

Actuator Formulas

FORMULA FOR:	WORD FORMULA:	LETTER FORMULA:
CYLINDER AREA In Square Inches	Area = $\Pi \times \text{Radius}^2$ (Inches)	$A = \Pi r^2$
	Area = $(P/4) \times \text{Diameter}^2$ (Inches)	$A = (\Pi D^2)/4$ or $A = .785D^2$
CYLINDER FORCE In Pounds, Push or Pull	Area = Pressure (psi) x Net Area (sq in.)	$F = \text{psi} \times A$ or $F = PA$
CYLINDER VELOCITY or SPEED In Feet/Second	Velocity = $\frac{231 \times \text{Flow Rate (GPM)}}{12 \times 60 \times \text{Net Area (sq in.)}}$	$v = 231Q/720A$ or $v = .3208Q/A$
CYLINDER VOLUME CAPACITY In Gallons of Fluid	Volume = $\frac{\Pi \times \text{Radius}^2 \text{ (in.)} \times \text{Stroke (in.)}}{231}$	$V = (\Pi r^2 L)/231$
	Volume = $\frac{\text{Net Area (sq. in.)} \times \text{Stroke (in.)}}{231}$	$V = (A L)/231$
CYLINDER FLOW RATE In Gallons/Minute	Flow Rate = $\frac{12 \times 60 \times \text{Velocity (Ft/Sec)} \times \text{Net Area (sq. in.)}}{231}$	$Q = (720vA)231$ or $Q = 3.117vA$
FLUID MOTOR TORQUE In Inch Pounds	Torque = $\frac{\text{Pressure (psi)} \times \text{F.M. Displacement (Cu. In./Rev.)}}{2\Pi}$	$T = \text{psi} \ d/2\Pi$ or $T = Pd/2\Pi$
	Torque = $\frac{\text{Horsepower} \times 63025}{\text{RPM}}$	$T = 63025 \text{ HP/n}$
	Torque = $\frac{\text{Flow Rate (GPM)} \times \text{Pressure (psi)} \times 36.77}{\text{RPM}}$	$T = 36.77QP/n$ or $T = 36.77Q\text{psi}/n$
FLUID MOTOR TORQUE/100 psi In Inch Pounds	$\frac{\text{Torque}}{100} = \frac{\text{F.M. Displacement (Cu. In./Rev.)}}{.0628}$	$T_{100\text{psi}} = d/.0628$
FLUID MOTOR SPEED In Revolutions/Minute	Speed = $\frac{231 \text{ Flow Rate (GPM)}}{\text{F.M. Displacement (Cu. In./Rev.)}}$	$n = 231 \ Q/d$
FLUID MOTOR POWER In Horsepower Output	Horsepower = $\frac{\text{Torque Output (Inch Pounds)} \times \text{RPM}}{63025}$	$HP = Tn/63025$