DAKOTA FLUID POWER

dakotafluidpower.com

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Rapid City, SD 57701
2610 Seger Dr.
Ph: 605.716.4750

Grand Rapids, MN 55721
34718 Industrial Blvd. Rd
Ph: 218.326.8910

There is a system design specialist at any of the locations above. If you would like to discuss your next project. Give us a call at the location most convenient for you.

COMMON CONVERSIONS

TO CONVERT	INTO	MULTIPLY BY
BAR	psi	14.5
cc	Cu. In.	0.06102
°C	°F	(°C X 1.8) + 32
kG	Lbs	2.205
KW	HP	1.341
Liters	Gallons	0.2642
mm	Inches	0.03937
Nm	lb.-ft.	0.7375
Cu. In.	cc	16.39
°F	°C	(°F-32) / 1.8
Gallons	Liters	3.785
HP	KW	0.7457
Inch	mm	25.4
Lbs.	Kg	0.4536
lb.-ft.	Nm	1.356
PSI	Bar	0.06896
In. of HG	PSI	.4912
In of H_2O	PSI	.03613

FORMULAS

CYLINDERS

CYL AREA = DIAMETER^2 X .7854
(IN^2)

CYL FORCE = PRESSURE X AREA
(LBS)

CYL TIME = $\frac{\text{AREA X STROKE X .26}}{\text{GPM}}$
(SEC)

CYL SPEED = $\frac{\text{GPM X 19.25}}{\text{AREA}}$
(FT/MIN)

TUBE AREA = $\frac{\text{GPM X .3208}}{\text{OIL VELOCITY}}$
(IN^2)

Annulus Area or
EREA = CYL AREA - ROD AREA
(IN^2)

ADJ. GPM = $\frac{\text{CYL AREA X GPM}}{\text{EREA}}$
ON RET

CYL SPEED = $\frac{\text{STROKE X 5}}{\text{TIME (SEC)}}$
(FT/MIN)

CYL HP = $\frac{\text{CYL SPEED X CYL FORCE}}{\text{33,000}}$

HYD HP = $\frac{\text{PSI X GPM}}{\text{1714}}$

HYDRAULIC PUMPS & MOTORS

ACTUAL PUMP GPM = $\frac{\text{THEO GPM X VOL. EFF.}}{\text{100}}$

ACTUAL TORQUE = $\frac{\text{THEO TORQUE X MECH. EFF.}}{\text{100}}$

ACTUAL MOTOR RPM = $\frac{\text{THEO RPM X VOL. EFF.}}{\text{100}}$

OVERALL EFF. = $\frac{\text{MECH. EFF. X VOL. EFF.}}{\text{100}}$

GPM = $\frac{\text{RPM X DISP (IN}^3\text{)}}{\text{231}}$

HP OUT = $\frac{\text{HP IN X OVERALL EFF.}}{\text{100}}$

TORQUE = $\frac{\text{PSI X DISP (IN}^3\text{)}}{\text{6.28}}$
(IN LBS.)

TORQUE = $\frac{\text{HP X 63025}}{\text{RPM}}$
(IN LBS.)

PNEUMATICS

$P_1 V_1 T_2 = P_2 V_2 T_1$ (USE ABSOLUTE VALUES)

PNEUMATIC = $\frac{\text{COMPRESSED CFM X PSI}}{\text{229}}$
HP

COMP = $\frac{\text{AREA X STROKE}}{\text{TIME (SEC) X 28.8}}$
CFM

VEHICLE SIZING FORMULAS

RPM = $\frac{\text{MPH X 168}}{\text{LR}}$

TORQ = TE X LR

WHEEL SLIP = WD X ADC X LR
TORQ

TE = RR + GR + DP

LR = LOADED RADIUS
TE = TRACTIVE EFFORT
WD = WEIGHT ON DRIVE WHEELS
ADC = ADHESION COEFFICIENT
RR = ROLLING RESISTANCE
GR = GRADE RESISTANCE
DP = DRAW BAR PULL