

ShinMaywa

Submersible Mixer Series



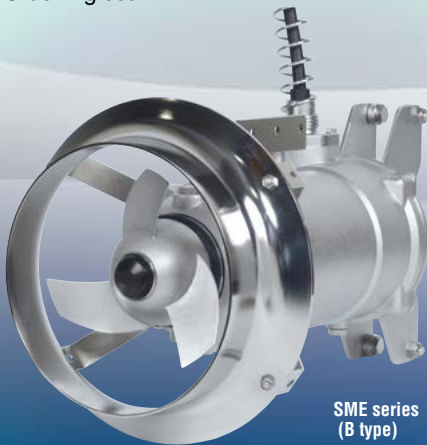
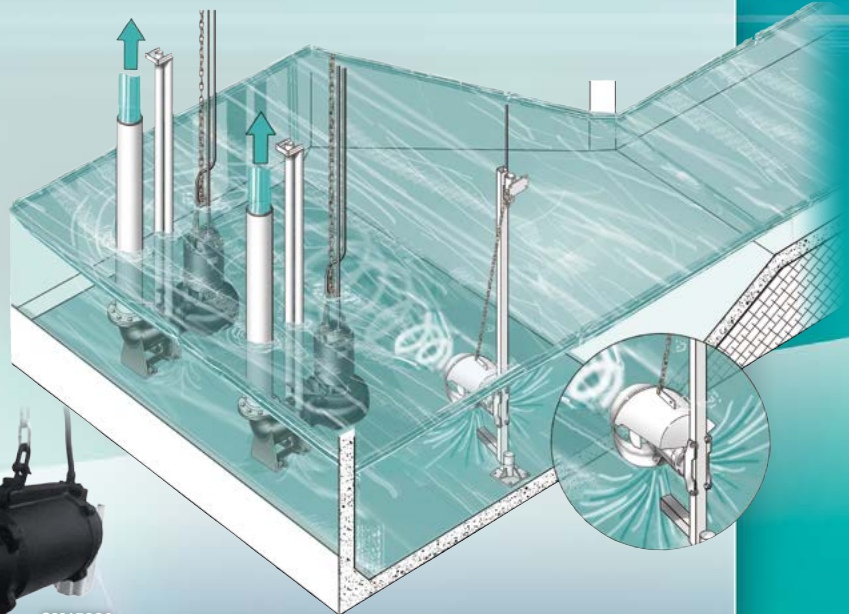
Save energy with powerful mixing. Meet wide-ranging needs with various lineups

SM/SME

High Speed Submersible Mixer SM Series

0.25 - 15 kW

- Mixing in a pump well, sludge storage tank or equalization tank
- Crushing scum



SME series
(B type)



SM1500A

SM1500B

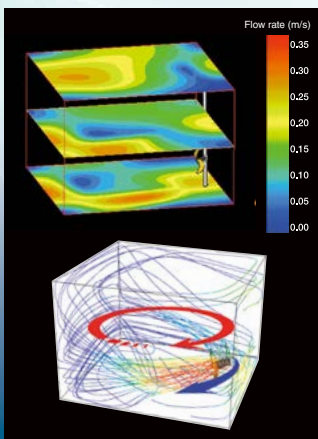


SM250 - 750

Medium Speed Submersible Mixer SMM Series

0.75 - 2.2kW

- Mixing of denitrification tank, reaction tank
- Mixing the carriers in wastewater treatment

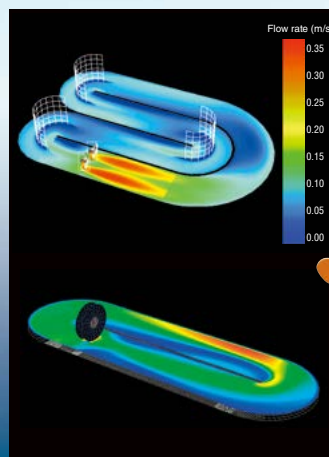


SMM

Low Speed Submersible Mixer SML Series

1.5 - 3.7 kW

- Oxidation ditch
- Water flow generation



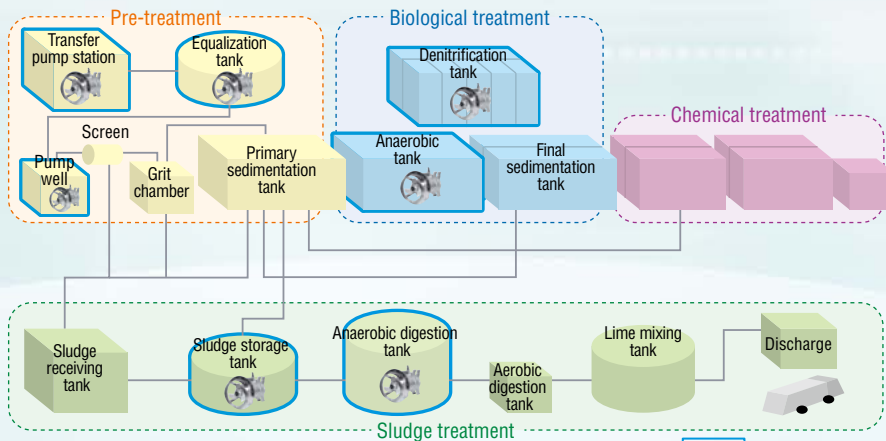
SML

ShinMaywa's submersible mixers can be installed anywhere.

With various lineups, we will address requirements for agitation, mixture and water flow generation in water-related facilities in all fields, including industry, water quality and the environment.

Each and every one of our products incorporates advanced technologies perfected by ShinMaywa through the development of our water treatment-related equipment.

Example of Submersible Mixer Application at Wastewater Treatment Plant



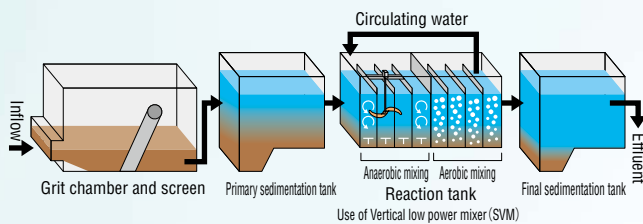
Purpose

Preventing the sedimentation of activated sludge
Uniform mixing
Reducing scum formation

Points of use

Sludge storage tank
Pump station for wastewater collection system
Pump well
pH regulating tank
Reaction tank (Denitrification tank, Anaerobic tank)

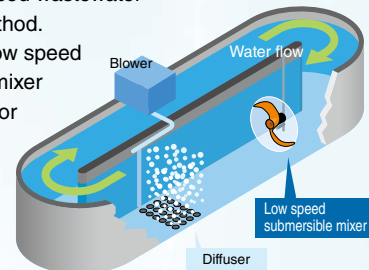
Advanced Wastewater Treatment Method



Conventionally, purification is performed by mixing activated sludge while supplying oxygen. However, the conventional method has the disadvantage of insufficient removal of nitrogen and phosphorus. To overcome this disadvantage, anaerobic mixing, in which no oxygen is supplied, and aerobic mixing, in which oxygen is supplied, combine to maximize the capability of various bacteria, as an advanced wastewater treatment method.

OD (Oxidation Ditch) Method

The oxidation ditch method performs aeration while circulating activated sludge in a circulating channel. The repeated starting and stopping of the diffuser enables anaerobic and aerobic mixing, just like an advanced wastewater treatment method. ShinMaywa low speed submersible mixer can be used for this system.



Small-sized Submersible Mixer at Small Wastewater Treatment System

■ Compact Submersible Mixer at small wastewater treatment tanks by applying 4 poles motor, SM/SME series realize universal, simple and compact design, which allows you to install it easy even in a limited space.

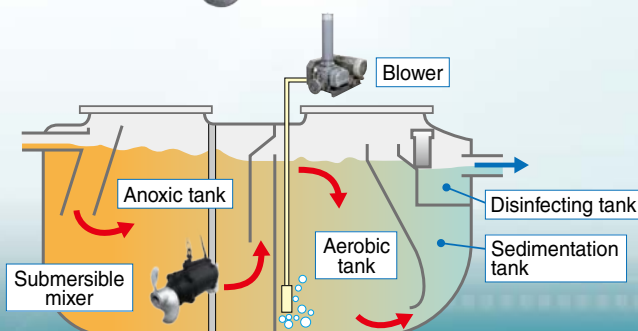
Regardless water condition, tank shape and water volume, SM/SME series is widely applicable.

Recommended Models

SM250 - SM750/SME750,
SM1500A・B(0.25 - 1.5kW)

Advantages

- Small output
- Energy-saving
- Space-saving



ShinMaywa submersible mixers are robust.
We focus on the smallest details.

SME series

Newly developed propeller and motor
realize to reduce power consumption

High efficiency propeller



● Adopt 3-D wing propeller

- Up to 40% reduction in power consumption compared with conventional models.
- Optimum design of propeller using CAE/CFD.
- Achieving the high performance airfoil.
- Improving wear resistance.
- Large thrust propeller for clear water can be used for wastewater.

High efficiency motor

- Optimum design of winding specifications and silicon steel sheet realize energy saving

SM/SME series

Features

0.9kW - 7.5kW (50Hz)

1.1kW - 7.5kW (60Hz)

