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COMMON CONVERSIONS

To Convert	Into	Multiply by
Bar	PSI	14.5
cc	Cu. in.	0.06102
°C	°F	(°C x 9/5) + 32
Kg	lbs.	2.205
KW	HP	1.341
Liters	Gallons	0.2642
mm	Inches	0.03937
Nm	lb.-ft.	0.7375
N	lbs.	0.22481
Cu. in.	cc	16.39
°F	°C	(°F - 32) /1.8
Gallons	Liters	3.785
HP	KW	0.7457
Inches	mm	25.4
lbs.	Kg	0.4535
lb.-ft.	Nm	1.356
PSI	Bar	0.06896
In. of HG	PSI	.4912
In. of H_2O	PSI	.03613
lbs.	N	4.4482

CYLINDERS

$$\text{CYLINDER AREA} = \text{DIAMETER}^2 \times .7854$$

$$\text{CYLINDER FORCE (LBS)} = \text{PRESSURE} \times \text{AREA}$$

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

$$\text{PNEUMATIC HP} = \frac{\text{COMPRESSED CMF} \times \text{PS} \times 144}{33,000}$$

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

$$\text{TUBE AREA} = \frac{\text{GPM} \times .3208}{\text{OIL VELOCITY}}$$

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

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

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

$$\text{COMP CFM} = \frac{\text{AREA} \times \text{STROKE} \times 60}{\text{TIME(SEC)} \times 1728}$$

HYDRAULIC PUMPS & MOTORS

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

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

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

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

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

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

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

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

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

VEHICLE SIZING FORMULAS

$$\text{RPM} = \frac{\text{MPH} \times 168 \times \text{G}}{\text{LR}}$$

$$\text{TORQUE} = \text{TE} \times \text{LR}$$

$$\text{WHEEL SLIP TORQUE} = \text{WD} \times \text{ADC} \times \text{LR}$$

$$\text{TE} = \text{RR} + \text{GR} + \text{DP}$$

$$\text{RR} = \frac{\text{GVW} \times \text{R}}{1000}$$

$$\text{GR} = \frac{\% \text{ GRADE} \times \text{GVW}}{100}$$

G	= GEAR REDUCTION RATIO
LR	= LOAD RADIUS
TE	= TRACTIVE EFFORT
WD	= WEIGHT ON DRIVE WHEELS
ADC	= ADHESION COEFFICIENT
RR	= ROLLING RESISTANCE
GR	= GRADE RESISTANCE
DP	= DRAW BAR PULL DESIRED
R	= ROLLING RESISTANCE COEFFICIENT
GVW	= GROSS VEHICLE WEIGHT