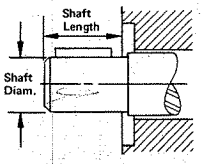
Pump/Motor Shafts & Flanges

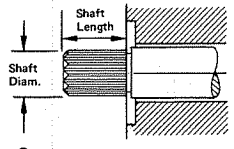
ANSI shaft and flange code assignments for fluid power pumps and motors. Complete dimensions may be obtained from Standards B93.6-1972.

Shaft Ident. Code	Shaft Diam.	Short Shaft Lgth.	Long Shaft Lgth.	Key Wdth.	SAE* Ref.
13-1	.500	0.750	----	.125	---
16-1	.625	0.938	2.000	.156	A
22-1	.875	1.312	2.500	.250	B
25-1	1.000	1.500	2.750	.250	---
32-1	1.250	1.875	3.000	.312	C
38-1	1.500	2.125	3.250	.375	---
44-1	1.750	2.625	3.625	.437	D,E



STRAIGHT SHAFT—
Without Threads

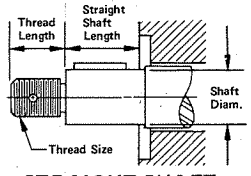
Shaft Code	Shaft Diam.	Shaft Lgth.	Spline Specifications	SAE* Ref.
13-4	1/2	.750	9T, 20/40 DP	---
16-4	5/8	.938	9T, 16/32 DP	A
22-4	7/8	1.312	13T, 16/32 DP	B
25-4	1	1.500	15T, 16/32 DP	---
32-4	1¼	1.875	14T, 12/24 DP	C
38-4	1½	2.125	17T, 12/24 DP	---
44-4	1¾	2.625	13T, 8/16 DP	D,E
50-4	2	3.125	15T, 8/16 DP	---



30° INVOLUTE SPLINE

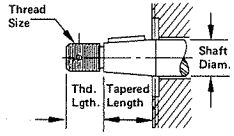
*Reference letters indicate the matching SAE front flange for each shaft diameter.

Shaft Ident. Code	Shaft Diam	Str. Shaft Lgth	Thd Size	Thd Lgth	Key Wdth
13-2	.500	.750	3/8-24	.562	.125
16-2	.625	.938	1/2-20	.719	.156
22-2	.875	1.312	5/8-18	.906	.250
25-2	1.000	1.500	3/4-16	1.062	.250
32-2	1.250	1.875	1-12	1.219	.312
38-2	1.500	2.125	1-1/8-12	1.375	.375
44-2	1.750	2.625	1-1/4-12	1.562	.437



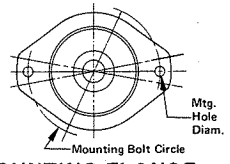
STRAIGHT SHAFT—
With Threads

Shaft Ident. Code	Shaft Diam.	Tprd Shaft Lgth	Thrd Shaft Lgth	Thread Size	Key Width
13-3	.500	.688	.500	5/16-32	.125
16-3	.625	.688	.719	1/2-20	.156
22-3	.875	1.125	.906	5/8-18	.250
25-3	1.000	1.375	1.062	3/4-16	.250
32-3	1.250	1.375	1.219	1-12	.312
38-3	1.500	1.875	1.375	1-1/8-12	.375
44-3	1.750	2.125	1.562	1-1/4-12	.437
50-3	2.000	2.875	1.562	1-1/4-12	.500



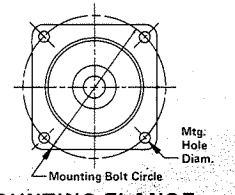
TAPERED SHAFT—
With Threads

ANSI Flange Code	SAE No.	SAE HP Rating	M't'g. Bolt Circle	M't'g. Hole Dia.	Pilot Dia., Ins.
50-2	---	---	3.250	.406	2.00
82-2	A	10	4.188	.438	3.25
101-2	B	25	5.750	.562	4.00
127-2	C	50	7.125	.688	5.00
152-2	D	100	9.000	.812	6.00
165-2	E	200	12.500	1.062	6.50
177-2	F	300	13.781	1.062	7.00



