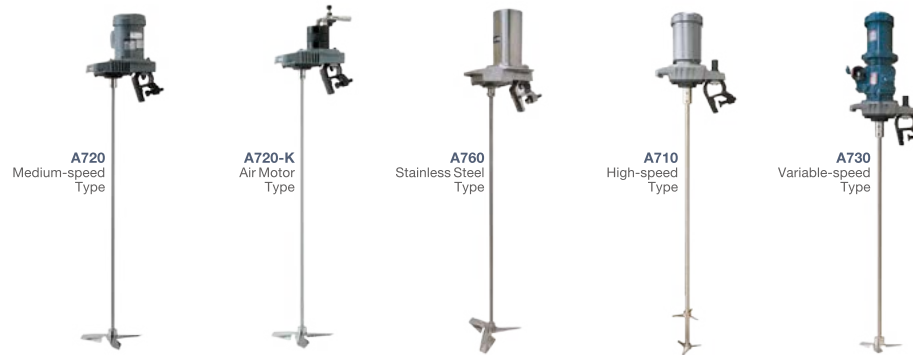
HADO mixers are the leading products in the industrial fields of petrochemicals and chemicals, pulp and paper, water and waste water treatment, FGD, oil and petroleum, mining and minerals, pharmaceuticals, slurry storage, and many other fluid applications. HADO provides the agitators, the static mixers and chemical process equipment for fluid mixing applications. We always make efforts to upgrade the reliability, functionality and safety of the mixers by using flow visualizing methods and advanced CAE methods. HADO appreciates all of our global customers use. We will always make our excellence to keep high quality for our faithful customers.

Mixers and Related Equipments for Industrial Use

Contents

Portable Mixers A-Series	03 · 04 · 05
Multi Medium-Speed Mixers (MT-1, 2)	05
Multi S Mixers Belt Reduction Type (S3~S5 Series)	06
Multi S Mixers Top Mount Type (S3~S9 Series)	07 · 08
D-type Top Mixers / E-type Top Mixers	09 · 10
Side Mixer	11 · 12
Mixing Torquemeter ST-3000 II	10
Line Mixers (Multi Line Mixer / Static Line Mixer)	13
Super Shear Mixer® (SDCS Type, SDRT Type)	14
Magnetic Mixer (Super Mag Mixer™, Flat Magnetic Coupling Mixer)	15
Large and Special Mixers	16
Super-Mix Series (High Performance Impellers)	17 · 18 · 19 · 20
Impellers Classification by Discharge Characteristics	21
Letter of Request	22

Portable Mixers A-Series



Clamp type mixers easily removable depending on the intended use. Compact and lightweight, low-priced, quality enhanced and maintenance free. Readily available.

- A720 (Medium-speed type)**
 Available in a wide-ranging field. Also ideal for mixing ordinary soluble liquids, mixing liquids for dilution and heat transfer, mixing relatively easy to dissolve solids and liquids, dispersion, prevention of slurry setting and uniform mixing.
- A720-K (Air motor type)**
 The A720K driven by the air motor features a safe, explosion-proof construction. It is widely variable in rpm from lows to highs, and poses no problem such as motor burning and heat generation even when overloaded.
- A760 (Stainless steel model / Medium-speed type)**
 Mixers are made of stainless steel to protect the product from rusts or paints. Ideal for fine chemical, pharmaceutical and food processing applications.
- A710 (High-speed type)**
 Delivers maximum performance in applications where high shearing is required or where powdery substances must be forced into liquids for dissolution. Capable of coping with changes in liquid viscosity, preventing excessive and insufficient mixing. Since the mixer can be operated at low speeds, operation while discharging the liquid from the tank can be safely performed.
- A730 (Variable-speed type)**
 Able to mix relatively-viscous liquids strongly and slowly. Also suited for mixing in which foaming must be prevented.

Portable Mixer Impeller



- S15 Impeller (High-speed type)**
 Design Registered
 This model rotates at high speed to generate a strong shearing force. The serration provided at the rear end of the blade generates a turbulent flow to break powder and fluid lumps, increasing the contact area of such lumps. This makes dispersion and dissolution extremely easy.



- P36 Impeller (Medium-speed type)**
 Design Registered
 This superior hydrofoil impeller with a camber and rake angle at each blade controls and converges the circumferential flow into a high-speed axial flow.



- L18 Impeller (Low-speed type)**
 Design Registered
 The blades are twisted to control the direction of the discharge flow. The twisted blades also propel the liquid forcefully in the axial direction. This impeller proves effective in operations with low liquid level or where a large D/D value is called for.

Portable Mixers A-Series

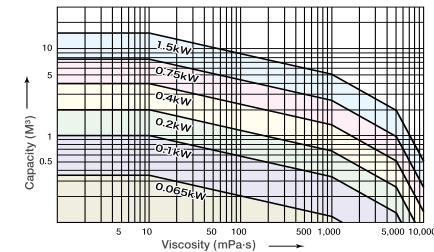
A series portable mixer is useful for small lot production less than 200 liter volume tank. Especially, it is recommended for liquid-liquid mixing and liquid-solid mixing.

Features and Strengths

- Light weight, Small size
- Low power, High efficiency
- One-touch coupling is you can easily remove the mixing shaft
- Angle adjustable drive unit clamp
- Oilless
- Low noise

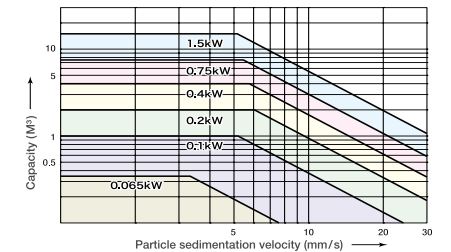
A720 / Charts to select the mixing capacity (For medium-speed type)

Judging by liquid viscosity



※ Please refer to us when the viscosity is 1000 mPa·s or more, or when the specific gravity is 0.2 or more.
 ※ It takes 5 minutes or more to mix a liquid with another liquid.

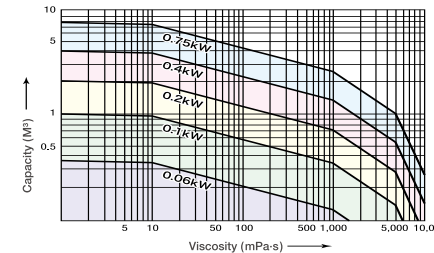
Judging by particle sedimentation velocity



※ This chart shows the case where the specific gravity is from 2 to 3 and the viscosity is 50 mPa·s.
 ※ Please refer to us when the impeller diameter is 25% of the tank diameter or smaller.

A720-K / Charts to select the mixing capacity (For medium-speed type)

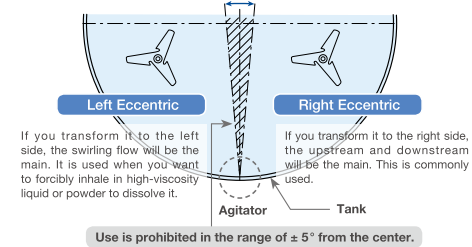
Judging by liquid viscosity



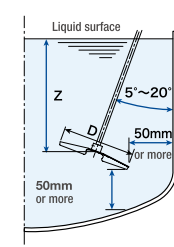
※ Please refer to us when the viscosity is 1000 mPa·s or more, or when the specific gravity is 1.2 or more.
 ※ It takes 5 minutes or more to mix a liquid with another liquid.

Mounting Position

Off-centered mounting ±5°



Mounting angles



Z dimension	
From the impeller to the liquid surface	
A720, A760	1.5D or more
A710	2.0D or more
A730	1.5D or more
A740	2.0D or more

※ The dimension is from the upper impeller position in the case of A710.

Portable Mixers A750 Series



K02 Impeller



During Rotation



During The Stoppage Period

Mixers that can be mounted directly on drums.

