

Conversions & Formulae

DEFINITION & UNIT

Displacement	$\text{in}^3/\text{rev.} \times 16.387 = \text{cm}^3/\text{rev.}$	$\text{cm}^3/\text{rev.} \times 0.03102 = \text{in}^3/\text{rev.}$
Flow	$\text{gpm} \times 3.78 = \text{L}/\text{min.}$	$\text{L}/\text{min} \times 0.2642 = \text{gpm}$
Power	$\text{hp} \times 0.7457 = \text{kW}$	$\text{kW} \times 1.341 = \text{hp}$
Torque	$\text{lb-ft} \times 1.3567 = \text{Nm}$	$\text{Nm} \times 0.7376 = \text{lb-ft}$
Pressure	$\text{lbs}/\text{in}^2 \text{ (PSI)} \times 0.06895 = \text{bar}$ $\text{lbs}/\text{in}^2 \text{ (PSI)} \times 6.895 = \text{kPa}$	$\text{bar} \times 14.50 = \text{lbs}/\text{in}^2 \text{ (PSI)}$ $\text{kPa} \times 0.1450 = \text{lbs}/\text{in}^2 \text{ (PSI)}$
Weight	$\text{lb} \times 0.4536 = \text{kg}$	$\text{kg} \times 2.205 = \text{lbs}$
Force	$\text{lb} \times 4.448 = \text{N}$	$\text{N} \times 0.2248 = \text{lbs}$
Volume	$\text{in}^3 \times 16.387 = \text{cm}^3$	$\text{cm}^3 \times 0.06102 = \text{in}^3$
Area	$\text{in}^2 \times 6.452 = \text{cm}^2$	$\text{cm}^2 \times 0.1550 = \text{in}^2$
Length	$\text{in} \times 25.4 = \text{mm}$	$\text{mm} \times 0.03937 = \text{in}$
Temperature	$\frac{\text{degree F}-32}{1.8} = \text{oC}$	$1.8 \times (\text{oC} + 32) = \text{oF}$
Viscosity	$\text{cSt} \times 1.0 = \text{mm}^2/\text{sec}$	$\text{mm}^2/\text{sec} \times 1.0 = \text{cSt}$

FLUID POWER FORMULAE

Pump input torque	lbs. in.	$\frac{\text{pressure (PSI)} \times \text{displacement (in}^3/\text{rev)}}{2\pi \times \text{mech. eff.}}$
Pump input power	hp	$\frac{\text{rpm} \times (\text{in}^3/\text{rev}) \times (\text{PSI})}{395934 \times \text{overall eff.}}$
Pump output flow	U.S gpm	$\frac{\text{rpm} \times (\text{in}^3/\text{rev}) \times \text{volumetric eff}}{231}$
Fluid motor speed	rpm	$\frac{231 \times \text{flow rate (US gpm)} \times \text{volumetric eff}}{\text{Displacement (in}^3/\text{rev)}}$
Fluid motor torque	lbs. in	$\frac{\text{pressure (PSI)} \times \text{displacement (in}^3/\text{rev)} \times \text{mech eff}}{2\pi}$
Fluid motor power	hp	$\frac{\text{rpm} \times (\text{in}^3/\text{rev}) \times (\text{PSI}) \times \text{overall eff}}{395934}$

(METRIC)

Pump input torque	Nm	$\frac{\text{pressure (bar)} \times \text{displacement (cm}^3/\text{rev)}}{20\pi \times \text{mech. Eff}}$
Pump input power	kW	$\frac{\text{rpm} \times (\text{cm}^3/\text{rev}) \times (\text{bar})}{600000 \times \text{overall eff}}$
Pump output flow	Lpm	$\frac{\text{rpm} \times (\text{cm}^3/\text{rev}) \times \text{volumetric eff}}{1000}$
Fluid motor speed	rpm/min	$\frac{1000 \times \text{flow rate (Lpm)} \times \text{volumetric eff}}{\text{Displacement (cm}^3/\text{rev)}}$
Fluid motor torque	Nm	$\frac{\text{pressure (bar)} \times \text{displacement (cm}^3/\text{rev)} \times \text{mech eff}}{20\pi}$
Fluid motor power	kW	$\frac{\text{rpm} \times (\text{cm}^3/\text{rev}) \times (\text{bar}) \times \text{overall eff}}{600000}$