Improved reliability

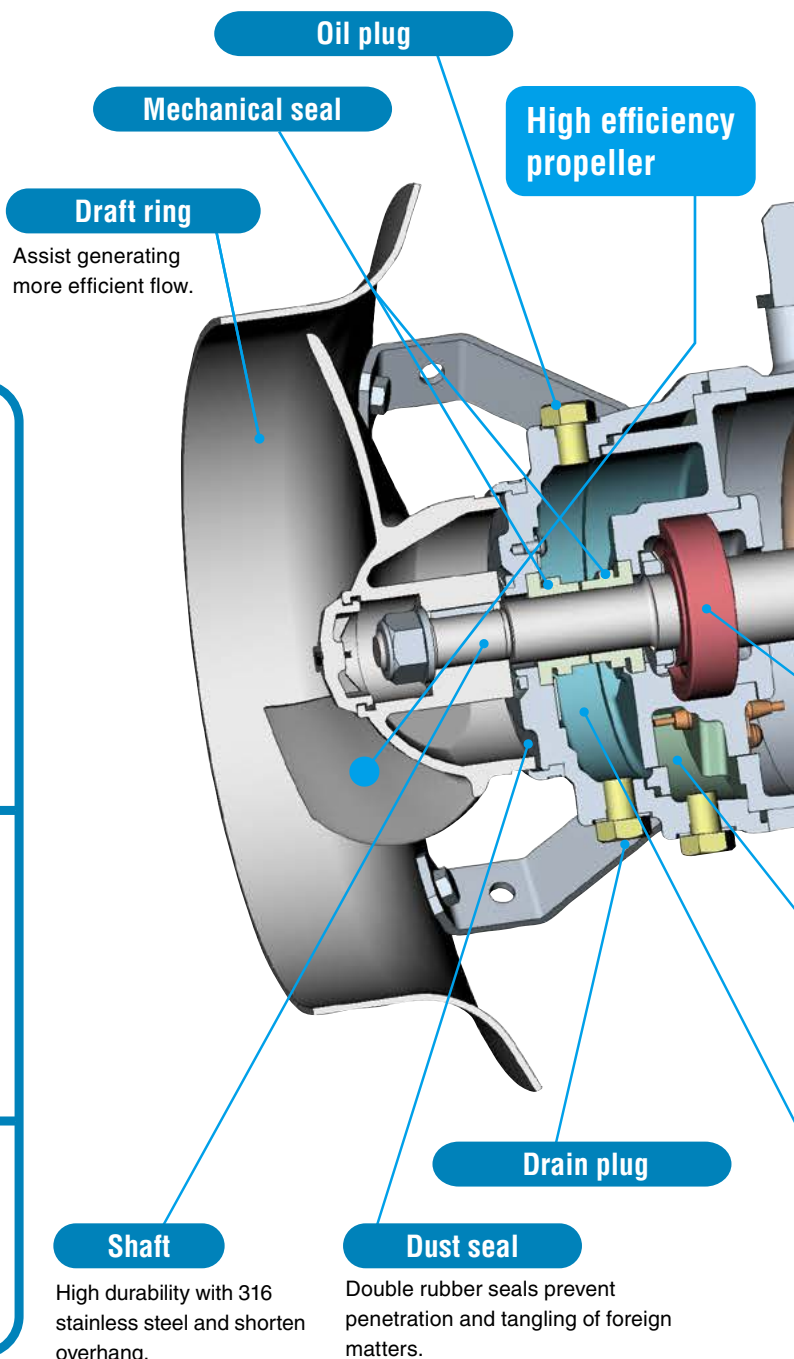
- To prevent cable entanglement, **support coil** and **cable fixture** are equipped.
- Adopt the **cable** with fiber reinforcement, core wire seal shut the water penetrating into the motor.
- Equipped with a **leakage water chamber** as standard, it protect the bearing and motor from leaked water and oil.
- Employing a large **shaft** with shorter overhang prevents shaft deflection and mechanical seal reliability is greatly improved.

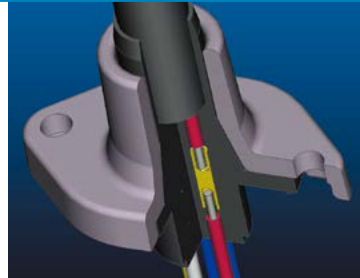
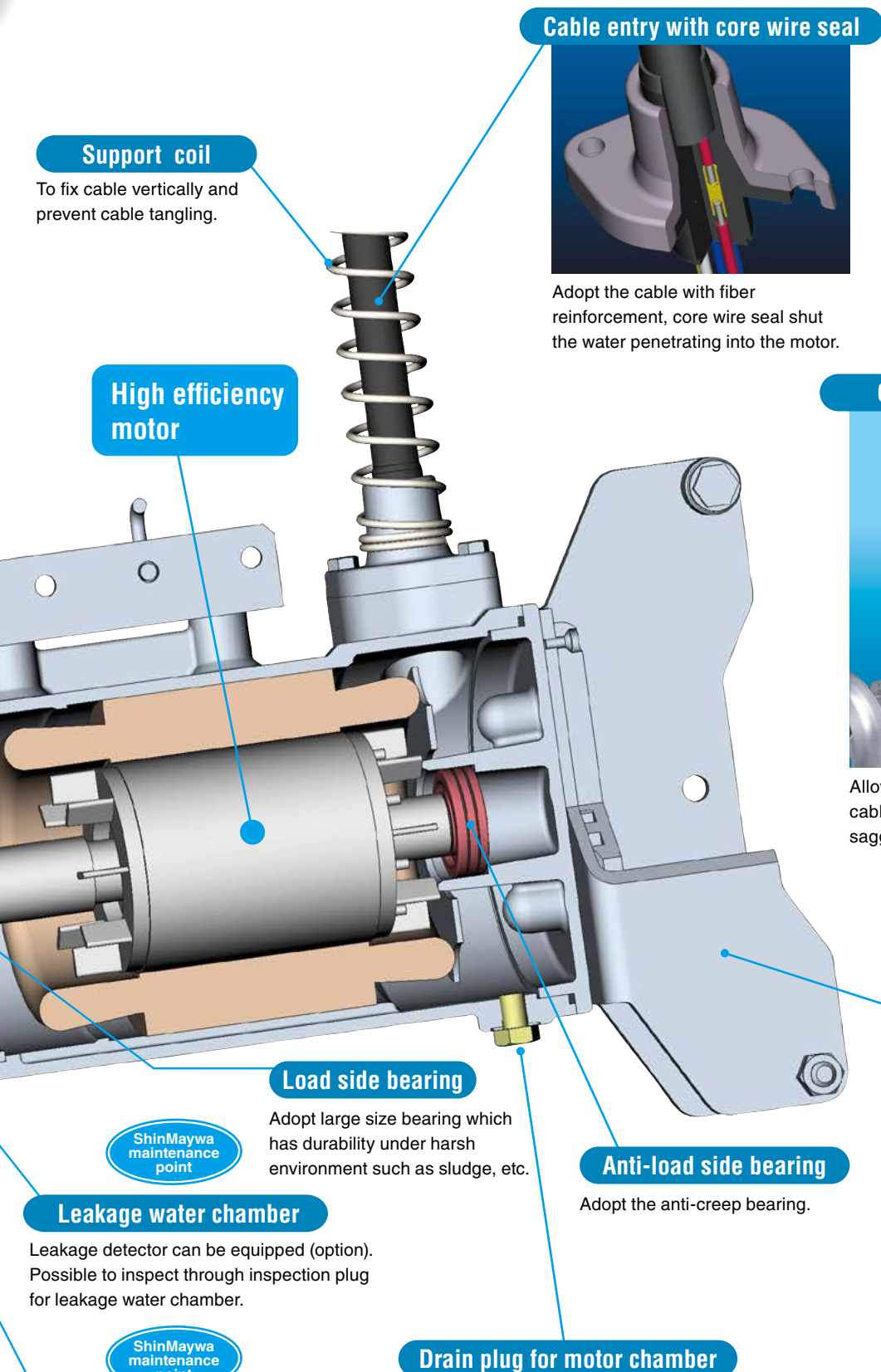
Superb durability

- Employing **double mechanical seal** with silicon carbide (SiC) seal faces that is proven for submersible pumps.
- Employing **large size bearing** for load side, and **anti-creep bearing** for rear side.
- **Propeller** has special hardening treatment to improve wear resistance.

Efficient mixing by simple adjustment

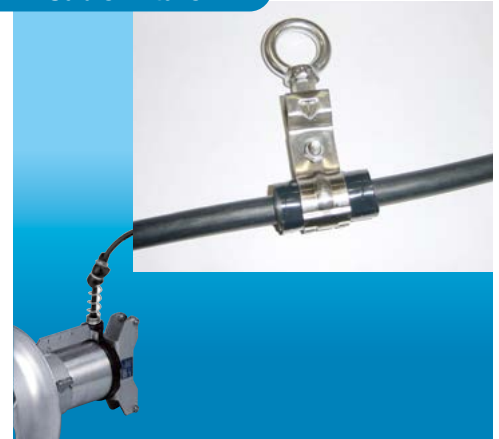
- As position and angle (left / right and up / down) can be easily adjusted to the most efficient location, efficient mixing can be realized in accordance with shape, size and depth of tank, liquid characteristics and mixing purpose.





Adopt the cable with fiber reinforcement, core wire seal shut the water penetrating into the motor.

Cable fixture



Allows you to adjust the cable length and fix the cable in the upper part of a tank to prevent sagging.

Slide

Suitable for square pipe of installation equipment and no limitation of installation depth.

Applicable Condition

Liquid type	Various types of wastewater and sludge
Specific gravity	1.1 or less
Viscosity	1,000mPa·s or less
Temperature	0°C - 40°C
Chlorine ion	1,000mg/ℓ or less
Sludge concentration	5% or less
Water depth	10m or less
pH	6-9

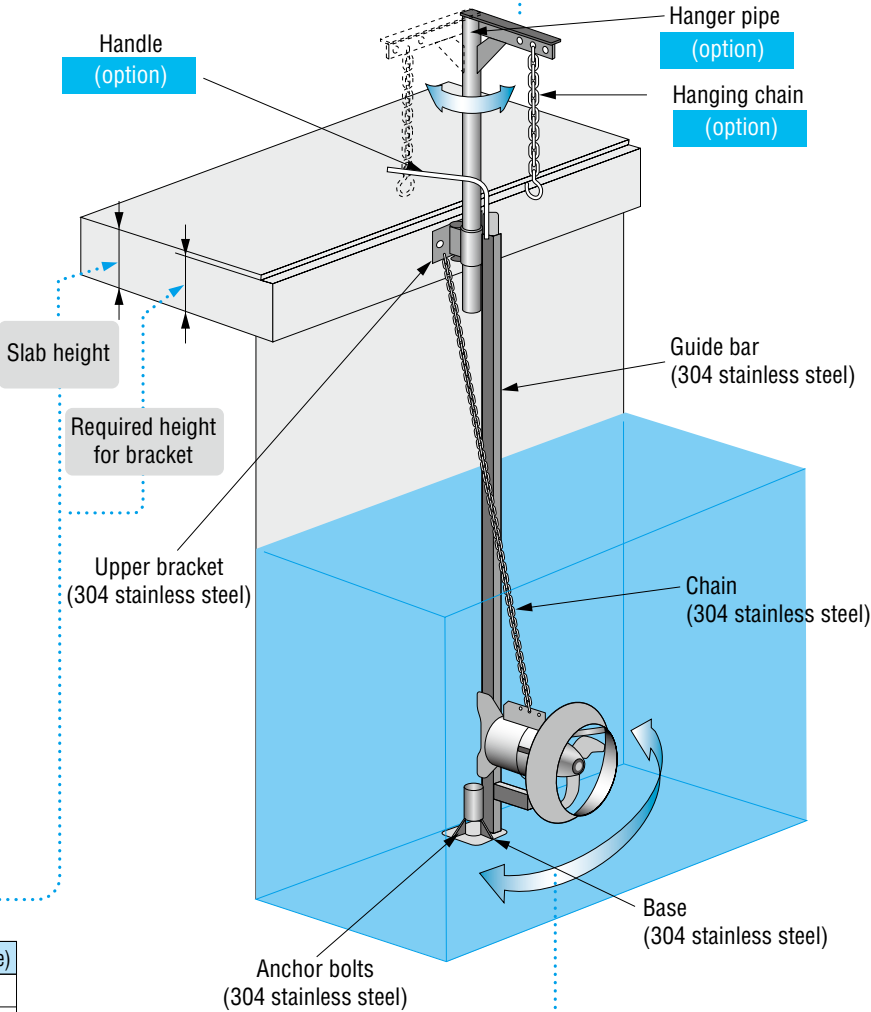
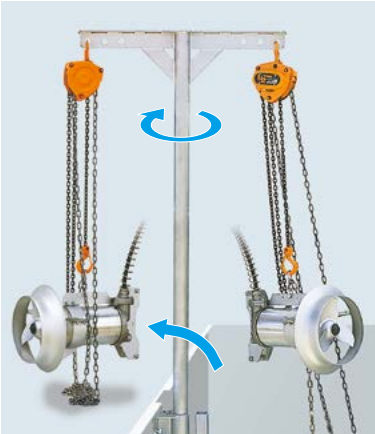
- Applicable liquid specific gravity and viscosity vary per product model.
- Some liquid type may be supported a range exceeding the above scope. Please contact us.

