

Stirrer Motors and Drives

Torque vs. Stirring Speed

The standard, open-type, variable speed motor installed on each Parr reactor will produce stirring speeds from zero to between 600 and 800 rpm with a torque adequate to drive the installed impellers in average viscosity mixtures. Higher horsepower motors and special stirrers can be provided for higher viscosities. Alternate drive pulleys are available to produce higher stirring speeds, but several basic rules must be considered when changing any of these components.

The highest torque from any motor is obtained at lower stirring speeds. Increasing the stirring speed reduces the torque in inverse proportion to the

speed. For operations involving high viscosity mixtures, the motor size, the type of impeller and the stirring speed must be matched to provide an effective mixing system.

As a general rule, the magnetic coupling installed on each Parr reactor will have a torque rating considerably higher than the torque obtainable from the motors offered for use with that apparatus. The goal is to make the motor the weak link so that the magnetic stirrer will be protected. Reference torque rating for applicable magnetic drive.

Explosion-proof Motors

Explosion-proof motors designed for Class I, Groups C and D and Class II, Groups F and G with variable speed control can be

furnished for most Parr reactors.

Flameproof “d” Motors

ATEX certified AC Flameproof Motors designed for use with group IIC gases are available for all of Parr’s stirred reactors. These inverter duty motors are available with simple variable frequency drives for control of the stirring speed. Please consult Parr for any specific ATEX certification related requirements.

Air Motors

Air-driven motors can be installed on most reactors. The horsepower rating, torque, and available speed are all dependent upon the pressure and available volume of the driving air source. Maximum torques are delivered at relatively slow speeds and maximum horsepower is delivered at high speed.

Stirrer Drive Motors

Motor Designation	HP (kW) Rating	Hazardous Location*	Variable Speed	Type	Standard Pulley		Optional Pulley	
					Max Speed, RPM**	Max Torque, in-lb	Max Speed, RPM**	Max Torque, in-lb
-VS.12	1/16 (0.05)	No	Yes	PMDC	600	6.75	1700	2.25
-VS.25	1/4 (0.18)	No	Yes	PMDC	600	27	1700	9
-XP.25	1/4 (0.18)	Class I, Div. 1 & 2 Groups C & D, E & F	Yes	PMDC	600	27	1700	9
-XP.25X	1/4 (0.18)	Ex 2G de IIC T4	Yes	Inverter Duty Constant Torque AC	450	33	1350	11
-AM.25**	1/4 (0.18)***	Ex II 2 GD c T4	Yes	Air	1000***	30	—	—
-VS.50	1/2 (0.37)	No	Yes	PMDC	600	54	1700	18
-XP.50	1/2 (0.37)	Class I, Div. 1 & 2 Groups C & D, E & F	Yes	PMDC	600	54	1700	18
-XP.50X	1/2 (0.37)	Ex 2G Ex de IIC T4	Yes	Inverter Duty Constant Torque AC	450	66	1350	22
-AM.50**	1/2 (0.37)***	Ex II 2 GD c T4	Yes	Air	1000***	66***	—	—
-VS.75	3/4 (0.55)	No	Yes	PMDC	600	81	1700	27
-XP.75	3/4 (0.55)	Class I, Div. 1 & 2 Groups C & D, E & F	Yes	Yes	600	81	1700	27

Values represented are nominal.

*For more information on Hazardous Locations information see Tech Note 230.

**Maximum speed values based on “no load”

***HP, RPM, and torque values for air motors are based on a 40 psi supply capable of 34 cfm for the AM.50 and 10 cfm for the AM.25.

Gear Box Torques

Motor HP Rating	3:1 Gear Box		5:1 Gear Box		10:1 Gear Box	
	Max Speed, RPM	Max Torque, in-lb	Max Speed, RPM	Max Torque, in-lb	Max Speed, RPM	Max Torque, in-lb
1/4	600	27	360	45	180	90
1/2	600	54	360	90	180	180
3/4	600	81	360	135	Not Recommended	

Contact Parr for ATEX Gear Box.

Geared, Direct Drive Motors

A geared, direct drive motor can be installed on most fixed head floor stand reactors. This is an attractive arrangement for handling heavy stirring loads.

Any 1/4 hp or larger, variable-speed standard or explosion-proof motor can be used. Gear box drives are available with ratios of 3:1, 5:1 and 10:1. The 1700 rpm maximum speed will be reduced in an amount determined by the reduction ratio of the gear box, and the associated torque values from the table will be increased in the same ratio.

Magnetic Drive

Description	Maximum Torque, in-lb
General Purpose	16
Footless General Purpose	16
Heavy Duty	60
Footless Heavy Duty	60
Extra Heavy Duty	120
Footless Extra Heavy Duty	120

Parr Geared Drive Motor mounted on a Series 4553 Stirred Reactor System.