Features

- These mixers can be mounted directly on the chime of steel drums [Class1 (200 L) as per JIS Z1601].
- Our original K02 impeller is automatically expanded by the centrifugal force created by the shaft's rotation.
- The clamping section grip facilitates the transport, mounting and dismounting of the mixer.

Specifications

A750 High-speed type

Model	Motor			Speed (min-1)		Dimension (mm)
	Output (kW)	No. of Poles (P)	Phase, Voltage (V)	50Hz	60Hz	Length
A750-0.4BS	0.4	4	200 Three-phase	1,450	1,750	Max.800

※ The standard coating color is Munsell N5.5.
 ※ The standard material of the shaft and impeller is SUS304.

Options

One touch coupling

You can easily remove the mixing shaft from the drive shaft. This device is useful when you clean the parts in food, medical, or chemicals factories. This device helps you to change another tank easily.



Safety Cover

This cover avoids accidents due to the rotating shaft.



Multi Medium-Speed Mixers (MT-1, 2)

Features and Strengths

- Uniform mixing speed irrespective of differences in electrical power frequency.
- Greater advancement in light and compact design
- No adjustment for gear-pinion meshing
- A wide variety of sealing systems to meet all applications and requirements.
- KS D 1513 & JIS B 2212 flange adopted for all models
- Use of standardized bearing frames and parts to ensure production efficiency
- Use of highly-precise flange couplings
- KS & JIS standards for mechanical design
- Larger shaft diameters
- Hado's exclusive multi-propeller design

Dimensions of Vertical-type Mixers

Motor output (kW)	Poles (P)	Speed (rpm)	M - Series			M - 2 Series		
			0.2	0.4	0.75	1.5	2.2	3.7
	2	720	0.2	0.4	0.75	1.5	2.2	3.7
	4	360	0.2	0.4	0.75	1.5	2.2	3.7
	6	240	-	-	0.4	0.75	1.5	2.2
	8	180	-	-	-	0.4	0.75	1.5



Multi S Mixers Belt Reduction Type (S3~S5 Series)

Patent pending /
Design registration pending

Compact design :
Side mount is of a special value

Features

- Our user-friendly design has improved ease in handling, maintenance, and inspection.
- High-performance impellers were developed for exclusive use in side-mount type models
- It employs a high power transmission V-belt, which has a long service life and exhibits high resistance to oil and heat. It is also electrostatic shielded.
- A wide selection allows for operation under conditions varying from 3.7 kW to 30 kW through belt reduction.

Specifications

Belt Reduction

Speed (rpm) 50Hz / 60Hz	Motor output (kW)							
	3.7	5.5	7.5	11	15	18.5	22	30
350 (4P)	-	S-3	S-3	S-3	S-4	S-4	S-4	S-5
230 (6P)	S-3	S-3	S-3	S-4	S-4	S-5	S-5	-



HR100 Impeller (Super-Mix)

The HR100 is simple configuration that can be made simply by pressing to bend along straight lines, yet this energy-saving low-shearing impeller excels in discharging performance. The HR100 impeller is suitable for liquid-liquid mixing and For uniform suspension of easy-to-crush and not heavy particles. Generates more discharging flow less power than the Conventional three-propeller system.

Multi S Mixers (S3~S9 Series)

Medium to large-sized mixers with a wide range of variations. (from 0.75 to 90 kW)

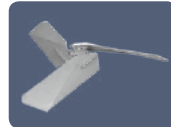
Features

- A new twist is added in the arrangement of gears. Interchangeability of components is further advanced.
- The number of speed and motor output combinations is substantially increased to 17.
- An impeller having a simple three-bladed axial flow design in one stage has been developed, featuring a high discharge coefficient and a low drag coefficient.



The impeller features a high discharge rate.

Features



• HR320 Impeller

- The impeller has an angular advance, which directs the liquid flow towards the shaft center.
- Due to the angular advance, liquid flow separation from the rear of the blade is minimized; thus, a large discharge is achieved.



• HR320S Impeller

- Employs a double-bladed configuration, which produces the same effect as that of a slotted flap and leading edge of an aircraft. This enables high discharge speed.
- HADO's original wing-tip blade has eliminated the need for a stabilizer ring and enabled operations in cases where the liquid level passes over the impeller position.

Specifications

Side-mount model variations (50Hz/60Hz)

	Speed (rpm)	Motor output (kW)															
		3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90			
One-step Reduction	50 HZ	350	-	S3	S3	S4	S4	S5	S5	S5	-	-	-	-	-	-	-
		280	-	S3	S3	S4	S4	S5	S5	S5	-	-	-	-	-	-	-
		230 (*)	S3	S3	S4	S4	S5	S5	S5	-	-	-	-	-	-	-	-
		190 (*)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Two-step Reduction	60 HZ	350	-	S3	S3	S4	S4	S5	S5	S5	-	-	-	-	-	-	-
		280 (*)	S3	S3	S4	S4	S5	S5	S5	-	-	-	-	-	-	-	-
		230 (*)	S3	S3	S4	S4	S5	S5	S5	-	-	-	-	-	-	-	-
		190 (*)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

※ (*) in the above table indicates 6P motor.

Top-mount model variations (50Hz)

	Speed (rpm)	Motor output (kW)																
		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	
One-step Reduction	350	-	-	-	-	S3	S3	S4	S4	S5	S5	S5	-	-	-	-	-	-
	280	-	-	-	-	S3	S3	S4	S4	S5	S5	S5	-	-	-	-	-	-
	230 (*)	-	-	-	-	S3	S3	S4	S4	S5	S5	S5	-	-	-	-	-	-
	190 (*)	-	-	-	-	S3	S3	S4	S4	S5	S5	S5	-	-	-	-	-	-
Two-step Reduction	155	-	-	S3	S3	S4	S4	S5	S5	S6	S6	S6	S7	S7	S8L	S8L	S8L	S8L
	125	-	S3	S3	S3	S4	S4	S5	S5	S6	S6	S6	S7	S7	S7	S8L	S8L	S8L
	100	-	S3	S3	S4	S4	S4	S5	S5	S6	S6	S6	S7	S7	S7	S8L	S8L	S8L
	84	-	S3	S3	S4	S4	S5	S5	S6	S6	S6	S7	S7	S7	S7	S8L	S8L	S8H
Three-step Reduction	68	-	S3	S3	S4	S5	S5	S5	S6	S6	S6	S7 (*)	S7 (*)	S7 (*)	S8L (*)	S8L (*)	S8H (*)	-
	56	-	-	-	-	-	-	-	-	S6	S7 (*)	S7 (*)	S7 (*)	S8L (*)	S8H (*)	-	-	-
	56	S3	S3	S4	S4	S5	S5	S6	S6	-	-	-	-	-	-	-	-	-
	45	S3	S3	S4	S5	S5	S5	S6	S6	S7	S7	S7	S7	S8L	S8H	S8H	S9L	S9H
	37	S3	S4	S4	S5	S5	S6	S6	S7	S7	S7	S7	S8L	S8H	S8H	S9L	S9H	S9H
	30	S3	S4	S4	S5	S6	S6	S7	S7	S7	S7	S8L	S8H	S8H	S9L	S9H	S9H	-
	25	S3	S4	S5	S5	S6	S6	S7	S7	S8L	S8L	S8H	S8H	S9L	S9H	S9H	-	-
	20	S4	S4	S5	S5	S6	S6	S7	S7	S8L	S8H	S8H	S9L	S9H	S9H	-	-	-
	16.5 (*)	S4	S5	S5	S6	S6	S7	S7	S8L	S8H	S8H	S9L	S9H	S9H	-	-	-	-
	13.5 (*)	S4	S5	S5	S6	S7	S7	-	S8H	S9L	S9H	S9H	-	-	-	-	-	-

※ (*) in the above table indicates 6P motor.

