Pump Application Reference Guide

The Pump Application Data Sheet can be conveniently used to transmit the required information to our Application Specialists to help them assist making a proper Pump Selection.

The first step in selecting a Pump is to determine the Frame size required for your application. The Table below relates capacity and pressure required to the three Frames available. Frame size is also determined by how other variables (Viscosity, Abrasiveness) affect Horsepower requirements. The "CL" frame is the standard bearing-drive designation. The "CM" frame utilizes the bearing drive unit from the next larger pump size. Select the Frame size which will most appropriately meet your needs.

PUMP FRAME	APPROXIMATE GPM RANGE	APPROXIMATE MAX. PRESSURE	SIZE PUMPING ELEMENTS AVAILABLE
CL	.9-500	225 psi	2, 3, 4, 6, 8 10, 10H, 12, 12H,
CM	.05-24	450 psi	1, 2, 3, 4
CG	5-350	150 psi	8, 10, 10H, 12, 12H,

Frame Selection

If particles in suspension are to be pumped, determine the Pump Frame Size that will handle the maximum dimension of the particle. Refer to Table No. 1.

TABLE No. 1
Pump Frame Size - Particle Size

PUMP FRAME SIZE	2CMI 6CM1	1CL2 2CL2 3CL2 6CM2	1CL3 2CL3 3CL3 6CM3	1CL4 2CL4 3CL4 6CM4	1CL6 2CL6 3CL6	1CL8 2CL8 3CL8	1CL10 2CL10 3CL10 1CL10 2CL10	1CL12 2CL12 3CL12 1CL12 2CL12	
Max. Particle Size	.08"	.15"	.20"	.30"	.40"	.60"	.80"	1.0"	

The size of the Rotor and Stator Pumping Elements required to deliver the required capacity at the viscosity of the fluid are set forth in Table No. 2. Select Elements large enough to deliver more than the required capacity when operating at the maximum speed shown.

Table No. 2 is based on viscosities for one fluid and will not be correct for slurries or emulsions where each of which have different viscosities. The recommended pumping speed for a mixture of fluids having different viscosities should be an approximate average of the several fluids.

TABLE NO. 2

Pump Frame Size - Viscosity - Pumping Elements Size

Pump Frame Size	Size Pumping Element		Viscosity (Centipoises)						
			1 to 1000	1000 to 2500	2500 to 5000	5000 to 10,000	10,000 to 50,000	50,000 to 100,000	100,000 to 150,000
2CM1, 6CM1	1	MAX. RPM	1200	900	450	250	125	40	20
		MAX. GPM	0.58	0.50	0.25	0.14	0.07	0.02	0.01
1CL2, 2CL2, 3CL2 6CM2	2	MAX. RPM	1200	900	450	250	125	40	20
		MAX. GPM	3.0	2.4	1.2	0.7	0.35	0.1	0.05
1CL3, 2CL3, 3CL3 6CM3	3	MAX. RPM	1200	900	450	250	125	40	20
		MAX. GPM	10.0	7.8	3.9	2.2	1.1	0.35	0.17
1CL4, 2CL4, 3CL4 6CM4	4	MAX. RPM	1200	900	450	250	125	40	20
		MAX. GPM	24.0	18.0	9.0	5.0	2.5	0.8	0.4
1CL6, 2CL6, 3CL6	6	MAX. RPM	900	900	450	250	125	40	20
		MAX. GPM	47.0	47.0	23.5	13.0	6.5	2.0	1.0
1CL8, 2CL8, 3CL8	8	MAX. RPM	900	900	450	250	125	40	20
		MAX. GPM	100	100	53.0	29.0	14.5	4.7	2.3
1CL10, 3CL10, 3CL10	10	MAX. RPM	750	750	450	250	125	40	20
		MAX. GPM	140	140	85.0	47.0	24.0	7.5	3.8
1CL10H, 2CL10H	10H	MAX. RPM	750	750	450	250	125	40	20
		MAX. GPM	210	210	125	70.0	35.0	11.0	5.5
1CL12, 2CL12, 3CL12	12	MAX. RPM	600	600	450	250	125	40	20
		MAX. GPM	261	261	196	109	54.4	17.4	8.7
1CL12H, 2CL12H	12H	MAX. RPM	600	600	450	250	125	40	20
		MAX. GPM	391	391	293	163	81.5	26	13

If the fluid has Abrasive characteristics, refer to Table No. 3 for the proper operating speed of the Pump. When the speed selected from Table No. 3 results in a lower capacity than required then change the selection of the size Pump even though it will operate below the maximum recommended speed. Keep in mind that the speed requirements for Viscosity in Table No. 2 must also be considered and in general where there is a difference; select the lower of the speeds.