Installation Equipment

Simple adjustment for effective mixing.

Easy Pull-out of Mixer from the Tank

- Using hanger pipe (option), lifted mixer can easily rotate to floor side and make easy inspection and adjustment.



Required Slab Height

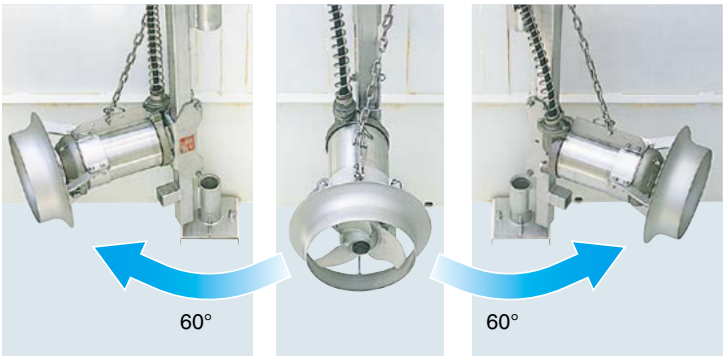
Guide bar	Required height for bracket	Slab height (reference)
□50 pipe	150mm	200mm
□100 pipe	200mm	250mm

Left / Right Angle Adjustment

- Mixing direction in horizontal can be adjusted within + / - 60° with 20° pitch.



1. Remove the pin.
2. Determine angle using the handle.
3. Insert the pin.



When Water cannot be Drained from an Existing Tank

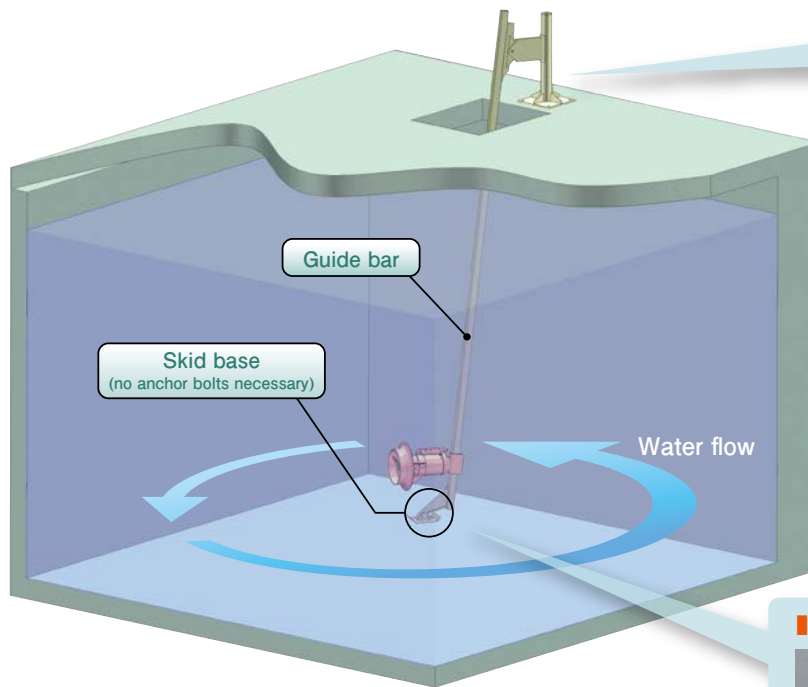
Equipped with an installation equipment
requiring no water drainage
Output: 1.5 · 2.8 kW

SME-D Series

A submersible mixer that saves energy by powerful mixing can be installed without shutting down the wastewater treatment facility.

Features

- Adopts a delta receiving structure in which a slanting guide bar is exposed to thrust from a submersible mixer.
- A skid base that can be inclined to any angle absorbs the inclination of the tank bottom (1 / 50 or less).
- The maximum possible depth of the water tank is 6m.



Opening



Fixed at the upper part of the tank.

Bottom surface of a tank (Photo for reference)



A skid base is used to stabilize at the tank bottom.

SELECTION SHEET of Submersible Mixer (Example)

ShinMaywa
No. MT8422
Date: 12. Oct. 2013
By: Mr. A. Matsuda

SELECTION SHEET of Submersible Mixer

Customer: _____
Project: _____
Equipment No.: _____
Tank No.: _____
No. of Req'd: _____

Calculate the "Required Reaction Force" for select the suitable model from shape of the tank, tank volume, liquid condition and mixing purpose.
Decided the suitable model compared with the "Required Reaction Force" and its catalogue value.

1. Conditions () : estimated value

Item	Value	Unit	Remarks
Tank name	Equalization tank		Mixing purpose: Equalization
Tank vol.	640 m ³	m ³	Water Depth: 5.0 m
Depth	5.0	m	Particle Dia. -
Liquid Density	1.0	g/cm ³	Specific gravity -
Viscosity	10	mPa·s	(1 Centistoke = 0.0100 g/cm ² ·s)
Temperature	15.0	°C	Max. 50°C

2. Check a required No. of the mixer
Divided vol. of tank is 2 because of the tank length / water depth: 25.0 / 5 = 4.7
(Minimum vol. : 1.2 tank vol. / Divided No. of tank = 768 / 5 = 153.6 m³)

3. Calculation of Required Reaction Force
From shape of the tank, objective and conditions.

Item	Value	Unit	Remarks
Correction coefficient (K ₁)	0.8		Other: 1
Req. reaction force of mixer	618.80	N	(ShinMaywa's rated value of a reaction force for mixing a standard tank)
Tank shape coefficient (K ₂)	1.1		Value from the tank shape and volume
Sludge density coefficient (K ₃)	1.0		Value from the above liquid quality
Mixing purpose coefficient (K ₄)	0.8		Value of the sedimentation behavior of solid, oxidation of equipment, etc.
Required Reaction Force	618.80	N	
Required Reaction Force	618.80	N	(618.80 x 1.17 x 1.01 x 0.80 x 1.00 = 644.80 N)

4. Selected Model
Select the following mixer model to meet the required reaction force from our catalogues.

Item	Value	Unit	Remarks
Model	SME15AD		Installation example:
Output	1.5	kW	
Frequency	50/60	Hz	
Propeller	302	mm	
Shaft dia.	30	mm	
Material	SS304		
Shaft length	2.0	m	
Required min. water level	1.7	m	(From bottom of the tank)
Required min. opening dia.	1.7	m	(From bottom of the tank)

Notes for Installation & Operation:
a) Remove the foreign matter by screen to prevent entangling with propeller.
b) Keep the required min. water level under operation.
c) We recommend anti-corrosion measure for the mixer's sacrificial anode, etc.
d) In case the above condition changed, the model shall be changed.

Standard Specifications

Model	Rated output (kW)	No. of poles	Propeller code		Flow (m ³ / min)	Thrust (N)	Weight (kg)
			50Hz	60Hz			
SME15JAD SME15JBD	1.5	6	2513	2523	7.4	300	52
			2512	2522	6.5	230	
			2511	2521	5.6	175	
SME15AD SME15BD	1.5	6	*3012	*3022	10.5	430	54
			3011	3021	9.8	380	
			3513	3523	15.0	650	75
SME28AD SME28BD	2.8	8	3512	3522	14.0	570	
			3511	3521	13.0	490	

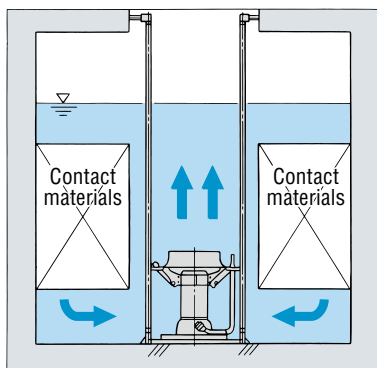
Note) Propeller code marked with * cannot be used in the liquid that contains a large amount of foreign objects or has a large specific gravity (1.03 or higher).

Special Installation Methods

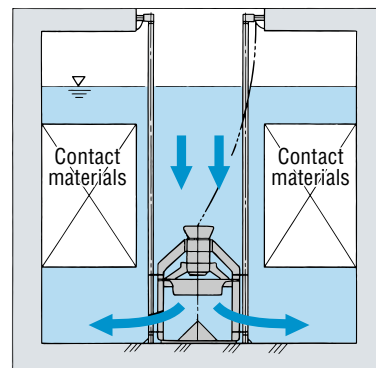
Special Installation Examples of a Mixer Facing Upwards or Downwards

A special mount and two guide pipes allow a mixer to be installed facing upwards or downwards. The mixer thus installed can be used to circulate and mix sewage water in a contact aeration tank filled with contact materials or an anaerobic filter bed tank in a small-sized sewage treatment facility. Also, installation mixer facing upwards or downwards is available by one guide pipe especially where the space is limited.

