Series PM

Penguin Mixers

Features:

- 316SS or Polypropylene Sleeved Shafts
- 316SS / Polypropylene Propellers
- 4 Mounting Configurations
- Economical and Efficient
- Polypropylene Turbines
- Tank and Drum Use
- 304SS Couplings
- Portable

Propeller / Turbine

The Penguin Propeller provides a simultaneous circular motion and top-to-bottom turnover due to liquid deflection off the tank bottom and sides to maintain good sweeping action on the tank bottom and intimate contact of all particles. For every revolution of the propeller, a cylindrical column of liquid having a base diameter equal to the propeller pitch, is discharged parallel to the shaft..
Propellers are constructed of 316SS and polypropylene.
The optimum location of the propeller is one propeller diameter off tank bottom.
Use the following chart to determine if one or two propellers should be employed:

Tank /Type	Single Propeller	Double Propeller
Cylindrical/Conical	Height/Diameter < 1	Height/Diameter > 1
Square	Height/Side Dim<1	Height/Side Dim >1
Rectangular	Height/Longest Side Dimension < 1	Height/Longest Side Dimension > 1
55 Gallon Drum	Turbine	N/A

When two propellers are used, the bottom or first propeller should be mounted at least one times its diameter from the tank bottom. The second propeller should be mounted 1/3 of the shaft length upward from the bottom propeller, installed half way between the liquid level and the bottom propeller, or the more common location 1/2 way up the straight side of the vessel.
There is no power increase for employing two propellers.

The Penguin Polypropylene Turbine
Liquid flows into the turbine from top and bottom and is dispersed outward towards the vessel wall simultaneously creating a circular flow of the solution. This circular flow is partially reversed by its built in baffles which prevents vortexing of the liquid. The continual repetition of this process produces an excellent evenly distributed agitation while maintaining intimate particle contact. Liquid flows both parallel and at right angles to the shaft.
The optimum location of the turbine is 1/2 to 1 turbine diameter off tank bottom.
Dual turbines are not generally recommended.

Mounting Configurations

Penguin mixers are available in the following configurations:

Clamp Mount
This allows the mixer to be mounted vertically by a clamp to the tank rim, 5º to 15º off the vertical in order to prevent vortexing. When mounted on the center line of the tank, some swirl is created without vibration and is excellent for mixing dry powders which tend to float in solution. However, a more thorough mixing action is obtained by mounting the mixture at a 5º to 15º angle and off-center to prevent vortexing. This produces optimum mixing efficiency without vortexing present in unbaffled tanks. Primarily used with propellers.

Bracket Mount
This mount provides a CPVC bracket for mounting the mixer on rails across an open tank or on the tank cover with the shaft dead vertical and off-center to prevent vortexing. Used primarily with propellers in baffled tanks.

Thread Mount Buttress by 2"NPT
This mount is equipped with a 2" MNPT PVC nipple which threads directly into the 2" FNPT bung hole of a 55 gallon drum. The shaft off/or on center. Used primarily with a turbine. The turbines built in fins act like baffles to prevent vortexing.

Flange Mount
A PVC flange is used for mounting the mixer directly onto the tank cover with the shaft dead vertical and off-center to prevent vortexing. Primarily used with propellers in baffled tanks.

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Shaft/Coupling

The Penguin 316SS mixers shafts are designed for efficient and trouble free operation based on properly engineered mechanical designs. All Penguin mixers operate below the first critical speed zone, the ratio of the operating speed to the critical speed. Penguin 304SS sleeved couplings and socket head set screws are employed on all Penguin mixer shafts. The shaft length is from the base of the pump. Be sure to include the thickness of the base in determining length of shaft for your setup.
Specifications are shown in the following:
Shaft/ Coupling Specification Chart:

HP	SHAFT LENGTH	SHAFT DIA.	COUPLING BORE
1/20	28”	1/2”	5/16” X 1/2”
1/12	28”	1/2”	5/8” X 1/2”
1/4	34”	1/2”	5/8” X 1/2”
1/3	36”	1/2”	5/8” X 1/2”
1/2	36”	5/8”	5/8” X 5/8”
1	44”	5/8”	5/8” X 5/8”

Flow

Flow (Q) is proportional to the speed (N) and cube of the propeller diameter (D): $Q=ND^3$. For efficient mixing, the recommended tank turnover time is approximately 1 tank turn per minute. The following *Flow Specification Chart* shows the flow rate for each size propeller (316SS/polypropylene) and single turbine.

Dimension/Type	GPM	GPH
3”/Propeller	8	480
2”/Turbine	12	720
4”/Propeller	18	1080
5”/Propeller	38	2280

Horsepower

The Horsepower Specification Chart is based on a specific gravity of 1.0. For a specific gravity higher than 1.0, multiply the ratio of gravities directly by the minimum required horsepower. For example: If using a 1/3 hp mixer for liquid with a specific gravity of 1.5, the horsepower required would be 1/3 x 1.5 = .495. Thus, a 1/2 hp would be the proper motor.

Dimension/Type	Minimum HP
4”/Propeller	1/4
5”/Propeller	1/2

Viscosity

An increase in viscosity will also increase the power absorption. Use the Viscosity Specification Chart for proper horsepower and propeller size. For viscosities over 500 centipoise, consult the factory. Turnover will be approximately 15-20 minutes for PM-1 mixers for tank volumes up to 1000 gallons.

	Tank Volume/Gallons				
Viscosity	50	100	200	500	1000
300cP	PM-1/4	PM-1/4	PM-1/3	PM-1/2	NA
500cP	PM-1/3	PM-1/3	PM-1/2	PM-1	NA
Propeller Size	3” or 4”	3” or 4”	4”	5”	5”

Motor

The standard motor supplied on Penguin mixers is TEFC. All motors are shipped unwired. For single phase motors, a cord and plug can be ordered as an option. Other available options include: special voltage, 50Hz, lower RPM, explosion proof motors in 1/3 hp, 1/2 hp, and 1 hp, and air motors.

HP	RPM	Volts	Hertz	Phase	Amps
1/20	1500	115	60	Single	1.5
1/12	1500	115	60	Single	1.5
1/4	1725	115/230	60	Single	6.8/3.4
1/3	1725	115/230	60	Single	6.8/3.4
1/2	1725	115/230	60	Single	9.0/4.5
1/2	1725	230/460	60	Three	2.0/1.0
1	1725	115/230	60	Single	13.6/6.8
1	1725	230/460	60	Three	3.6/1.8

Nomenclature

PM	1/2	P	C	EXP
Penguin Mixers	Horsepower 1/20 = 1/20 1/12 = 1/12 1/4 = 1/4 1/3 = 1/3 1/2 = 1/2 1 = 1	Mixer Material & Type / Coupling & Shaft Material P = Polypropylene propeller/Poly S = 316SS propeller/316SS V = Polypropylene turbine/Poly	Mount C = Clamp B = Bracket F = Flange T = Thread	Options ODM = Open Drip Motor EXP = Explosion Proof Motor D = Dual Propellers PS = Polypropylene Sleeved Shaft CP = Cord and Plug A = Air Motor

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