Multi S Mixers (S3~S9 Series)

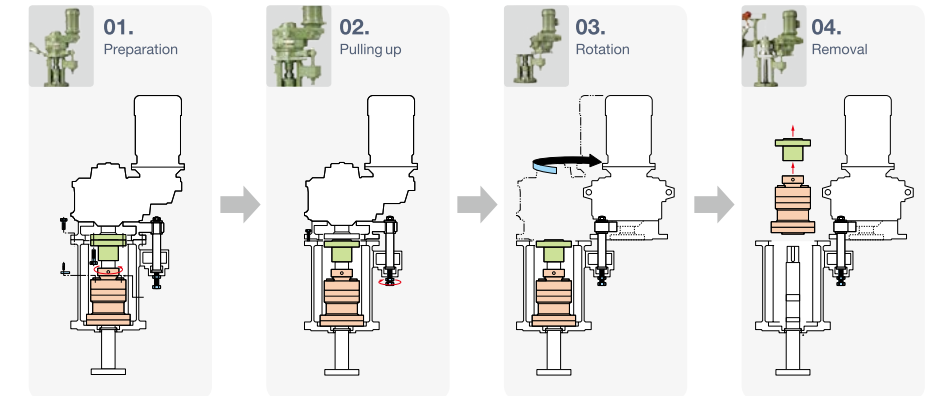
Design Registration Pending

Mixers that allow easy replacement of mechanical seal.

Features

- The existing mechanical seal can be easily replaced with a new one without removing the reduction gear unit.
- The reduction gear unit can be swung aside to allow the mechanical seal to be pulled out overhead.
- The time required for maintenance is significantly reduced.

Mechanical seal removable mixer

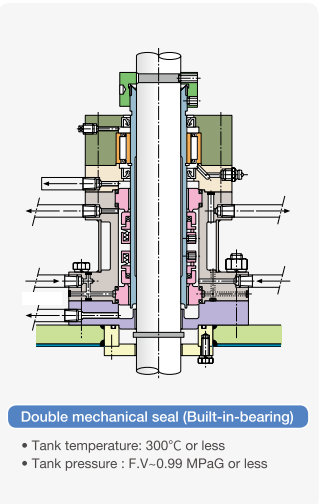


Specifications

Top-mount model variations (60Hz)

	Speed (rpm)	Motor output (kW)																
		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	
One-step Reduction	350	-	-	-	-	S3	S3	S4	S4	S5	S5	S5	-	-	-	-	-	-
	280 (*)	-	-	-	-	S3	S3	S4	S4	S5	S5	S5	-	-	-	-	-	-
	230 (*)	-	-	-	-	S3	S3	S4	S4	S5	S5	S5	-	-	-	-	-	-
	190	-	-	S3	S3	S4	S4	S5	S5	S6	S6	S6	S7	S7	S7	S8L	S8L	S8L
Two-step Reduction	155	-	S3	S3	S4	S4	S5	S5	S6	S6	S6	S7	S7	S7	S8L	S8L	S8L	S8L
	125	-	S3	S3	S3	S4	S4	S5	S5	S6	S6	S6	S7	S7	S7	S8L	S8L	S8L
	100	-	S3	S3	S4	S4	S4	S5	S5	S6	S6	S6	S7	S7	S7	S8L	S8L	S8L
	84	-	S3	S3	S4	S4	S5	S5	S6	S6	S6	S7	S7	S7	S7	S8L	S8L	S8L
Three-step Reduction	68	-	-	-	-	-	-	-	-	S6	S6	S7 (*)	S7 (*)	S7 (*)	S8L (*)	S8L (*)	S8H (*)	-
	68	-	S3	S3	S4	S5	S5	S6	-	-	-	-	-	-	-	-	-	-
	56	S3	S3	S4	S4	S5	S5	S6	S6	S7	S7	S7	S7	S7	S8L	S8H	S9L	S9L
	45	S3	S3	S4	S5	S5	S5	S6	S6	S7	S7	S7	S7	S8L	S8H	S8H	S9L	S9H
	37	S3	S4	S4	S5	S5	S6	S6	S7	S7	S7	S7	S8L	S8H	S8H	S9L	S9H	S9H
	30	S3	S4	S4	S5	S6	S6	S7	S7	S7	S7	S8L	S8H	S8H	S9L	S9H	S9H	-
	25	S3	S4	S5	S5	S6	S6	S7	S7	S8L	S8L	S8H	S8H	S9L	S9H	S9H	-	-
	20	S4	S4	S5	S5	S6	S6	S7	S7	S8L	S8H	S8H	S9L	S9H	S9H	-	-	-
	16.5 (*)	S4	S5	S5	S6	S6	S7	S7	S8L	S8L	S8H	S8H	S9L	S9H	S9H	-	-	-
	13.5 (*)	S4	S5	S5	S6	S6	S7	S7	S8L	S8H	S8H	S9L	S9H	S9H	-	-	-	-

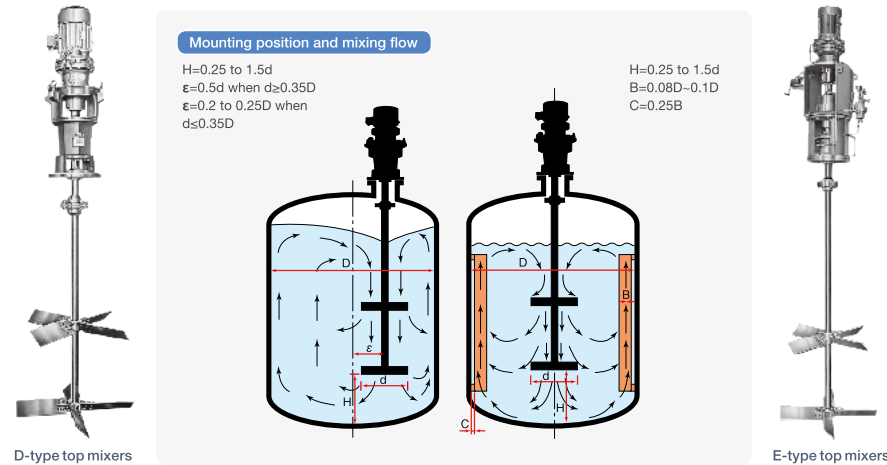
※ (*) in the above table indicates 6P motor.



Double mechanical seal (Built-in-bearing)

- Tank temperature: 300°C or less
- Tank pressure: F.V-0.99 MPaG or less

D-type Top Mixers / E-type Top Mixers



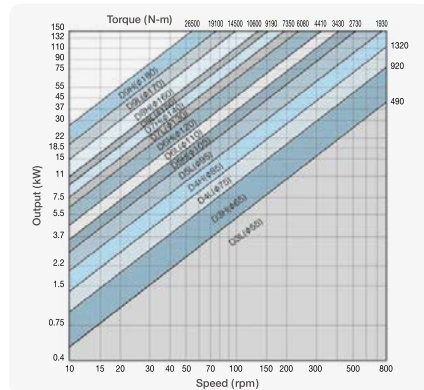
Mixers that allow virtually all commercially available reduction gears and speed changers.

Features

- Seven different sizes are available so that any commercially available reduction gear, speed changer, or motor can be used.
- The capacity ranges from 0.4 kW to 150 kW, with most mixers designed for large low-speed models.

Specifications

D-type top mixers



※ D-type top mixers are available depending on the torque range. The table on the left provides a guideline. The torque can be obtained when the speed and power output are known. The frame number and drive shaft diameter can be determined simultaneously.