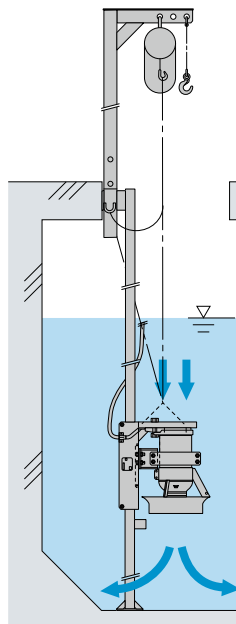
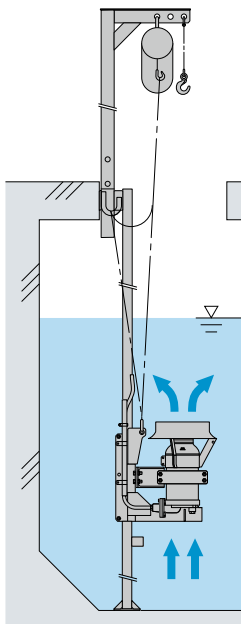
Example of a mixer facing upwards



Example of a mixer facing downwards

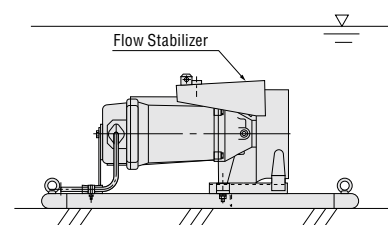
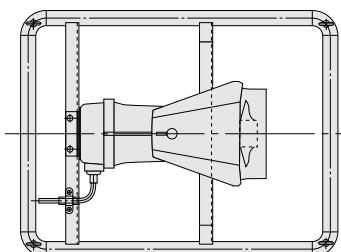


Example of a mixer facing upwards and downwards with one guide bar



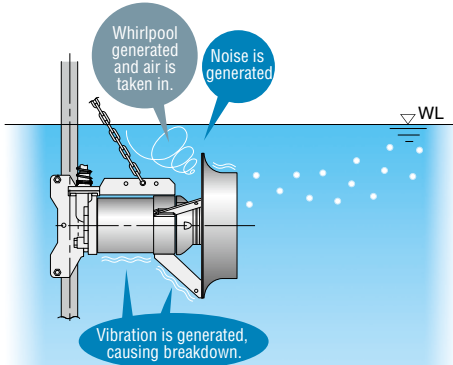
Installation on the floor (bottom)

Submersible mixer can be installed by using the installation base and bracket. This installation type is helpful when using guide bar is not practical or when the water depth is low.



Flow Stabilizer for Low Water Level (Option)

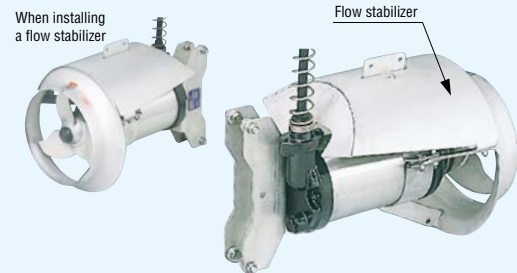
Problems at Low Water Level



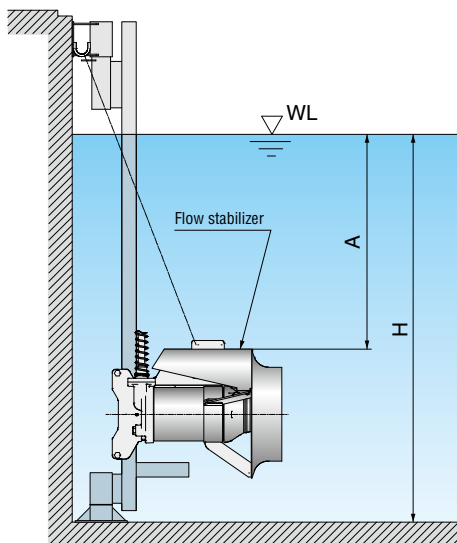
When submersible mixer operates at the lower water level, for example in a shallow equalization tank, anaerobic mixing is disabled as mixer takes air due to whirlpool generated on the water surface. This may cause breakdown of mixer. Therefore, in case of low water level operation, by installing flow stabilizer to mixer, operable water level can be lowered.

Effect of a Flow Stabilizer

A flow stabilizer precludes sucking of swirl generated at low water levels. Installation of a flow stabilizer allows operation of the mixer with a lower water level than usual.



Operational Min. Water Level



Model	Flow stabilizer	H (mm)	A (mm)
SM250	Without	1,100	700
	With	500	100
SM400	Without	1,100	700
	With	500	100
SM750 / SME750	Without	1,100	700
	With	500	100
SM1500A • B	Without	600 (50 Hz) / 700 (60 Hz)	200 (50 Hz) / 300 (60 Hz)
	With	—	—
SME15JA • JB	Without	1,100	700
	With	500	100
SME15A • B	Without	1,300	700
	With	900	300
SME22JA • JB	Without	1,100	700
	With	500	100
SME28A • B	Without	1,500	900
	With	900	300
SME40A • B	Without	1,700	1,100
	With	1,000	400
SM50A • B	Without	1,700	800
	With	1,200	300
SM75A • B	Without	1,900	1,000
	With	1,200	300

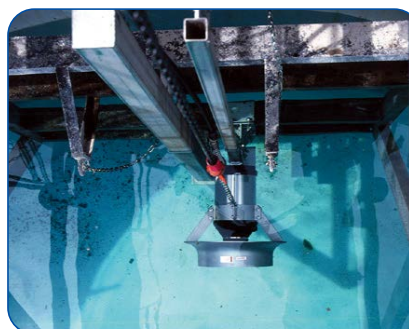
*Flow stabilizer is not applicable to SM1500A•B

Actual Measurement of Thrust at the Factory



Thrust Measurement System

ShinMaywa has a thrust measurement system specific for submersible mixers installed at our Ono plant.



High quality can be achieved by accurately measuring the thrust during submersible operation.

Standard Specifications

50Hz Specifications

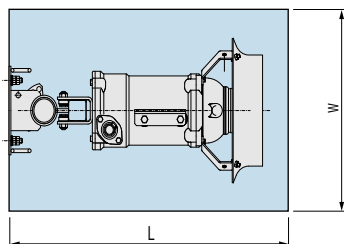
Model	Rated output (kW)	No. of poles	Synchronous rotation speed (min ⁻¹)	Propeller code	Propeller diameter (mm)	Consumption power for mixing clear water (kW)	Flow (m ³ / min)	Thrust (N)	Weight (kg)
SM250	0.25	4	1,500	—	150	0.38	1.8	53	20
SM400	0.4			—	180	0.52	2.7	80	23
SM750	0.75			—		0.82	3.5	140	25
SME750				—		0.66			28
SM1500A・B	1.5	4	1,500	—	210	1.1	5.5	240	26
SME15JA・JB	1.5	6	1,000	2513	254	1.4	7.4	300	52
				2512		1.0	6.5	230	
				2511		0.8	5.6	175	
SME15A・B				*3012	300	1.6	10.5	430	54
				3011		1.4	9.8	380	
SME22JA・JB	2.2	4	1,500	2212	220	1.8	6.4	300	52
				2211		1.1	5.1	190	
SME28A・B	2.8	8	750	3513	350	2.1	15.0	650	75
				3512		1.9	14.0	570	
				3511		1.6	13.0	490	
SME40A・B	4			3515		3.2	17.0	850	93
				3514		2.6	16.0	750	
				3513		2.2	15.0	650	
SM50A・B	5			10		600	*512	525	5.5
		513	4.9		34.2		1,500		
		514	4.4		30.6		1,200		
		515	3.4		26.5		900		
SM75A・B	7.5	*510	8.2		43.0		2,370		160
		511	7.4		40.0		2,050		
		512	6.4		35.5		1,620		
SM110A	8.8	4	311		503		780		7.2
SM150A	13.5		352	502	10.4	71.5		3,300	
	15		367	501	11.8	74.7		3,600	

*Propeller code marked with * cannot be used in the liquid that contains a large amount of foreign objects or has a large specific gravity (1.03 or higher).

•For mixers with motor rated output not specified in these tables, please contact us.

•Draft ring is not equipped to SM1500A·B as a standard.

Opening Slot Dimensions



Model	W	L
SM250,SM400,SM750,SME750	400	700
SM1500A·B		
SME15JA·JB,SME22JA·JB	500	800
SME15A·B	600	
SME28A·B		900
SME40A·B		1,000
SM50A·B,SM75A·B	800	1,200
SM110A,SM150A	1,100	1,400

60Hz Specifications

Model	Rated output (kW)	No. of poles	Synchronous rotation speed (min ⁻¹)	Propeller code	Propeller diameter (mm)	Consumption power for mixing clear water (kW)	Flow (m ³ / min)	Thrust (N)	Weight (kg)
SM250	0.25	4	1,800	—	136	0.38	1.5	44	20
SM400	0.4			—	150	0.49	2.0	60	23
SM750	0.75			—	180	0.94	3.4	125	25
SME750				—		0.7			28
SM1500A・B	1.5	4	1,800	—	210	1.1	5.5	240	26
SME15JA・JB	1.5	6	1,200	2523	254	1.3	7.4	300	52
				2522		1.0	6.5	230	
				2521		0.7	5.6	175	
SME15A・B				*3022	300	1.7	10.5	430	54
				3021		1.5	9.8	380	
SME22JA・JB	2.2	4	1,800	2221	220	1.8	5.8	250	52
SME28A・B	2.8	8	900	3523	350	2.3	15.0	650	75
				3522		2.0	14.0	570	
				3521		1.7	13.0	490	
SME40A・B	4			3525		3.0	17.0	850	93
				3524		2.6	16.0	750	
				3523		2.3	15.0	650	
SM50A・B	5	12	600	*512	525	5.5	35.5	1,620	145
				513		4.9	34.2	1,500	
				514		4.4	30.6	1,200	
				515		3.4	26.5	900	
SM75A・B	7.5			*510		8.2	43.0	2,370	160
				511		7.3	40.0	2,050	
				512		6.4	35.5	1,620	
SM110A	10.5			4		328	602	780	8.4
SM150A	15	373	601		12.4	75.7	3,700		

*Propeller code marked with * cannot be used in the liquid that contains a large amount of foreign objects or has a large specific gravity (1.03 or higher).

•For mixers with motor rated output not specified in these tables, please contact us.

•Draft ring is not equipped to SM1500A·B as a standard.

Cable Specifications

Model	Type	Section area (mm²)	No. of cores	Application	Length (m)	Outer diameter (mm)
SM250 SM400 SM750 SME750	PVC insulated PVC sheathed cable	1.25	4	Power	10	11.5
SM1500A·B						
SME15JA·JB SME15A·B SME22JA·JB	EPR insulated PCP sheathed cable	1.25 1.25 (1.25)	4 2 (2)	Power Thermal (Leakage detector)	10	15 (17)
SME28A·B	with fabric reinforcement	2.0 2.0 (2.0)				16 (18)
SME40A·B		3.5 2.0 (2.0)				18 (20)

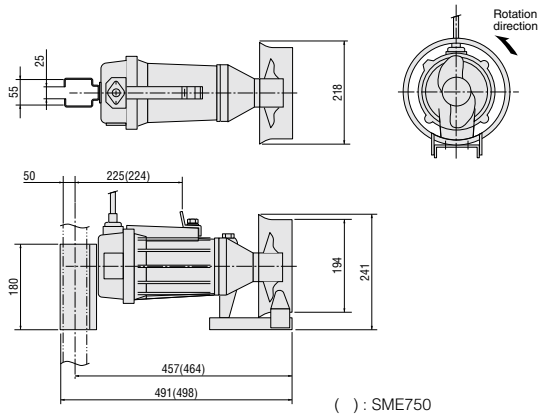
Model	Type	Section area (mm²)	No. of cores	Application	Length (m)	Outer diameter (mm)
SM50A·B	EPR insulated PCP sheathed cable with fabric reinforcement	5.5 2.0 (2.0)	4 2 (2)	Power Thermal (Leakage detector)	10	20 (22)
SM75A·B		8.0 2.0 (2.0)				22 (24.5)
SM110A SM150A		14 2.0 (2.0)				29

() shows the optional specification with [leakage detector].