TABLE NO. 3

Pump Frame Size - Abrasives - Pump Elements Size

Pump Frame Size	Size Pumping Elements		Abrasive Characteristics			
			None	Light	Medium	Heavy
2CM1, 6CM1	1	MAX. RPM	1200	900	600	300
		MAX. GPM	0.58	0.50	0.34	0.17
1CL2, 2CL2, 3CL3, 6CM2	2	MAX. RPM	1200	900	600	300
		MAX. GPM	3.0	2.4	1.6	0.8
1CL3, 2CL3, 3CL3, 6CM3	3	MAX. RPM	1200	900	600	300
		MAX. GPM	10.0	7.8	5.2	2.6
1CL4, 2CL4, 3CL4, 6CM4	4	MAX. RPM	1200	900	600	300
		MAX. GPM	24.0	18.0	12.0	6.0
1CL6, 2CL6, 3CL6	6	MAX. RPM	900	675	450	225
		MAX. GPM	47.0	35.5	23.5	12.0
1CL8, 2CL8, 3CL8	8	MAX. RPM	900	675	450	225
		MAX. GPM	100	70.0	52.5	26.5
1CL10, 2CL10, 3CL10	10	MAX. RPM	750	565	375	190
		MAX. GPM	140	106	70.0	36.0
1CL10H, 2CL10H	10H	MAX. RPM	750	565	375	190
		MAX. GPM	210	156	105	52.5
1CL12, 2CL12, 3CL12	12	MAX. RPM	600	450	300	150
		MAX. GPM	261	196	130	65
1CL12H, 2CL12H	12H	MAX. RPM	600	450	300	150
		MAX. GPM	391	293	195	97.5

The length of the Rotor and Stator Elements are designated by Stages, even though both Elements are each integral components. The approximate Pressure Per Stage (PSI) where the fluid pumped has no Abrasives or is laden with Light, Medium or Heavy Abrasives is shown in Table No. 4.

TABLE NO. 4

Pump Frame Size - Pressure Per Stage of Rotor/Stator Elements

Pump Frame Size	Approximate Pressure Per Stage (PSI) Abrasive Characteristics			
	No	Light	Medium	Heavy
1 and 2	60	40	25	10
3 thru 12	75	60	35	15

Referring to Table No. 4, if the fluid has no Abrasives and the Pump Frame Size is 2, the Pressure Per Stage for a 1CL2 is 60 PSI; If it is a 2CL2 the total pressure would be 120 PSI. Further, if the Abrasive is Light the total pressure for a 2CL2 would be 80 PSI and if the Abrasive is heavy the total pressure for the 2CL2 would be 20 PSI.

Having generally selected the pump Frame Size and the number of Stages of the Rotor/Stator Elements, refer to the Performance Data for the Initial Horsepower required to drive the Pump handling fluid with relatively no Viscosity (1 to 2500 Centipoises). For fluids containing increasing amounts of Abrasives the horsepower needed will be greater, refer to Table No. 5 for this additional amount. Multiply the HP increase/ 100 RPM/ Stage by the Pump speed in hundreds of RPM and then by the number of Pump Stages. Add this amount to the initial Horsepower to determine the Final Horsepower required.

TABLE NO. 5

Pump Frame Size - Horsepower Increase - Viscosity

Pump Frame Size	Size Pumping Elements	HP Additives/100 R.P.M./Stage Viscosity (Centipoises)						
		1 to 2500	2500 to 5000	5000 to 10,000	10,000 to 50,000	50,000 to 100,000	100,000 to 150,000	150,000 to 200,000
2CM2, 6CM1	1	0	0.002	0.0025	0.003	0.007	0.010	0.012
1CL2, 2CL2, 3CL2, 6CM2	2	0	0.01	0.015	0.016	0.032	0.046	0.056
1CL3, 2CL3, 3CL3, 6CM3	3	0	00.03	0.04	0.05	0.11	0.15	0.19
1CL4, 2CL4, 3CL4, 6CM4	4	0	0.06	0.09	0.12	0.25	0.35	0.44
1CLc, 2CL6, 3CL6	6	0	0.17	0.23	0.31	0.64	0.91	1.12
1CL8, 2CL8, 3CL8	8	0	0.37	0.52	0.71	1.43	2.05	2.52
1CL10, 2CL10, 3CL210	10	0	0.60	0,83	1.13	2.30	3.29	4.06
1CL10H, 2CL10H	10H	0	0.88	1.22	1.67	3.39	4.83	5.97
1CL12, 2CL12, 3CL12	12	0	1.4	2.0	2.7	5.3	7.7	9.0
1CL12H, 3CL12H	12H	0	2.1	2.9	4.0	8.0	11.3	13.2