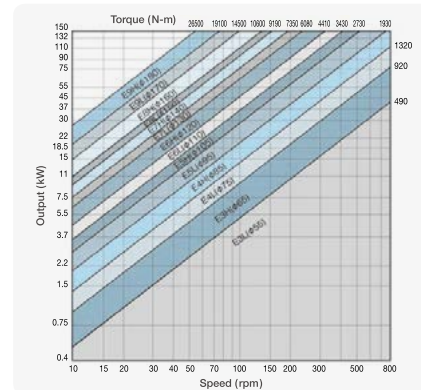
Easily detachable mechanical seal type mixers.

Features

- The sleeve-type mechanical seal unit is easy to remove from the side of the mounting frame.
- All the tools needed to disassemble and reassemble the mixer are provided. No additional tools are required.
- Troublesome centering is eliminated because of the adoption of spigot joint construction.

Specifications

E-type top mixers

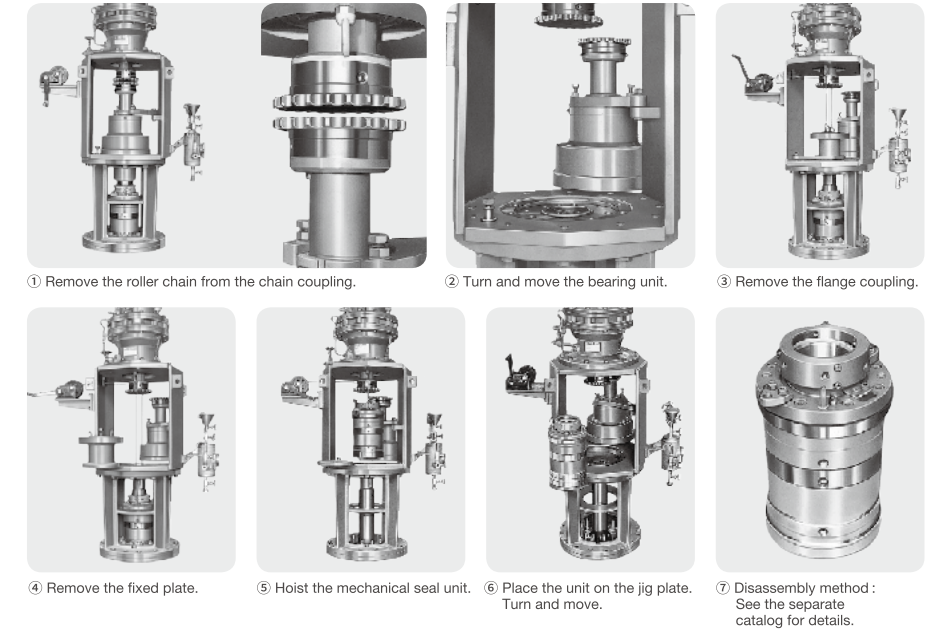


※ E-type top mixers are available depending on the torque range. The table on the left provides a guideline. The torque can be obtained when the speed and power output are known. The frame number and drive shaft diameter can be determined simultaneously.

D-type Top Mixers / E-type Top Mixers

Patented Structure

E-type Top Mixers Disassembly method of the mechanical seal unit.



Mixing Torquemeter ST-3000 II



Application

- To collect the basic data of mixing. (Power, N_p)
- To determine the best mixing conditions and need for up-scaling.
- To measure reaction, change of physical properties during mixing, etc.
- Physical properties and quality control of slurry, mixtures, etc.

Upgraded to ST-3000 II with the addition of air-purging and associated software.(Optional)

- A maximum torque of 0.32 N-m facilitates mixing of substances having a wide range of viscosities from low to medium to high.
- The attached control box features a touch type panel for easy, interactive operation.
- Among the newly introduced functions is the "PC control" feature that enables operation from a PC after installation of the associated software StirPC for ST-3000 II. (Optional)
- Pressurized air is introduced from the air purge inlet to protect the main unit from corrosive gases.
- The standard package includes five impellers, which include three impellers from the high performance impellers super-mix series.
- The main unit and control box are lightweight and compact for greater portability.

Side Mixer

Registered Utility Model / Design Registered

Valuable, compact and, lightweight side-mount mixers to choose from by the drive method.



Side-mount one-step belt reduction

Features

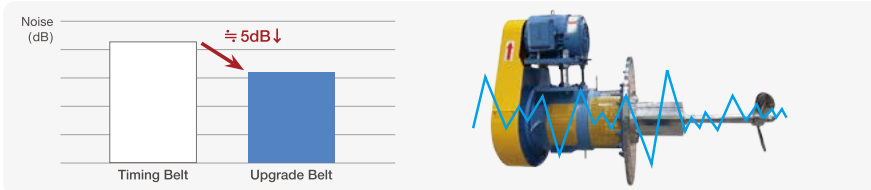
- The side-mount type is suitable for mixing liquids of medium or low viscosity in a deep tank.
- Though this type is compact and lightweight, it can perform partially strong agitation as it can be mounted in the chosen position.
- By mounting the mixer on the tank in an off-set position, the need for baffle plates can be eliminated without affecting the steady flow of liquid.

Features of Shut Off Device



Belt Noise Improvement

- It is suggested for users who are worried about noise generated when using existing Timing Belt.



• AK100 Impeller (Super-Mix) Patented Design Registered

The Super-Mix AK100[®], an energy-efficient impeller, suppresses flow separation from the backside and accomplishes a large discharge amount with low power. The impeller applied to the NS Mixer has increased discharge power, allowing the discharge flow to reach further and mix the contents of the tank more efficiently as shown in the discharge flow analysis below.



• Propeller Impeller

Most common impellers of high discharge and low shearing type deriving from marine propellers. The high-velocity axial flow containing swirls is associated with a wake flow that creates a large circulating flow.

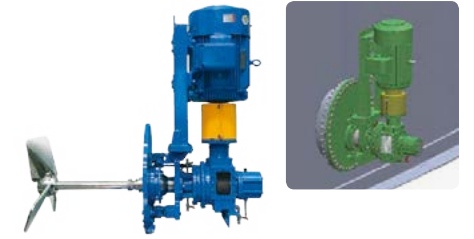
Application : Oil tank, FGD.

NS Mixer

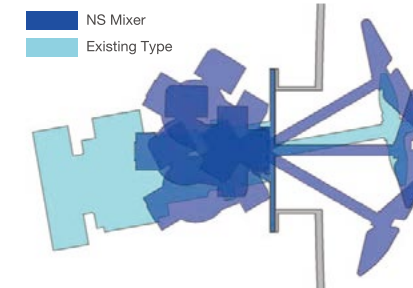
NS Mixer is compact, light frame that is 40% shorter than our existing type. Easy maintenance of mechanical seal by using the simple shut-off device.

Features and Strengths

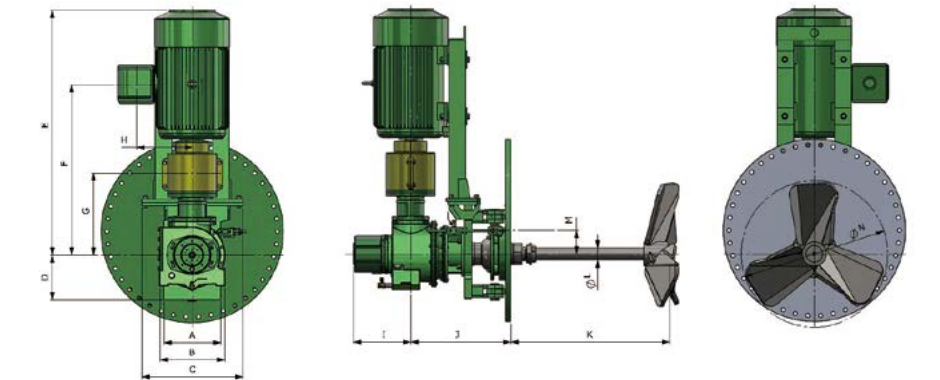
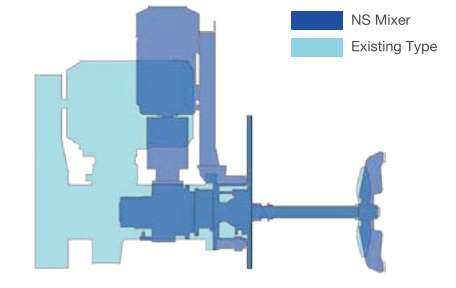
- Compact and lightweight
- Strong gear-driving type & improved durability
- Variable installation angles & controllable discharge direction
- Easy to replace mechanical seal; just 1~2 workers required
- High discharge impeller installed