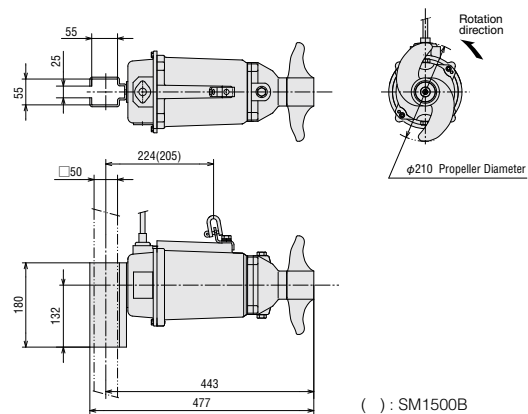
() shows the optional specification with [leakage detector].

Dimensions (Unit : mm)

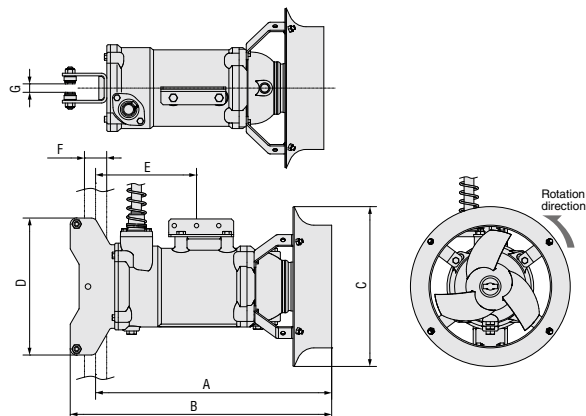
SM250·SM400·SM750·SME750



SM1500A·B

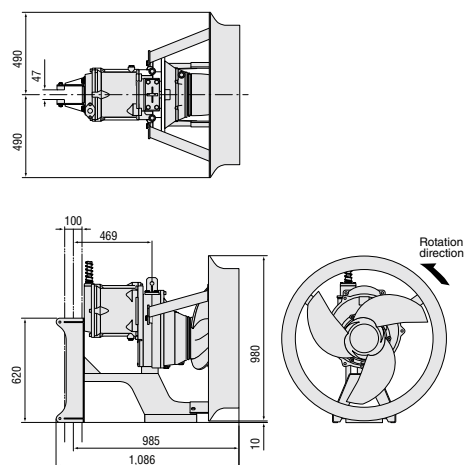


SME15JA·SME15A·SME22JA·SME28A·SME40A·SM50A·SM75A SME15JB·SME15B·SME22JB·SME28B·SME40B·SM50B·SM75B



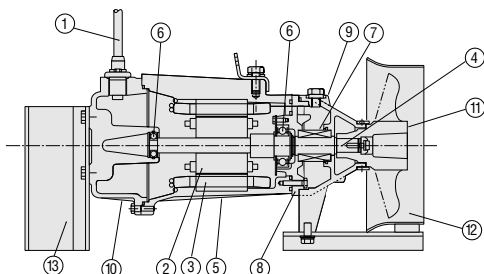
Model	Dimensions						
	A	B	C	D	E	F	G
SME15JA·JB	531	588	360	308	234	50	19
SME15A·B	557	614	440		247		
SME22JA·JB	531	588	360		234		
SME28A·B	641	698	510		278		
SME40A·B	701	758	705	280	308	100	43
SM50A·B	746	836			328		
SM75A·B	798	888			350		

SM110A·SM150A



Sectional View

SM250·SM400·SM750·SME750



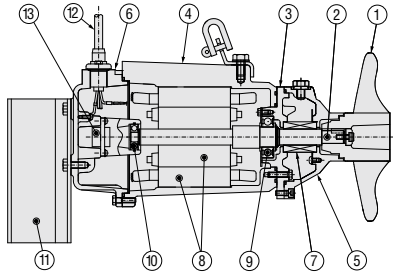
Material

No.	Name	Material	No.	Name	Material
1	Cable	PVC insulated PVC sheathed cable	8	Mechanical seal bracket	Gray iron casting (FC200)
2	Rotor	—	9	Oil housing	Gray iron casting (FC200)
3	Stator	—	10	Motor cover	Gray iron casting (FC200)
4	Shaft	420J2 stainless steel	11	Propeller	Spheroidal graphite iron casting (FCD500)
5	Stator housing	Gray iron casting (FC200)	12	Draft ring	304 stainless steel
6	Bearing	—	13	Sliding bracket	304 stainless steel
7	Mechanical seal	—			

Sectional View

SM1500A (Cast iron specification)

SM1500B (Stainless steel specification)



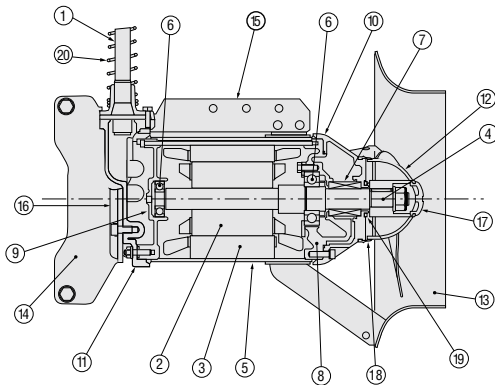
Material

No.	Name	Material	No.	Name	Material
1	Propeller	316 Stainless steel casting	8	Rotor/Stator	—
2	Shaft	SUS420J2 Stainless Steel <316 Stainless Steel>	9	Ball Bearing	—
3	Mechanical Seal Bracket	Gray iron casting (FC200)	10	Ball Bearing	—
4	Stator Casing	Gray iron casting (FC200) <316 Stainless steel casting>*	11	Slide	304 Stainless Steel
5	Oil Casing	Gray iron casting (FC200) <316 Stainless steel casting>*	12	Cable	PVC insulated PVC sheathed cable
6	Head Cover	Gray iron casting (FC200) <316 Stainless steel casting>*	13	Thermal protector	—
7	Mechanical Seal	SiC/SiC			

*The material within the bracket < > is for stainless steel specification models.

SM50A·SM75A (Cast iron specification)

SM50B·SM75B (Stainless steel specification)



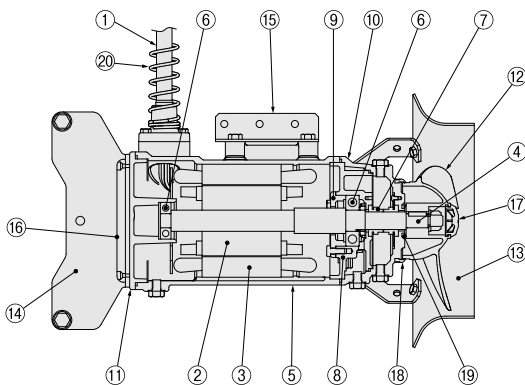
Material

No.	Name	Material	No.	Name	Material
1	Cable	EPR insulated PCP sheathed cable with fabric reinforcement	11	Motor cover	Gray iron casting (FC200) <316 stainless steel casting>*
2	Rotor	—	12	Propeller	316L stainless steel
3	Stator	—	13	Draft ring	304L stainless steel
4	Shaft	316 stainless steel (wet portion only)	14	Sliding bracket	304 stainless steel
5	Stator housing	316L stainless steel	15	Hanger plate	304 stainless steel
6	Bearing	—	16	Sliding plate	Polyethylene (PE)
7	Mechanical seal	—	17	Propeller cap	Acrylonitrile butadiene rubber (NBR)
8	Mechanical seal bracket	Gray iron casting (FC200)	18	Shield ring	Acrylonitrile butadiene rubber (NBR)
9	Bearing bracket	Gray iron casting (FC200)	19	Oil seal	Acrylonitrile butadiene rubber (NBR)
10	Oil housing	Gray iron casting (FC200) <316 stainless steel casting>*	20	Support coil	304 stainless steel

*The material within the bracket < > is for stainless steel specification models.

SME15JA·SME15A·SME22JA·SME28A·SME40A (Cast iron specification)

SME15JB·SME15B·SME22JB·SME28B·SME40B (Stainless steel specification)

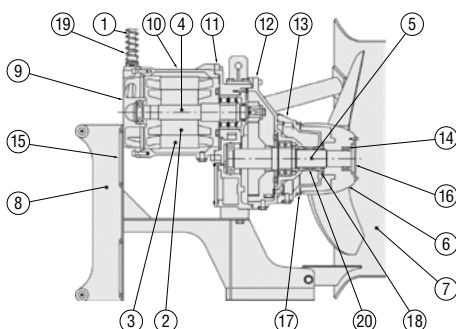


Material

No.	Name	Material	No.	Name	Material
1	Cable	EPR insulated PCP sheathed cable with fabric reinforcement	11	Motor cover	Gray iron casting (FC250) <316 stainless steel casting>*
2	Rotor	—	12	Propeller	316 stainless steel casting
3	Stator	—	13	Draft ring	304 stainless steel
4	Shaft	316 stainless steel (wet portion only)	14	Sliding bracket	304 stainless steel
5	Stator housing	Gray iron casting (FC250) <316 stainless steel casting>*	15	Hanger plate	304 stainless steel
6	Bearing	—	16	Sliding plate	Polyethylene (PE)
7	Mechanical seal	—	17	Propeller cap	Acrylonitrile butadiene rubber (NBR)
8	Bearing bracket	Gray iron casting (FC250)	18	Shield ring	Acrylonitrile butadiene rubber (NBR)
9	Bearing retainer	Gray iron casting (FC250)	19	Oil seal	Acrylonitrile butadiene rubber (NBR)
10	Oil housing	Gray iron casting (FC250) <316 stainless steel casting>*	20	Support coil	304 stainless steel

*The material within the bracket < > is for stainless steel specification models.

