Formulas and Conversions

Unit Conversions

LENGTH

1 inch = 2.54 cm
1 metre = 3.281 feet
1 cm = .3937 inches
1 mm = 0.039 inches

VOLUME

1 Imperial Gallon = 4.546 Litres
1 US Gallon = 3.786 Litres

MASS

1 kg = 2.205 lb
1 imperial tonne = 1.016 metric tonne

FORCE

1 N= 10dyn = 0.2248 lbf = 0.10197 kgf

ENERGY

1 KJ = 10^5 Nm = 0 2388 kcal = 0.9478 Btu
= 737.6 ft lbf

FLOW

1 cfm = 28.317 Litres/Min
1 Litre/Min = 0.3532 cfm

PRESSURE

1 psi = 0.07Kp/Sq cm
1 bar = 14.5 psi
1 bar = $100,000/m^2$ (Pa)
1 bar = 750 mm Hg =10.20 m H_2O

POWER

1kW=1.341hp = 3.41 x 10^3 Btu/h
1 hp = 0.7457 kW

TEMPERATURE

Centigrade = (Fahrenheit -32)*0.5555
Fahrenheit = (1.8 * Centigrade)+ 32

Useful Hydraulic Formulas

GEOMETRICAL FLOW RATE (pumps and motors)

$$l/mm = \frac{\text{Geometric displacement } (cm^3/rev) \times \text{shaft speed (rpm)}}{1000}$$

$$gpm = \frac{\text{Geometric displacement } (in^3/rev) \times \text{shaft speed (rpm)}}{231}$$

HYDRAULIC POWER

$$kW = \frac{\text{Flow rate } (l/mm) \times \text{pressure (bar)}}{600}$$

$$hp = \frac{\text{Flow rate (gpm)} \times \text{pressure (psi)}}{1714}$$

SHAFT POWER

$$kW = \frac{\text{Torque at shaft (Nm)} \times \text{shaft speed (rpm)}}{9550}$$

$$hp = \frac{\text{Torque at shaft (lb-in)} \times \text{shaft speed (rpm)}}{63025}$$

GEOMETRIC FLOW RATE (cylinders)

$$l/mm = \frac{\text{Effective area } (cm^2) \times \text{piston speed (in/min)}}{10}$$

$$gpm = \frac{\text{Effective area } (in^2) \times \text{piston speed (in/min)}}{231}$$

THEORETICAL THRUST (cylinders)

N = Effective area (cm^2) x pressure (bar) x 10
Lb = Effective area (in^2) x pressure (psi)

VELOCITY OF FLUID IN PIPE

$$Misec = \frac{\text{Flow rate } (l/mm) \times 21.22}{D^2}$$
Where D = inside diameter of pipe in mm

$$Ft/sec = \frac{\text{Flow rate (qpm)} \times .408}{D^2}$$
Where D = inside diameter of pipe in inch

Other sizes and materials available on request - please enquire. Standard terms and conditions apply.