Angular Variety Comparison Between NS Mixer and Existing Type



Size Comparison Between NS Mixer and Existing Type



[Unit : mm]

kW	A	B	C	D	E	F	G	H	I	J	K	L	M	N	kg
37	306	355	545	195	1270	880	450	300	310	546	800	80	*	780	830
45	306	355	545	195	1320	930	450	300	310	546	800	80	*	780	850
55	306	355	545	195	1323	933	450	335	310	546	800	80	*	780	900

※ The dimensions may change without prior notice. The displayed weight of the mixer is the weight when the standard motor is installed. The area that comes in contact with the fluid is made of SS400 or STS304.

Line Mixer (Multi Line Mixer / Static Line Mixer)

Multi Line Mixer

Installed in existing pipelines for continuous, high-shear mixing

Features

- Can be used with both horizontal and vertical pipelines.
- Combined with other equipment, this mixer provides a mixing process suitable for each particular purpose.
- A HADO multi-line mixer only 1/2000th the size of a conventional batch-type mixer can process an equal amount of materials. Moreover, the multi-line mixer's mixing efficiency is also three times greater.

※ Models of 7.5 kW or larger power are not included in the multi-mixer series. They are coded according to the former system: L-7 is the top-mount type and L-8 is the side-mount type.

※ The specifications are based on mixing one kind of liquid.
For other applications such as dissolving powder, kindly consult us.

※ Mixers with 2-pole motors are also available on request.

Specifications

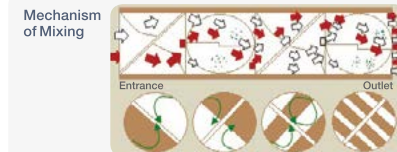
Model	Motor				Applicable Viscosity (mPa·s)	Processing Amount (m ³ /h)
	Output (kW)	No. of poles (P)	Speed (rpm)			
			50Hz	60Hz		
MT14-MPR (Top-mount Type)	0.4	4	1,450	1,750	1 ~ 3,000 1 ~ 10,000 1 ~ 20,000	10 ~ 0.6 18 ~ 0.6 32 ~ 0.6
	0.75					
	1.5					
MT24-MPR	2.2	4	1,450	1,750	1 ~ 30,000 1 ~ 50,000	45 ~ 0.8 70 ~ 1.0
	3.7					
MT26-MPR	5.5	6	960	1,150	1 ~ 50,000	120 ~ 1.6
L 86-MPR L 76-MPR	7.5	6	960	1,150	1 ~ 50,000	160 ~ 2.0 220 ~ 3.0
	11					
L 88-MPR L 78-MPR	15	8	730	880	1 ~ 50,000	300 ~ 4.0 370 ~ 4.8 450 ~ 6.0 540 ~ 7.0 600 ~ 8.0 720 ~ 9.5 800 ~ 10.0
	18.5					
	22					
	30					
	37					
	45					
	55					



Static Line Mixer

Features

- Simple construction and compact no rotation parts, competitive price and less maintenance compared with other type of mixers.
- On line installation but less pressure drop static line mixer. It is possible to install on existing pipe line without change pump.
- Applicable for various mixing of fluids for liquid, gas to gas, several gaseous mixing, etc combining numbers of elements.
- Easy maintenance clean by washing fluid will be enough and easy to dismantle.
- Safety and less energy no agitator, just mixing on pipeline.



Super Shear Mixer®



SDCS-type in-line dispersion mixers. Assembled in ducting for continuous dispersion and discharging.

Features

- Despite the small size, these compact in-line dispersion mixers deliver high dispersing and pumping actions required for continuous, large-volume processing.

Specifications

SDCS-type In-line Dispersion Mixers

Model	Motor		Applicable Viscosity (mPa·s)	Processing Amount (m ³ /h)
	Output (kW)	Max.Speed (min ⁻¹)		
060M-1.5	1.5	~ 5,000	0.1 ~ 1,000	1.9
075M-3.7	3.7	~ 5,000		3.8
100M-5.5	5.5	~ 3,600		6.5
125M-15	15	~ 3,600		8.4
150M-22	22	~ 3,000		12

SDRT-type dispersion mixer for laboratory use. Designed for laboratory use. Experience the small-scale dispersion performance.

Features

- Dispersion mixer to be used experimentally for small scale of laboratory testing. Moreover, this device is equipped with the control box, which enables to operate at variable speeds up to the maximum rotating speed of 8,000-10,000min⁻¹ with a rotor tip peripheral velocity (Vtip) in the range of 18-20m/s. This device can be used for a vessel size from 1ℓ-20ℓ, and it also has the elevating unit adjustable to the size of the vessel.

Specifications

SDRT-type Dispersion Mixers for Laboratory Use.

Model	Motor		Applicable Viscosity (mPa·s)
	Output (kW)	Max.Speed (min ⁻¹)	
035-0.75	0.75	~ 10,000	0.1 ~ 10,000
050-1.5	1.5	~ 8,000	

Super Mag Mixer™

The sealless design (Sterile agitation) puts an end to the conventional magnet-type mixers.

Features

- Completely enclosed mixers offering clean processing environment.
- Validation to ensure high quality per SIP/CIP under GMP.
- SIP (Sterilization in place) at 130°C is a standard feature.
- Mixers and impellers can be customized to enhance the specification for all mixing needs.

Top-mount Type

- The drive unit and the main unit are easily detachable by means of ferrule clamping for cleaning, sterilization, parts replacement, etc.
- The ceramic bearing is ideal for SIP/CIP systems. (Although the life-hour is shorter than ordinary bearing)
- Dust cover is provided to prevent dust from directly entering the tank.
- A speed control box is attached.

Specifications

Top-mount Type

Model	Motor	Speed (min ⁻¹)
	Output (kW)	50Hz*60Hz Parallel type
SMT-1	0.04	10 ~ 100
	0.075	10 ~ 100
	0.12	10 ~ 100
	0.2	10 ~ 100

※ SUS316L (#400 buffing) is standard material for the vessel components. Other materials are available upon request.

※ MAG-NEO® magnetic circuitry is used. (MAG-NEO® is the registered trademark of Magneo Giken Co., Ltd.)



Flat Magnetic Coupling Mixer

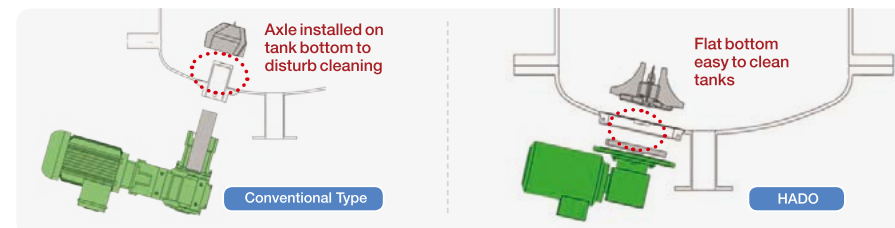
Flat Magnetic Coupling Mixer with Super-Mix Impeller improves mixing efficiency. The impeller with the axle is designed for the flat bottom of tanks and is much easier to clean than the conventional magnetic mixer.