SM110A·SM150A



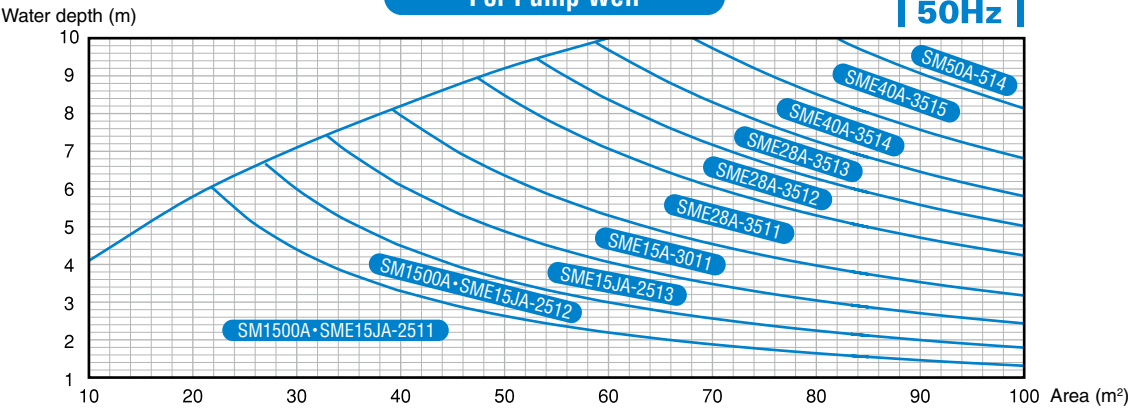
Material

No.	Name	Material	No.	Name	Material
1	Cable	EPR insulated PCP sheathed cable with fabric reinforcement	11	Gear housing	Gray iron casting (FC200)
2	Rotor	—	12	Mechanical seal bracket	Gray iron casting (FC200)
3	Stator	—	13	Oil housing	Gray iron casting (FC200)
4	Motor shaft	Carbon steel	14	Locking element	—
5	Propeller shaft	316 stainless steel	15	Sliding plate	Polyethylene (PE)
6	Propeller	316 stainless steel casting	16	Propeller cap	316 stainless steel casting
7	Draft ring	304L stainless steel	17	Shield ring	Chloroprene rubber (CR)
8	Sliding bracket	304 stainless steel	18	Oil seal	Acrylonitrile butadiene rubber (NBR)
9	Motor cover	Gray iron casting (FC200)	19	Support coil	304 stainless steel
10	Stator housing	Gray iron casting (FC200)	20	Mechanical seal	—

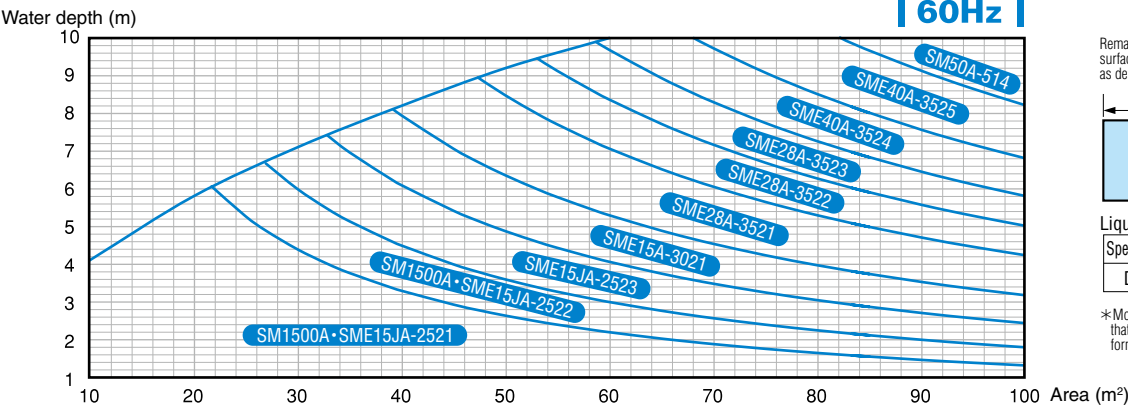
Simple Selection Chart

For Pump Well

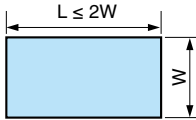
50Hz



60Hz



Remarks) Length/Width ratio of plain surface of tank shall be less than 2:1 as described below.

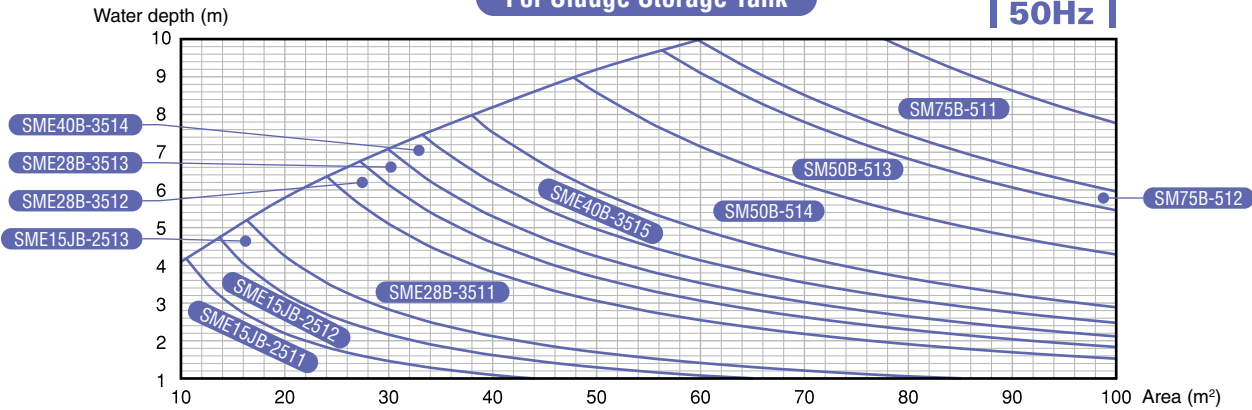


Liquid condition	
Specific gravity	1.01
Density	0.1%

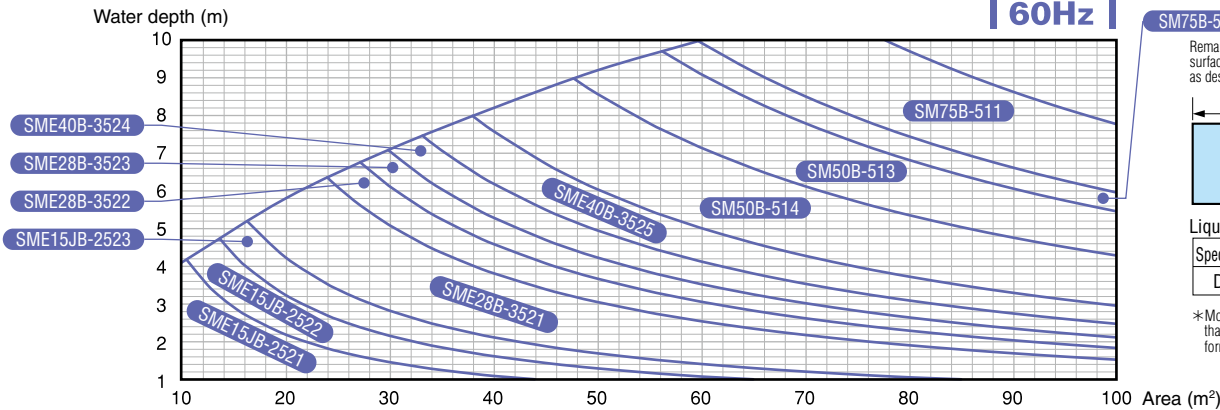
*Model selection is just for reference so that correct model shall be determined by formal calculation chart.

For Sludge Storage Tank

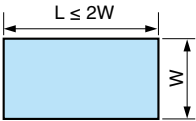
50Hz



60Hz



Remarks) Length/Width ratio of plain surface of tank shall be less than 2:1 as described below.

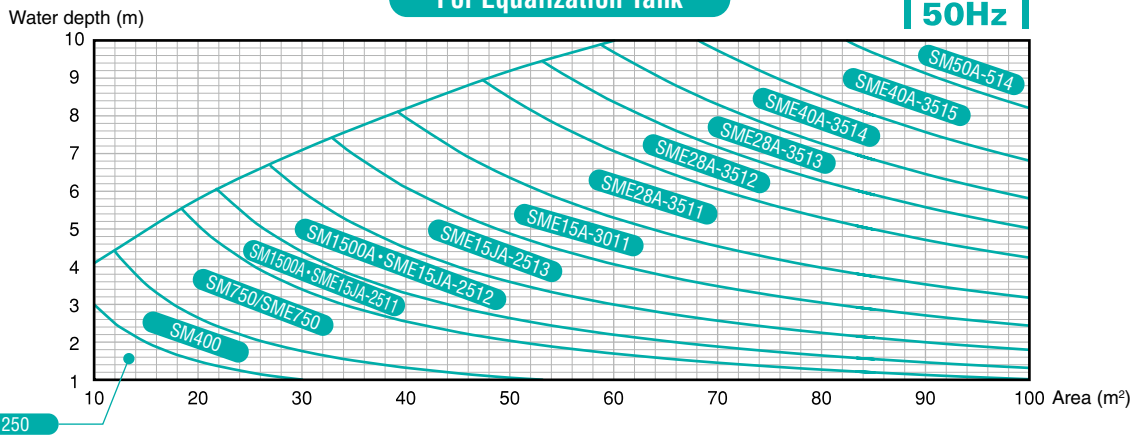


Liquid condition	
Specific gravity	1.05
Density	Less than 2%

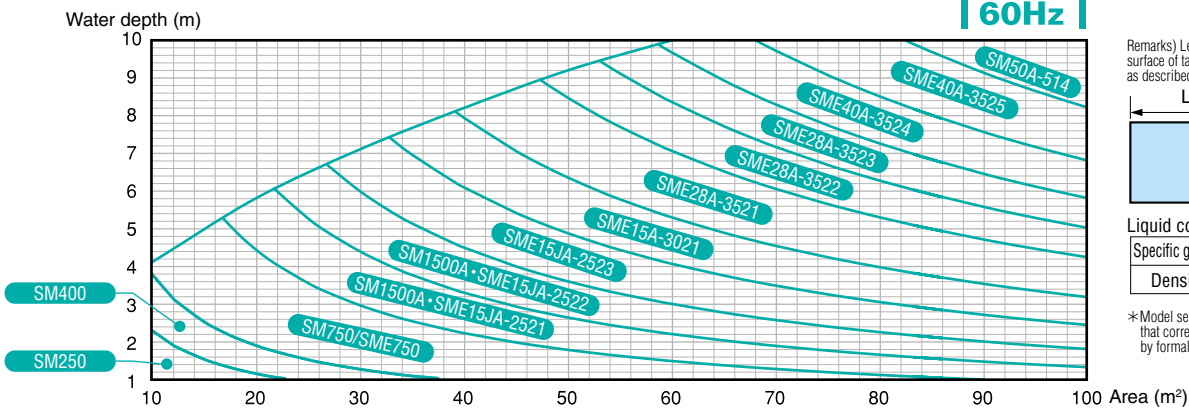
*Model selection is just for reference so that correct model shall be determined by formal calculation chart.

For Equalization Tank

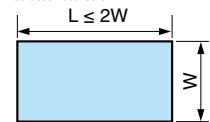
50Hz



60Hz



Remarks) Length/Width ratio of plain surface of tank shall be less than 2:1 as described below.



