



Head Loss From Flow Past Motor

Table 7 lists the approximate head loss due to flow between an average length motor and smooth casing or flow inducer sleeve.

Table 7 Head Loss in Feet (Meters) at Various Flow Rates

MOTOR DIAMETER		4"	4"	4"	6"	6"	6"	8"	8"
CASING ID IN INCHES (MM)		4 (102)	5 (127)	6 (152)	6 (152)	7 (178)	8 (203)	8.1 (206)	10 (254)
Flow Rate in gpm (l/m)	25 (95)	0.3 (.09)							
	50 (189)	1.2 (.37)							
	100 (378)	4.7 (1.4)	0.3 (.09)		1.7 (.52)				
	150 (568)	10.2 (3.1)	0.6 (.18)	0.2 (.06)	3.7 (1.1)				
	200 (757)		1.1 (.34)	0.4 (.12)	6.3 (1.9)	0.5 (.15)		6.8 (2.1)	
	250 (946)		1.8 (.55)	0.7 (.21)	9.6 (2.9)	0.8 (.24)		10.4 (3.2)	
	300 (1136)		2.5 (.75)	1.0 (.30)	13.6 (4.1)	1.2 (.37)	0.2 (.06)	14.6 (4.5)	
	400 (1514)				23.7 (7.2)	2.0 (.61)	0.4 (.12)	24.6 (7.5)	
	500 (1893)					3.1 (.94)	0.7 (.21)	37.3 (11.4)	0.6 (0.2)
	600 (2271)					4.4 (1.3)	1.0 (.30)	52.2 (15.9)	0.8 (0.3)
	800 (3028)								1.5 (0.5)
1000 (3785)								2.4 (0.7)	

Hot Water Applications (Standard Motors)

Franklin Electric offers a line of Hi-Temp motors which are designed to operate in water with various temperatures up to 194 °F (90 °C) without increased flow. When a standard pump-motor operates in water hotter than 86 °F (30 °C), a flow rate of at least 3 ft/s is required. When selecting the motor to drive a pump in over 86 °F (30 °C) water, the motor horsepower must be de-rated per the following procedure.

- Using table 7A, determine pump gpm required for different well or sleeve diameters. If necessary, add a flow sleeve to obtain at least 3 ft/s flow rate.

Table 7A Minimum gpm (l/m) Required for 3 ft/s (.91 m/sec) Flow Rate

CASING OR SLEEVE ID		4" HIGH THRUST MOTOR		6" MOTOR		8" MOTOR	
INCHES	(MM)	GPM	(L/M)	GPM	(L/M)	GPM	(L/M)
4	(102)	15	(57)				
5	(127)	80	(303)				
6	(152)	160	(606)	52	(197)		
7	(178)			150	(568)		
8	(203)			260	(984)	60	(227)
10	(254)			520	(1970)	330	(1250)
12	(305)					650	(2460)
14	(356)					1020	(3860)
16	(406)					1460	(5530)



- Determine pump horsepower required from the pump manufacturer's curve.

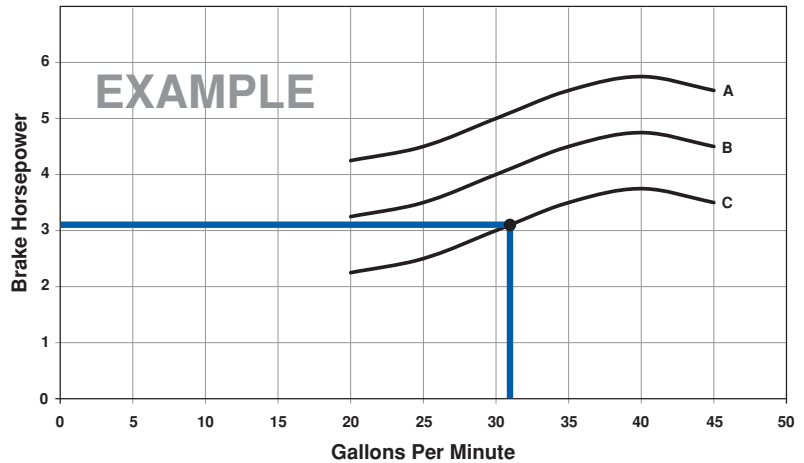


FIG. 2 MANUFACTURER'S PUMP CURVE

- Multiply the pump horsepower required by the heat factor multiplier from table 8.

Table 8 Heat Factor Multiplier at 3 ft/s (.91 m/sec) Flow Rate

MAXIMUM WATER TEMPERATURE	1/3 - 5 HP .25 - 3.7 KW	7 1/2 - 30 HP 5.5 - 22 KW	OVER 30 HP OVER 22 KW
140 °F (60 °C)	1.25	1.62	2.00
131 °F (55 °C)	1.11	1.32	1.62
122 °F (50 °C)	1.00	1.14	1.32
113 °F (45 °C)	1.00	1.00	1.14
104 °F (40 °C)	1.00	1.00	1.00
95 °F (35 °C)	1.00	1.00	1.00

- Select a rated hp motor on table 8A whose Service Factor Horsepower is at least the value calculated in Item 3.

Table 8A Service Factor Horsepower

HP	KW	SFHP	HP	KW	SFHP	HP	KW	SFHP	HP	KW	SFHP
1/3	0.25	0.58	3	2.2	3.45	25	18.5	28.75	100	75	115.00
1/2	0.37	0.80	5	3.7	5.75	30	22.0	34.50	125	93	143.75
3/4	0.55	1.12	7.5	5.5	8.62	40	30.0	46.00	150	110	172.50
1	0.75	1.40	10	7.5	11.50	50	37.0	57.50	175	130	201.25
1.5	1.10	1.95	15	11.0	17.25	60	45.0	69.00	200	150	230.00
2	1.50	2.50	20	15.0	23.00	75	55.0	86.25			

Hot Water Applications - Example

EXAMPLE: A 6" pump end requiring 39 hp input will pump 124 °F water in an 8" well at a delivery rate of 140 gpm. From table 7A, a 6" flow sleeve will be required to increase the flow rate to at least 3 ft/s.

Using table 8, the 1.62 heat factor multiplier is selected because the hp required is over 30 hp and water

temperature is above 122 °F. Multiply 39 hp x 1.62 (multiplier), which equals 63.2 hp. This is the minimum rated service factor horsepower usable at 39 hp in 124 °F. Using table 8A, select a motor with a rated service factor horsepower above 63.2 hp. A 60 hp motor has a service factor horsepower of 69, so a 60 hp motor may be used.