MOUNTING FLANGE—
Two-Bolt

ANSI Flange Code	SAE No.	SAE HP Rating	M't'g. Bolt Circle	M't'g. Hole Dia.	Pilot Dia., Ins.
101-4	B	25	5.000	.5625	4.00
127-4	C	50	6.375	.5625	5.00
152-4	D	100	9.000	.8125	6.00
165-4	E	200	12.50	.8125	6.50
177-4	F	300	13.78	1.063	7.00



MOUNTING FLANGE—
Four-Bolt

Replacement of Pump or Motor

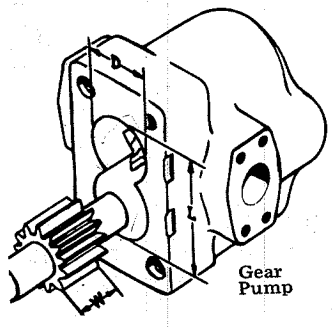
Calculating the Theoretical GPM of a Pump by Measuring Its Internal Parts.

To select a replacement for a broken or worn out hydraulic pump or motor which has no nameplate or has no rating marked on its case, use the formulae below after making internal physical measurements.

When replacing a pump, catalog ratings will usually be shown in GPM at a specified shaft speed. On a motor, catalog ratings will usually be in C.I.R. (cubic inches displacement per shaft revolution). Formulae are given for calculating either GPM at 1800 RPM or calculating C.I.R. Use the formula which is appropriate.

Make all measurements in inches, as accurately as possible. Convert fractional dimensions into decimal equivalents for use in the formulae.

Make sure the catalog pressure rating is adequate for your application, and in the case of a pump, be sure direction of shaft rotation is correct.



Gear Pump

GEAR PUMPS AND MOTORS

1. Measure gear width, W.
2. Measure bore diameter of one of the gear chambers; this is D.
3. Measure distance across both gear chambers; this is L.

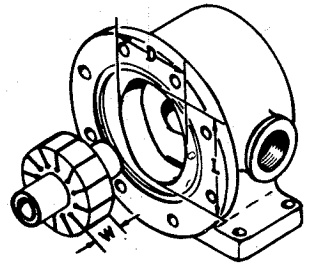
GPM @ 1800 RPM =

$$47 \times W \times (2D - L) \times \frac{(L - D)}{2}$$

A speed of 1800 RPM is used in the formula. At other speeds, GPM is proportional to RPM.

C.I.R. Displ. =

$$6 \times W \times (2D - L) \times \frac{(L - D)}{2}$$



Vane Pump (Balanced Type Only)

VANE PUMPS AND MOTORS

(Balanced type, not variable displ.)

1. Measure width of rotor. This is W.
2. Measure shortest distance across bore; this is D.
3. Measure longest distance across bore; this is L.

GPM @ 1800 RPM =

$$94 \times W \times \frac{(L + D)}{4} \times \frac{(L - D)}{2}$$

A speed of 1800 RPM is used in the formula. At other speeds, GPM is proportional to RPM.

C.I.R. Displacement is:

$$12 \times W \times \frac{(L + D)}{4} \times \frac{(L - D)}{2}$$

PISTON PUMPS AND MOTORS

1. Find piston area from piston diameter; this is A in formula.
2. Measure length of stroke; this is L in formula.
3. Count number of pistons; this is N in formula.

GPM @ 1800 RPM = A x L x N x 1800 ÷ 231

A speed of 1800 RPM is used in formula. At other speeds, GPM is proportional to RPM.

C.I.R. displacement = A x L x N

If a pump of higher GPM has to be used, it will require more HP at the same pressure and cylinders in the system will move faster. If one with lower GPM is used, the system will have plenty of power but cylinders will move more slowly than originally.

If a motor with greater displacement is used, it will deliver more torque at a reduced RPM, but will require no more fluid HP from the pump. If it has less displacement it will rotate faster with less torque.