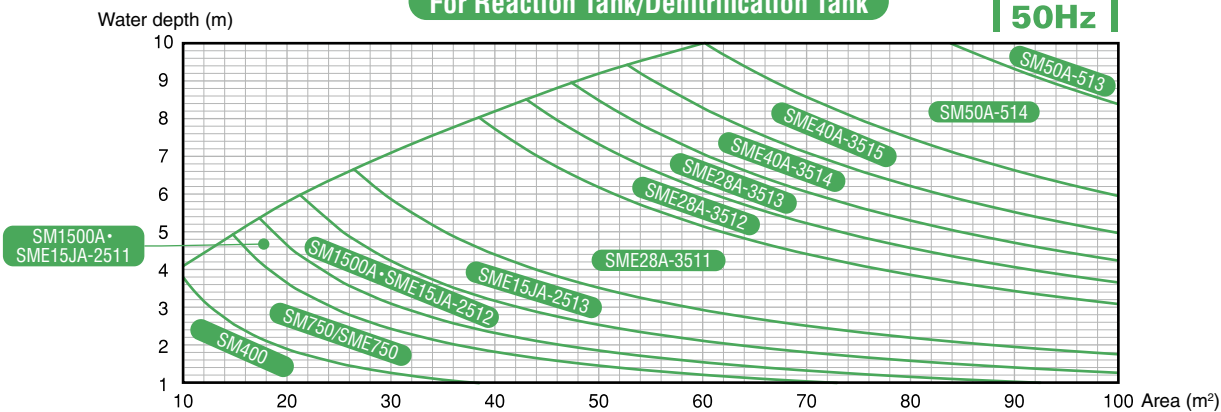
Liquid condition

Specific gravity	1.01
Density	0.1%

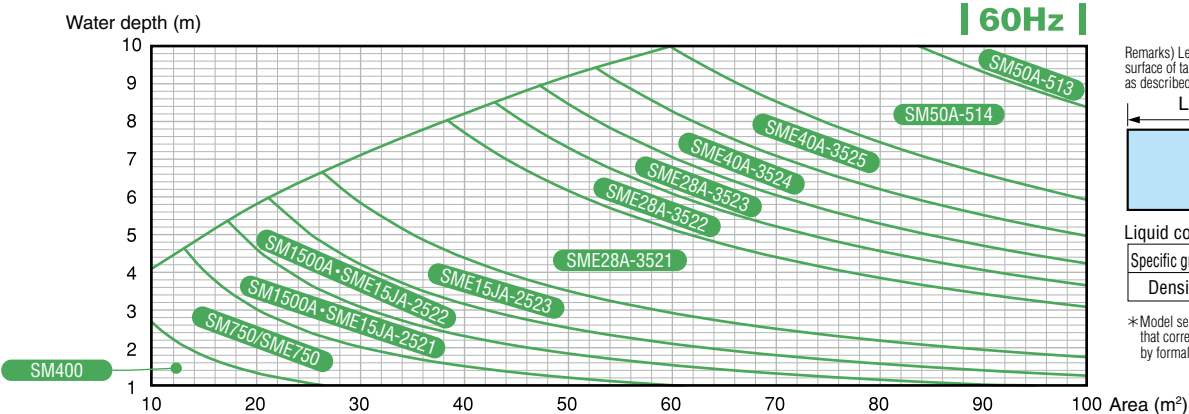
*Model selection is just for reference so that correct model shall be determined by formal calculation chart.

For Reaction Tank/Denitrification Tank

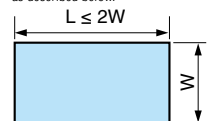
50Hz



60Hz



Remarks) Length/Width ratio of plain surface of tank shall be less than 2:1 as described below.



Liquid condition

Specific gravity	1.03
Density	0.5%

*Model selection is just for reference so that correct model shall be determined by formal calculation chart.

Mixing of the reaction tank is realized with a small power density.

Features

Energy saving

Mixing of the reaction tank is realized with a slight power density of 2 to 4 W / m³.

Energy consumption can be reduced to 1 / 2 to 1 / 3 compared to high speed submersible mixers.

High maintainability

The maintenance cycle is twice as long as the SM series high speed submersible mixer. In addition, it can be easily pulled up with the portable hanger pipe, reducing maintenance costs.

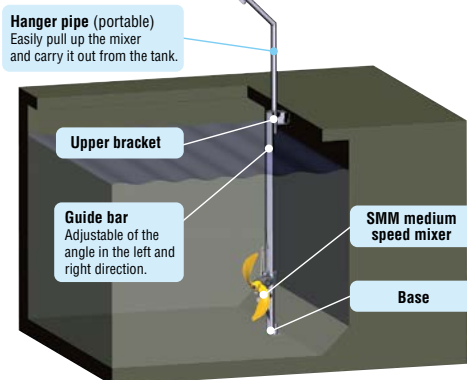
Smooth mixing of biological flocs

A smooth propeller shape and low blade tip speed provide gentle mixing for biological flocs and so on.

Installation on the tank wall side

Unlike other mechanical mixing systems, there is no need for structures (installation structures or inspection walkways) at the center of the tank, so the installation to the existing tank can be reduced the construction period and cost.

Installation Example



Applications

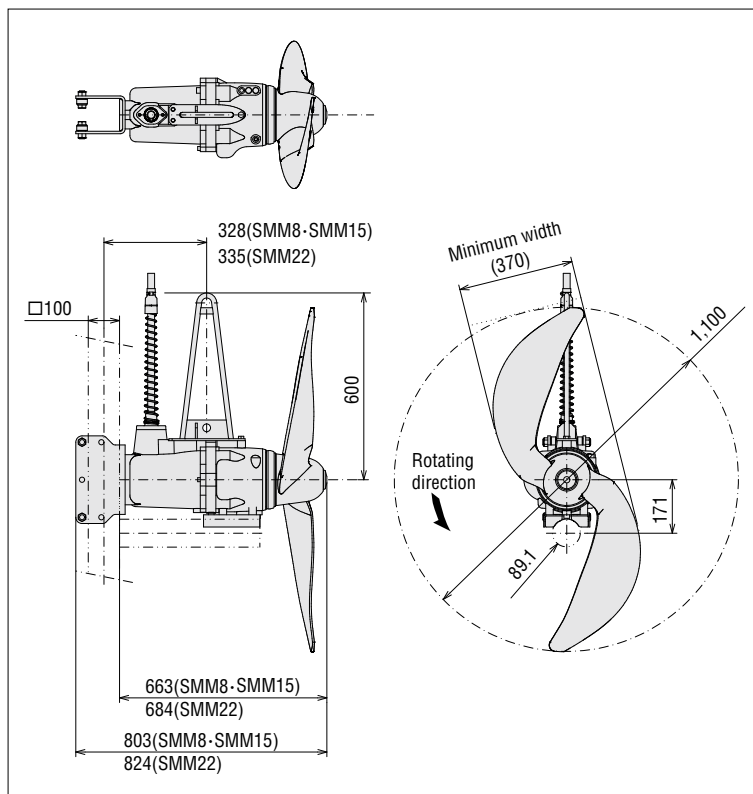
Energy save mixing in denitrification tank and reaction tank.

Standard Specifications

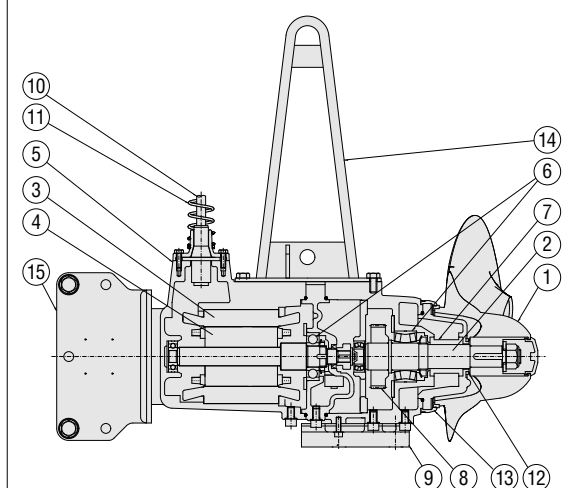
Model	Rated output (kW)	No. of poles	Synchronous rotation speed (min ⁻¹)	Propeller code	Propeller diameter (mm)	Minimum width (mm)	Consumption power for mixing clear water (kW)	Flow (m ³ /min)	Thrust (N)	Weight (kg)
SMM8	0.75	8	109	723	1,100	Approx. 370	0.7	109	600	Approx. 100
SMM15	1.5	6	137	722			1.4	137	1,000	
SMM22	2.2	4	156	721			2.0	156	1,300	

Dimensions

(Unit: mm)



Sectional View



Material

No.	Name	Material	No.	Name	Material
1	Propeller	Glass fiber reinforced plastic (GFRP)	9	Buffer material	Ethylene propylene diene rubber (EPDM)
2	Shaft	316 stainless steel	10	Cable	EPDM insulated PCP sheathed cable with fabric reinforcement
3	Stator	—	11	Support coil	304 stainless steel
4	Rotor	—	12	Oil seal	Acrylonitrile butadiene rubber (NBR)
5	Stator housing	Gray iron casting (FC200)	13	Shield ring	Chloroprene rubber (CR)
6	Bearing	—	14	Hanger bracket	304 stainless steel
7	Mechanical seal	—	15	Sliding bracket	304 stainless steel
8	Gear	Chromium molybdenum steel			

Generate a huge water flow using minimal energy.

Features

Strong water flow

Using CFD / CAE analysis, adopt the high-performance propeller that enables both mixing performance and strength. In addition, a structure with a sweepback angle will prevent foreign matters from tangling and provide superb durability.

Safety design

Leakage water chamber is standard on all models to prevent water penetration to the motor. In addition, a leakage detector (optional) prevents insulation deterioration due to leakage water. In addition, adopt the cable with fiber reinforcement, core wire seal shut the water penetrating into the motor.

High maintainability

Under a hanging up condition, oil change for mechanical seal and reduction gear parts, and inspection of the immersion to the leakage water chamber are possible.

Superb reliability

Employs double mechanical seal with silicon carbide (SiC) seal faces that is proven for submersible pumps. Secured the reliability that can withstand the long-time continuous operation required for the submersible mixer. In addition, the propeller shaft is made of corrosion resistant 316 stainless steel. It exhibits reliability in a wide range of environments.