Application : Food / Pharmaceutical

Features

- Completely separable structure from tanks.
- Flat bottom easy to clean tanks.
- No contamination / After delivery possible to mix again.

Structure



Large and Special Mixers

Introducing large and special mixers.



37 m

Long Shaft

- Tank Vol. : 285 m³
- RPM : 8 ~ 32 rpm
- Shaft Size : 37,140 L



525 kW

Large Fermenter

- Tank Vol. : 500 m³
- RPM : 64 rpm
- Shaft Size : 13,388 L
- Top Type



300 °C

High Temperature

- Tank Vol. : 7.2 m³
- RPM : 165 rpm
- Shaft Size : 4,950 L

630 kW

Large Bottom Mixer

- Tank Vol. : 110 m³
- RPM : 27 ~ 66 rpm
- Shaft Size : 1,100 L
- Bottom Type



22 kW

Large Homogenizer

- Tank Vol. : 4 m³
- RPM : 180 ~ 2,000 rpm
- Shaft Size : 2,900 L
- Line Type

1600 m³

Large Oil Tank

- Tank Vol. : 1,600 m³
- RPM : 22 rpm
- Shaft Size : 1,000 L
- Side Type



5500 mm Dia

Large Impeller

- Tank Vol. : 564.2 m³
- RPM : 14.5 rpm
- Shaft Size : 8,000 L



1,400,000 mPa.s

High Viscosity

- Tank Vol. : 4 m³
- RPM : 42 rpm
- Shaft Size : 2,890 L

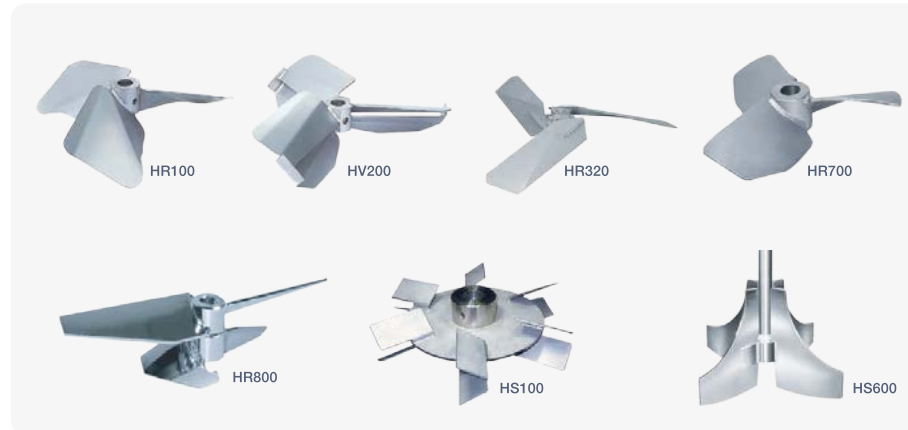
15 MPa

High Pressure

- Tank Vol. : 10 m³
- RPM : 186 rpm
- Shaft Size : 3,900 L

Super-Mix Series (High Performance Impellers)

Patent Pending / Design Registered



High-performance impellers based on high advanced flow control technology.

Features

HR100 Impeller / Design Registered

- HR100 is a simple configuration that can be made simply by pressing to bend along straight lines, yet this energy-saving low-shear impeller excels in discharge performance.
- HR100 impeller is suitable for solid-liquid mixing and uniform suspension of easy-to-crush and lightweight particles.
- Generates more discharge flow from less power than the conventional three-propeller system.

HV200 Impeller / Patented

- HADO's unique double-bladed impeller incorporates the effects of a 3-wide-bladed impeller and auxiliary blades.
- The slotted flap effect of the slotted flap cancels flow separation behind the main blades. This contributes to a substantial increase in discharge rates and maximum discharge speeds.

HR320 Impeller / Design Registered - Patent Pending

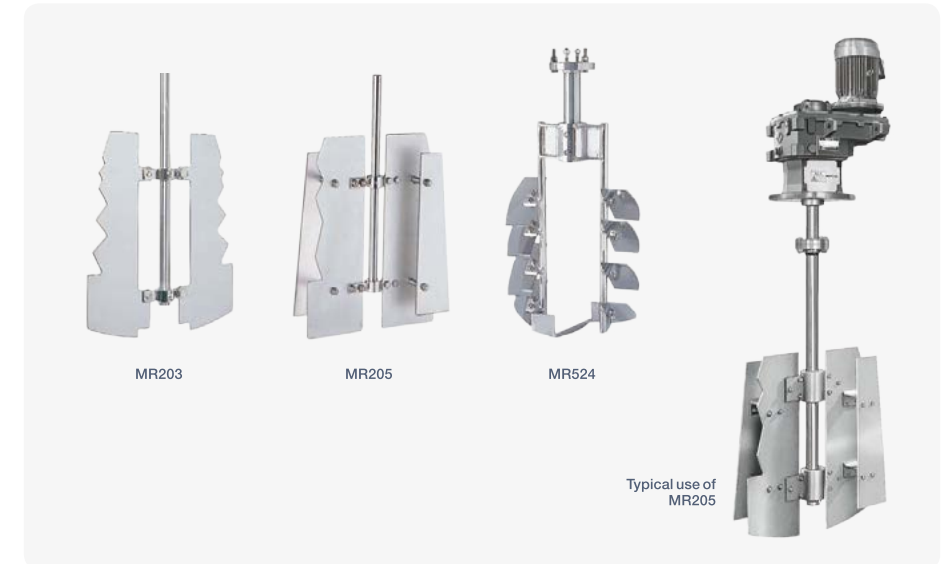
- The forward-blade twist-down effect prevents liquid flow separation at the blade tip and increases discharge capacity.
- Ideal for operations where the liquid level passes over the impeller position, installations with unusually low blade positioning heights, and solid-liquid mixing.
- Substantial improvement of efficiency as compared to the conventional 4-pitched paddle system.

HR700 Impeller / Design Registered - Patented

- This high-discharge impeller reflects the special efforts undertaken to determine the optimal blade surface shape and camber ratio that prevents separation at the blade tip, and the dihedral angle that contributes to the discharge performance.
- Ideal for simultaneous mixing of different substances such as, liquids, gases, solids, and powders, i.e., in solid-liquid mixing, as well as for mixing compounds of these substances.
- Efficiency has been increased substantially as compared to the conventional 3-propeller system.

HR800 Impeller / Patent Pending

- Double-blade effects from the combination of low-power, high-performance discharge-type main blades, and overlapping smaller blades with a large angle of attack.
- Ideal for storage tanks for solid-liquid mixing.



Typical use of
MR205

Features

HS100 Impeller / Patented

- Improved liquid fluidization along with higher gas absorption (k_La) than the conventional turbine.
- Ideal for gas-liquid and gas-solid-liquid mixing operations.

HS600 Impeller / Design Registered - Patent Pending

- Installation near the tank bottom means greater acceptance of liquid surface fluctuation and better particle uniformity for extraction.
- The highly uniform dispersion is ideal for solid-liquid mixing and slurry mixing.

MR203 Impeller / Design Registered

- The trapezoidal shape towards the tank bottom and the clearance effect at the shaft center are combined to produce a strong suction flow and large-volume circulation.
- Ideal for applications in which adhesion must be prevented or where the cleaning effect is critical, and it is available in a wide range of variant designs to meet specific needs.

MR205 Impeller / Design Registered - Registered Utility Model - Patent Pending

- The double-blade effect produces a strong, radial discharge flow even for high-viscosity liquids. An upward liquid flow is formed from the tank bottom towards the liquid surface. This contributes to high mixing performance.
- Ideal for reaction systems that accompany change in physical properties in operations, such as, mixing medium to high-viscosity fluids, mixing liquids that vary in specific gravity or viscosity, and suspending slurry of high concentration.

