

# HYDRAULIC AND ENGINEERING DATA CONVERSION CHART



## FORMULAE

$$\text{Torque (Nm)} = \frac{\text{kW} \times 9550}{\text{RPM}}$$

$$\text{Torque (kgf.m)} = \frac{\text{kW} \times 974}{\text{RPM}}$$

$$\text{Torque (lbf.ft)} = \frac{\text{HP} \times 5252}{\text{RPM}}$$

### Theoretical torque produced by hydraulic motor

Metric  $T = \frac{D \times P}{20 \pi}$

Where T = Torque (Nm)  
D = Displacement (cc/rev)  
P = Pressure difference across motor (Bar)

Imperial  $T = \frac{D \times P}{24 \pi}$

Where T = Torque (lbf.ft)  
D = Displacement (in<sup>3</sup>/rev)  
P = Pressure difference across motor (psi)

### Power output of a hydraulic motor

$W = T \times \text{RPM} \times 0.1047$

Where W = Power output (watt)  
T = Torque (Nm)

## MASS

Unit	Kilogram (kg)
1 kg	= 2.2046 lb
1000 kg	= 1T (tonne)
1 lb	= 0.4536 kg

## FORMULAE

$$\text{Power (kW)} = \frac{\text{Nm} \times \text{RPM}}{9550}$$

$$\text{Power (kW)} = \frac{\text{kgf.m} \times \text{RPM}}{974}$$

$$\text{Power (HP)} = \frac{\text{lbf.ft} \times \text{RPM}}{5252}$$

## POWER

Unit	Kilowatt (kW)
1 kW	= 1.341 hp
1 kW	= 1.360 PS (Pferdestärke)
1 kW	= 1.360 CV (Cheval-vapeur)
1 hp	= 0.746 kW
1 W	= 0.7377 lbf.ft/sec

## TORQUE

Unit	Newton metre (Nm)
1 Nm	= 0.7376 lbf.ft
1 Nm	= 8.851 lbf.in
1 lbf.ft	= 1.3558 Nm
1 lbf.in	= 0.113 Nm
1 kgf.m	= 9.807 Nm
1 kgf.m	= 7.233 lbf.ft
1 kgf.m	= 86.796 lbf.in

## PRESSURE

Unit	Pascal (Pa)
1 kPa	= 0.145 lbf/in <sup>2</sup> (psi)
1 MPa	= 145.037 lbf/in <sup>2</sup> (psi)
1 MPa	= 10 Bar
1 atmosphere	= 101.3 kPa
1 psi	= 6.895 kPa
1 Bar	= 100 kPa
1 Bar	= 14.5 psi
1 MPa	= 10.19 kgf/cm <sup>2</sup>
1 kgf/cm <sup>2</sup>	= 98.07 kPa
1 kgf/cm <sup>2</sup>	= 14.22 psi

## VOLUME AND CAPACITY

Unit	Solids	Cubic metre (m <sup>3</sup> )
	Liquids	Litre (l)
1 l	=	0.2199 imp. gal.
1 l	=	0.2642 US gal.
1 l	=	61.02 in <sup>3</sup>
1 ml	=	1cm <sup>3</sup> (1cc)
1 US gal.	=	3.785 l
1 US gal.	=	231 in <sup>3</sup>
1 imp. gal.	=	4.546 l
1 imp. gal.	=	277.4 in <sup>3</sup>
1 cm <sup>3</sup>	=	0.061 in <sup>3</sup>
1 in <sup>3</sup>	=	16.39 cm <sup>3</sup>
1 m <sup>3</sup>	=	1000 l
1 m <sup>3</sup>	=	264.2 US gal.

## FORCE

Unit	Newton (N)
1 N	= 0.102 kgf
1 N	= 0.225 lbf
1 kgf	= 9.806 N
1 lbf	= 4.448 N

## LENGTH

Unit	Metre (m)
1 m	= 3.2808 ft
1 m	= 39.3700 in
1 mm	= 0.0394 in
1 in	= 25.400 mm

## COMMON PREFIXES

Prefix	Symbol	Meaning	Value	Factor
micro	μ	one millionth	0.000 001	10 <sup>-6</sup>
milli	m	one thousandth	0.001	10 <sup>-3</sup>
centi	c	one hundredth	0.01	10 <sup>-2</sup>
deci	d	one tenth	0.1	10 <sup>-1</sup>
deka	da	ten	10.0	10 <sup>1</sup>
hecto	h	hundred	100.0	10 <sup>2</sup>
kilo	k	thousand	1 000.0	10 <sup>3</sup>
mega	M	million	1 000 000.0	10 <sup>6</sup>