BARISH
PUMP COMPANY

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CALCULATORS

Contact Us

Calculators will help you to properly size up your pump, piping and fittings. With these tools, you can determine suction loss, friction loss, specific gravity, along with the useful conversion tables.

HEAD & PRESSURE FORMULA

$$\text{Head in feet} = \frac{(\text{Head in psi}) \times 2.31}{(\text{Sp. Gr.})}$$

$$\text{Head in psi} = \frac{(\text{Head in feet}) \times (\text{Sp. Gr.})}{2.31}$$

NET POSITIVE SUCTION HEAD

Suction Lift:
$NPSH = h_a ? h_v ? h_s ? h_l$

Flooded suction:
$NPSH = h_a ? h_v + h_s ? h_l$

h_a = the absolute pressure in feed of liquid on the surface of the supply liquid
h_v = the vapor pressure of the liquid being pumped expressed in feet of head
h_s = the height in feed of the supply liquid surface with respect to the pump inlet
h_l = suction line friction losses express in feet of head
These calculations yield the available net positive suction head for a given system. This must be compared to the required net positive suction head NPSHR calculated by the manufacturer. $NPSH_A$ must exceed $NPSH_R$.

AFFINITY LAWS

Centrifugal Pumps

For constant speed:

$$\frac{D_1}{D_2} ? = \frac{Q_1}{Q_2} = \frac{?H_1}{?H_2} ? \frac{BHP_1 = (D1)^3}{BHP_2 = (D2)^3}$$

For constant impeller diameter:

$$\frac{S_1}{S_2} = \frac{Q_1}{Q_2} = \frac{?H_1}{?H_2} ? \frac{BHP_1 = (S1)^3}{BHP_2 = (S2)^3}$$

D = Impeller diameter in inches ??? H = Head in feet

S = Speeds in RPM ??? Q = Capacities in GPM

BHP = Brake Horsepower

VACUUM PRESSURE EQUIVALENTS:

1 Atmosphere = 29.92 in. Hg = 760mm Hg = 14.7 psi
1 mm Hg = 1 Torr = (3.937x10-2) in. Hg = 1000? Hg = 1.333 millibars
1 bar = 103 millibars = 106 microbars = 750.06 mm Hg
1 microbar = 0.75 micron
1 inch Hg = 2.54 x 101 mm Hg
x in. Hg vacuum = (29.92?x) in. Hg absolute
y mm Hg vacuum = (760-y) mm Hg absolute
z PSIG = (z + 14.7) PSIA
w PSIA = (w-14.7) PSIG

PUMPING POWER FORMULA

Centrifugal pumps:

$$\text{Brake hp} = \frac{\text{gpm} \times H_{ft} \times \text{Sp. Gr.}}{3960 \times \text{Efficiency}}$$

Rotary and reciprocating pumps:

$$\text{Brake hp} = \frac{\text{gpm} \times \text{psi}}{1714 \times \text{Efficiency}}$$

$$\text{KW} = \frac{\text{pump bhp} \times 0.7457}{\text{motor efficiency}}$$

GENERAL INFORMATION

1 HP = .746 KW or 746 Watts
GPM = Bbls. / Hr. x 0.70
GPM = Bbls. / Day x 0.2917
One Barrel Oil = 42 Gallons

VISCOSITY

Relationships

$$\text{Centistokes} = \frac{\text{Centipoises}}{\text{Density}}$$ *(usually the same as specific gravity)*

ft^2 / sec = Centistokes x 1.07639 x 10^{-5}
Centistokes = ft^2 / sec x 92903.4

Approximate Conversions

(50 < SSU ? 100) Centistokes = SSU x 0.226 ? 205.3 / SSU
(100 < SSU ? 350) Centistokes = SSU x 0.220 ? 147.7 / SSU
(SSU > 350 @ 100? F) Centistokes = SSU x 0.21576
(SSU > 350 @ 210? F) Centistokes = SSU x .021426

FLOW

Lbs. Of Water / Hr x 0.002 = Gal Min.

Gal / Min. x 500 = Lbs of Water / Hr

$$\frac{\text{Lbs of Fluid / Hr}}{\text{Specific Gravity}} = \text{Gal Min.}$$

Liter Min. x 0.264 = Gal / Min. (US)
GPM x 3.785 = Liters / Min.
Cu. Meters / Hr x 4.4 = Gal / Min. (US)
Gal / Min. x 227 = Cu. Meters / Hr
Kg of Water / Min. x 0.264 = Gal / Min. (US)
Gal Min. x 3.8 = Kg of Water / Min.

PRESSURE

Ft of Water x 0.433 = PSI
PSI x 2.31 = Ft of Water
Inches Hg. X 0.491 = PSI
Inches Hg. X 1.133 = Ft of Water
ATM x 14.7 = PSI
ATM x 33.9 = Ft of Water
Kg / Sq cm x 14.22 = PSI
Meters of Water x 1.42 = PSI
ATM x 760 = mm Hg.
mm Hg. X 0.39 = Inches Hg.
Bar x 14.5 = PSI
Newton / Meter2 x 1 = Pascal
PSI x 6.9 = kPa (Kilopascal)
kPa x 0.145 =PSI

VOLUME

Lbs Water x 0.119 = Gal
Gal (Brit) x 1.2 = Gal (US)
Gal x 128 = Fluid Ounces
Cubic Ft x 7.48 = Gal
Cubic in. x 0.00433 = Gal
Gal x 3.785 = Liters
Liter x 0.264 = Gal
Cubic Meters x 264.2 = Gallons
Cubic Meter x 1000 = Liters
Liters x 1000 = Cubic Centimeters
Cubic Centimeters x 0.338 = Fluid Ounces
Fluid Ounces x 29.57 = Cubic Centimeters

MASS

Gal of Water x 8.336 = Lbs
Cubic Ft of Water x 62.4 = Lbs
Ounces x 0.625 = Lbs
Kilograms x 2.2 = Lbs
Lbs x 0.454 = Kilograms
Metric Ton x 2205 = Lbs

MASS

Mils x 0.001 = Inches
Meters x 3.281 = Feet
Centimeters x 0.394 = Inches
Millimeters x 0.0394 = Inches
Microns x 0.0000394 = Inches

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