MR524 Impeller / Patented

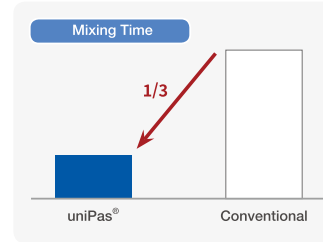
- Significantly high mixing performance at Reynolds number < 1 .
- The multi-stage, inclined blade design ensures better mixing performance regardless of liquid volume fluctuation. This eliminates the poor mixing performance associated with the conventional ribbon blades.

uniPas®

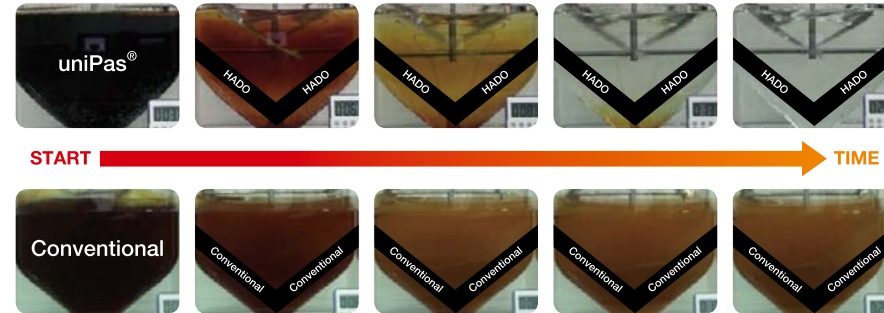
uniPas® shows much higher mixing performance than conventional Helical Ribbon Impeller in high viscosity region. HADO Co.,Ltd has a successful scale-up experience with viscosity of Max. 1.4×10^6 mPa·s.

Experience : Viscosity Max. 1.4×10^6 mPa·s

Application : Bio-degradable Plastic and Others



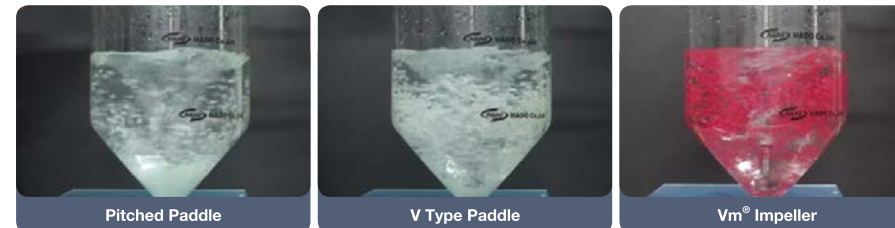
Mixing Time Comparison



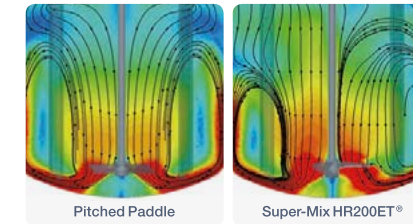
Vm®

Vm® impeller is effective in preventing occurrence of dead zones which easily occur when the lower part of the stirring tank is in the form of a cone. When stirring a high-viscosity fluid or slurry, it is common to design the bottom of the tank in the form of a cone to facilitate discharge after the stirring is complete. Previously used paddles or V-type paddles had problems in reaction or discharging products, due to frequent agitation (stirring) failures where the raw materials or slurries stirred in the cone part did not float sufficiently. Vm® paddle is recommended for the purpose of resolving the stagnation of agitation and maintaining a good mixing state as a whole, without any significant change in the stirring tank.

Test for Particle Mixing Comparison

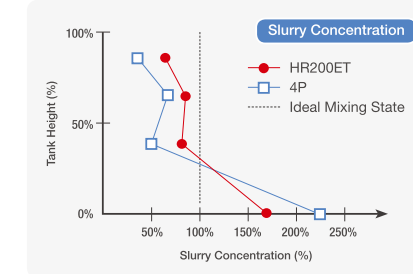


Super-Mix HR200ET®



Flow Pattern

- Super-Mix HR200ET® is an improved version of the Super-Mix HR200®, a hydrofoil-type impeller specialized in slurry agitation.
- The flow velocity of the lower part of the tank is developed by the flow discharged strongly in the axial direction from the impeller.
- In particular, it is effective for the purpose of preventing sedimentation of the slurry at the bottom of the tank when the slurry has a high density.



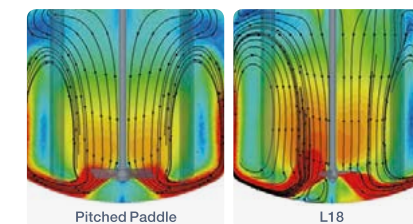
Slurry Concentration

- The Super-Mix HR200ET® has excellent mixing performance in the tank compared to the pitched paddle mainly used for slurry agitation.
- In addition to preventing sedimentation, it can be used for the purpose of mixing uniformly.
- Even when high-density gravity slurry is stirred, it is relatively easy to appear TSC evenly to the liquid level.