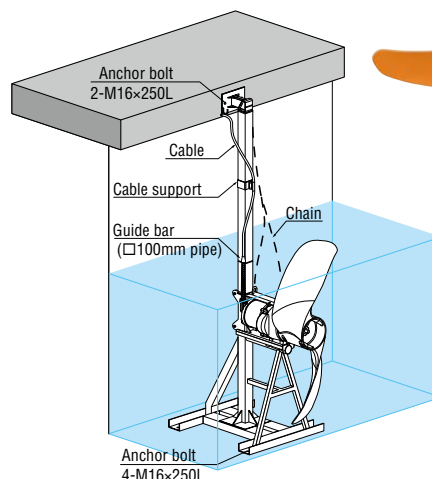
Long service life

Adopt the multi-pole motor with slow rotating speed reduces the load on the reduction gear, which realizes long service life.

Wider scope of application

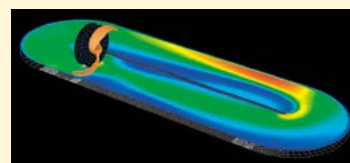
The high-temperature resistant motor, which reduces temperature rise, is employed to endure liquid temperature up to 40°C. Liquid contact part is fully made of stainless steel for applications in wider environment such as seawater.

Installation Example



Applications

- Generating circulating water flow for Oxidation Ditch (OD) tank
- Generation or circulation of water flow for dam and lake / bog



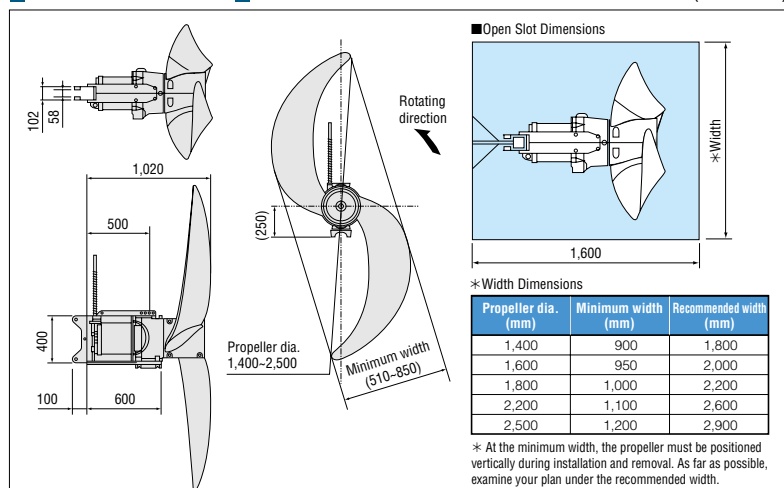
Computational fluid dynamics of oxidation-ditch tank

Standard Specifications

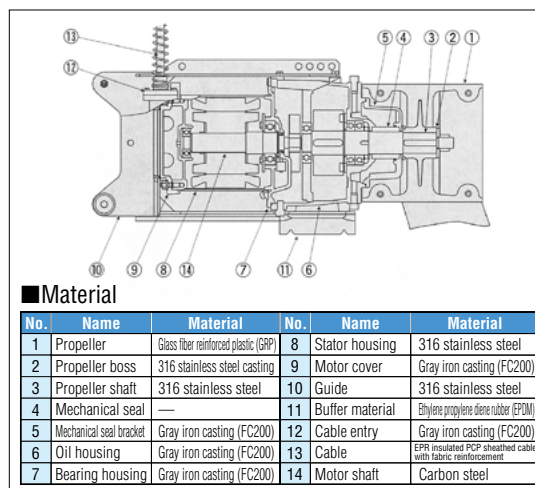
Model	Rated output (kW)	No. of poles		Synchronous rotation speed (min ⁻¹)	Propeller diameter (mm)	Minimum width (mm)	Consumption power for mixing clear water (kW)	Flow (m ³ /min)	Thrust (N)	Weight (kg)
		50 Hz	60 Hz							
SML15	1.5	10	12	25 - 39	1,400 - 2,500	510 - 850	1.0 - 1.5	63 - 180	800 - 1,800	225
SML22	2.2			28 - 45			1.5 - 2.2	70 - 201	900 - 2,300	225
SML37	3.7			34 - 50			2.0 - 3.6	80 - 237	1,200 - 3,200	235

Dimensions

(Unit: mm)



Sectional View

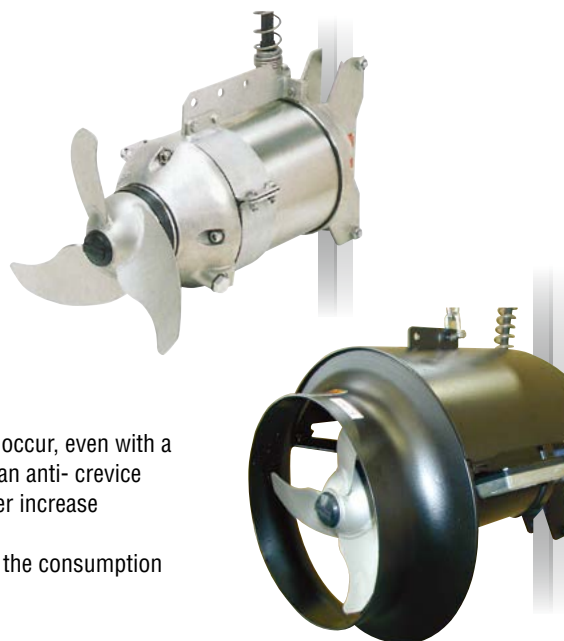


Various Cases

No Draft Ring

In order to improve the mixing effect of a submersible mixer, a draft ring is provided on the outer perimeter of a propeller. However, when used in a liquid with abundant foreign objects, including screen residues, overload due to trapping of foreign objects or entanglement to draft ring mounting stay may impair the mixing efficiency. In such an environment, a submersible mixer without a draft ring is useful.

* This is not applicable to some specific propeller codes as removal of a draft ring increases shaft power. For details, please contact us.



Anti-corrosion Treatment

During treatment of garbage landfill leachate, corrosion problems may occur, even with a device made of 100% stainless steel. In such cases, the application of an anti- crevice corrosion sealant and mounting of a sacrificial anode (zinc plate) further increase corrosion resistance.

In this example, epoxy resin is applied to an external surface to reduce the consumption of the sacrificial anode.

Shallow Pond in Park

To improve the water quality of small and very shallow water areas, like ornamental ponds in a park, a compact submersible mixer that can be installed at a water depth of 500 mm or more is effective. These mixers are installed at certain internal positions and in the same orientation to generate a water flow. By creating a state equivalent to that of a river with constant water flow, water corrosion and odor generation can be prevented, enhancing the park for users and nearby residents.



Application Examples

Domestic STP for SBR system Malaysia

Install submersible mixer in existing tank. Advanced treatment (denitrification and dephosphorization) can be realized by operating submersible mixer for anoxic mixing during times when no aeration running.



Food processing WWTP Vietnam



Submersible mixer installing in Anoxic tank. ShinMaywa Submersible Mixers are widely installed for advanced wastewater treatment in factory, Industrial park..etc.

Energy savings achieved by replacing from the blower

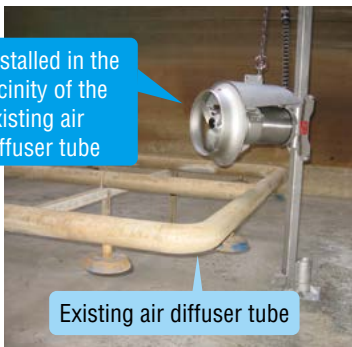
Customer's problem

The water level in the equalization tank was raised due to the increased amount of drainage water, which sometimes resulted in blower overload. At the same time, pH adjustment was also performed in this tank, but the adjustment occasionally failed, which precluded the stable operation of the treatment facility.

Proposal from ShinMaywa

We recommended to use submersible mixers instead of diffuser system, because its driving power is unaffected by changes in the water level and it can significantly reduce the power consumption.

Installed in the vicinity of the existing air diffuser tube



Existing air diffuser tube



Before replacing

Product in use	Blower
Rated output	15.0kW
Number of units	1

Replacing to

Product to use	Submersible mixer
Rated output	1.5kW
Number of units	2

**Total output
15.0kW→3.0kW
Cost reduction!**

Effect

Various problems have been solved and energy savings have been achieved at the same time.

Solving sedimentation by uniform mixer

Customer's problem

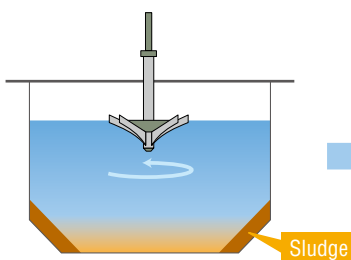
Sludge was always settled at the bottom of tank when only using a vertical agitator.

*No cleaning or sludge removal was conducted.

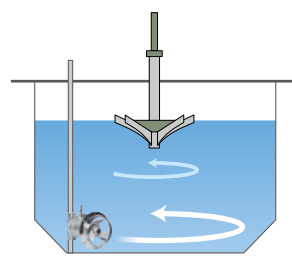
Proposal from ShinMaywa

We recommended installing submersible mixer at the bottom of the tank.

Submersible mixer will generate a water flow in the tank with lower power so that it leads to prevent sedimentation effectively.



Only with Vertical agitator
Sludge settles at the bottom



Submersible mixer+(Vertical agitator)
Sludge doesn't settle at the bottom



Advantage of Submersible mixer

- Available at low water level
- Not affected by water level fluctuation
- Angle of water flow is adjustable
- Various installation

*Please contact to our sales representatives for details.

Effect

The sludge sedimentation has solved and water quality in the tank has been uniformed.

ShinMaywa Mixer and Pump Selector

The Mixer selector programs from ShinMaywa allow you to search varieties of our Submersible Mixer that mostly meet your requirements.

You can easily access to Submersible Mixer selection without registration.

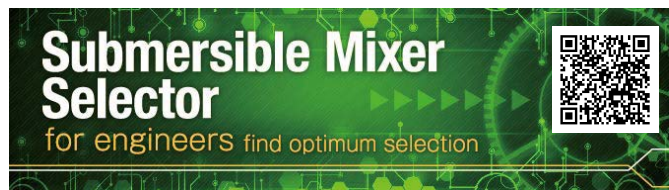
Using ShinMaywa Submersible Mixer Selector, you can make your decision quickly and make it smooth to communicate with our sales representatives. Please contact us to get selection sheet or any additional documents.

ShinMaywa Pump Selector provides you to make easy selection from variety of ShinMaywa pump products to meet your application.

You can get pump selection and datasheet (specifications and performance curve) easily.

In addition to datasheet, you can also get technical information for selected pump including catalogue, drawings, CAD data, etc. through ShinMaywa Product Data Download system seamlessly.

Using ShinMaywa Pump Selector, you can make your decision quickly and make smooth communication with our sales representatives.



ShinMaywa Product



Specifications and dimensions are subject to change without notice.

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<https://www.shinmaywa.co.jp/pump/english/index.html>



Website

ShinMaywa ONO PLANT

ISO 9001-0066539/ISO 14001-0066652

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