※ TSC : Total Solid Concentration

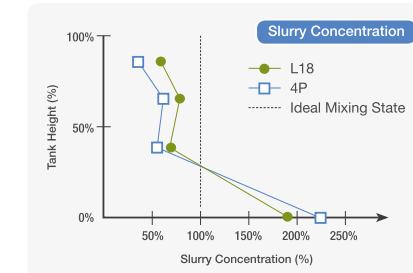


L18

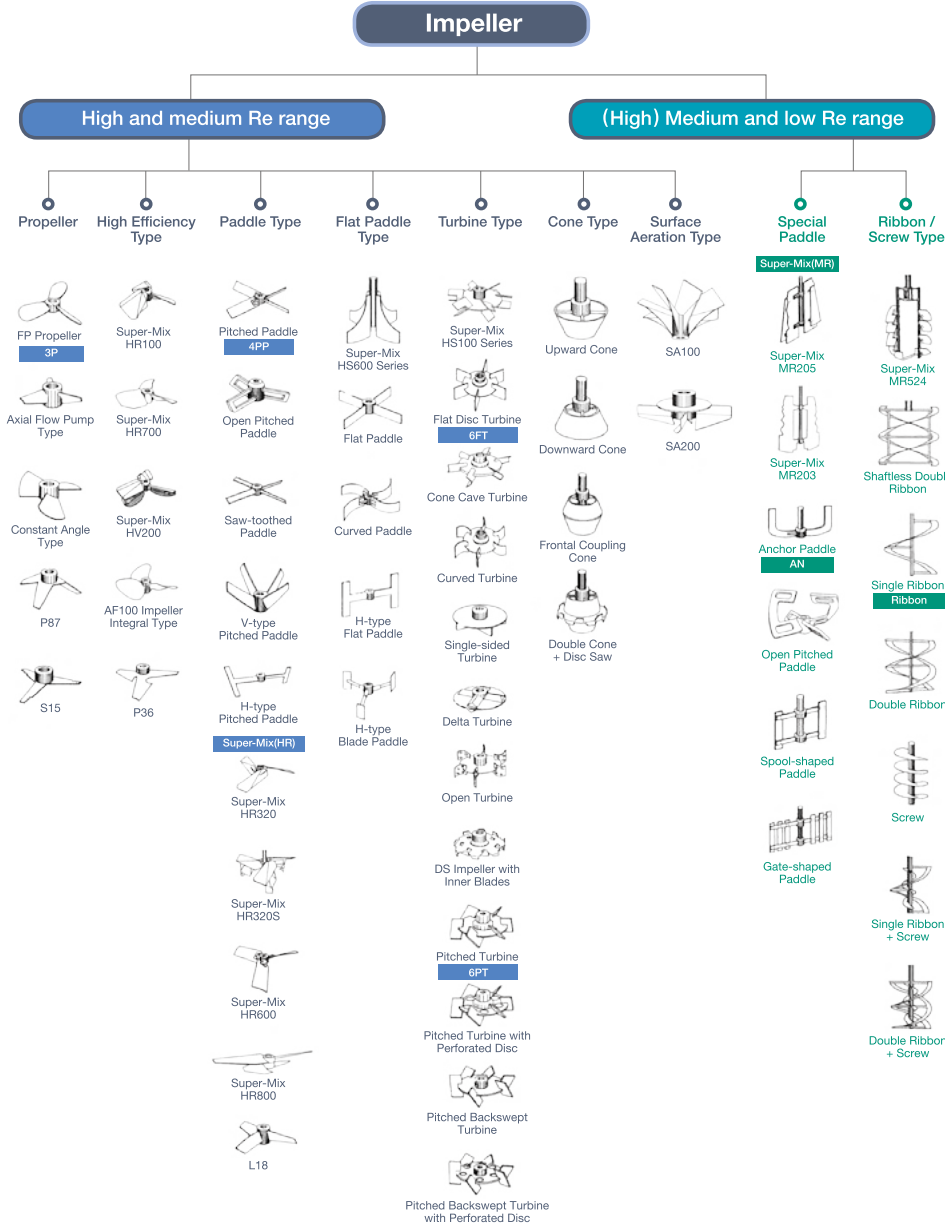


Flow Pattern

- L18 is a diagonal flow type impeller with an energy-saving design and low shear stress.
- Relatively well-developed upward flow on the wall compared to pitched paddles, under fully agitated conditions.
- In particular, it is effectively used in preventing sedimentation of slurries in large slurry tanks, and it has a number of excellent performance records.



Impellers Classification by Discharge Characteristics



Letter of Request

HR : Hado Recommendation

Enduser	Sender Name	95, Gajaeul-ro, Seo-gu, Incheon, 22830 Korea T E L : +82-32-583-6321 F A X : +82-32-583-6329 e-mail : hado@hado.co.kr	
Project	Company		
Job No.	e-mail		
Item No.	Tel No.		
Job Site	Fax No.		
Hado Records	<input type="checkbox"/> Yes (HADO Job No.) <input type="checkbox"/> No		

Mixing Purpose

Liquid-Liquid Mixing Solid-Liquid Mixing Gas-Liquid Mixing Gas-Solid-Liquid Mixing

Mixing Reaction Dispersing Heat Transfer Suspension Dissolving Emulsification

Crystallization Sinking Prevention

No.	Substance	Phase	Quantity [m ³]	Temperature [°C]	Viscosity [mPa·s]	Density [kg/m ³]	Particle Size Max./Min. [μm]	Concentration [wt/vol%]	Remark
1									
2									
3									

Mixture

Op. Quantity	Max. m ³	Nor. m ³	Min. m ³
Op. Time	<input type="checkbox"/> Continuous (Hr / Year : Period) <input type="checkbox"/> Batch (Hr / Batch : Batch/Day)		
Mixing Time			
Empty Operation	<input type="checkbox"/> Yes <input type="checkbox"/> No		Foot Bearing <input type="checkbox"/> Yes (Material :) <input type="checkbox"/> No
Installation	<input type="checkbox"/> Flange (<input type="checkbox"/> Top <input type="checkbox"/> Side <input type="checkbox"/> Bottom) <input type="checkbox"/> Clamp <input type="checkbox"/> Stand		

Tank

Shape	<input type="checkbox"/> Cylinder	Capacity	m ³
Top-Shape	<input type="checkbox"/> Flat <input type="checkbox"/> Cone <input type="checkbox"/> 10% Dish <input type="checkbox"/> 2:1 Ellips <input type="checkbox"/> Other ()		
Bottom-Shape	<input type="checkbox"/> Flat <input type="checkbox"/> Cone <input type="checkbox"/> 10% Dish <input type="checkbox"/> 2:1 Ellips <input type="checkbox"/> Other ()		
Dimension	i.D mm × T. L - T. L mm	(L mm × W mm × H mm)	
Temperature	(Des. / Ope.) °C	Pressure	(Des. / Ope.) MPa · G
Regulation	Baffle <input type="checkbox"/> Yes (ea) <input type="checkbox"/> No		
Mounting	<input type="checkbox"/> Center <input type="checkbox"/> Off - Center (Distance mm)		

Place

Place Indoor Outdoor Indoor but Outdoor Spec.

Temperature

Mixer

Mixing Tendency	<input type="checkbox"/> HR <input type="checkbox"/> Violent <input type="checkbox"/> Medium <input type="checkbox"/> Mild <input type="checkbox"/> Motor (kW) <input type="checkbox"/> Pv (kW/m ³)	
Speed	<input type="checkbox"/> HR <input type="checkbox"/> () rpm Flange <input type="checkbox"/> HR (JIS. 10K) <input type="checkbox"/> Other ()	
Impeller	<input type="checkbox"/> HR <input type="checkbox"/> 3P <input type="checkbox"/> 4PP <input type="checkbox"/> 6FT <input type="checkbox"/> 6PT <input type="checkbox"/> Ribbon <input type="checkbox"/> Super-Mix <input type="checkbox"/> Other ()	
Wet Part Material	<input type="checkbox"/> SUS304 <input type="checkbox"/> SUS316 <input type="checkbox"/> C-S <input type="checkbox"/> Lining (<input type="checkbox"/> Rubber <input type="checkbox"/> FRP <input type="checkbox"/> Teflon)	
Seal	<input type="checkbox"/> Buffing (#) <input type="checkbox"/> Electro Polishing <input type="checkbox"/> Acid Cleaning	
	<input type="checkbox"/> Open <input type="checkbox"/> Oil Seal <input type="checkbox"/> Gland Packing <input type="checkbox"/> Water Seal <input type="checkbox"/> Mechanical Seal (<input type="checkbox"/> Dry <input type="checkbox"/> Single <input type="checkbox"/> Double)	
Drive	<input type="checkbox"/> OPU (Sealant :) <input type="checkbox"/> Non-seal	
	<input type="checkbox"/> Gland Packing () <input type="checkbox"/> Gasket Material () <input type="checkbox"/> Other ()	
Explosion Proof	<input type="checkbox"/> Motor <input type="checkbox"/> Air Motor <input type="checkbox"/> Oil Pressure Motor <input type="checkbox"/> Maker ()	
	<input type="checkbox"/> Constant <input type="checkbox"/> Variable (<input type="checkbox"/> Mechanical ()) <input type="checkbox"/> Inverter)	
Power	<input type="checkbox"/> TEFC <input type="checkbox"/> Exe II T3 <input type="checkbox"/> Exd II B T4	
Supplied	<input type="checkbox"/> Water Proof · IP () <input type="checkbox"/> Other ()	
Power	V Hz Ph. Poles	
Spare Part	<input type="checkbox"/> Motor <input type="checkbox"/> Reducer <input type="checkbox"/> OPU <input type="checkbox"/> Other () Paint <input type="checkbox"/> HR (RAL6011) <input type="checkbox"/> Other ()	
Spare Part	<input type="checkbox"/> No <input type="checkbox"/> 1Year Spare <input type="checkbox"/> 2Year Spare <input type="checkbox"/> Other ()	

Industrial Process Applications

- + Oil and petroleum
- + Petrochemicals
- + Rubber
- + Resin
- + Chemicals
- + Pharmaceuticals
- + Pulp and papers
- + Fibers
- + Paint
- + Fertilization
- + Fermentation
- + Flue gas desulfurization
- + Electric materials
- + Ceramics
- + Foods
- + Water and waste water treatment
- + Slurry storage
- + Mining and minerals

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China Branch

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SAKURA SEISAKUSHO, LTD., JAPAN

Business Card Attached