

HELPFUL PUMP RELATED FORMULAS

TOTAL DIFFERENTIAL HEAD (TDH)

System Head = total discharge head - total suction head

$$H = h_d - h_s$$

$$h_d = h_{sd} + h_{pd} + h_{fd}$$

$$h_s = h_{ss} + h_{ps} + h_{fs}$$

where:

h_d = total discharge head

h_s = total suction head

h_{sd} = discharge static head

h_{ss} = suction static head

h_{pd} = discharge surface pressure

h_{ps} = suction surface pressure

h_{fd} = discharge friction head

h_{fs} = suction friction head

AVAILABLE NPSH

Available NPSH is "the difference between the total suction head and the vapor pressure of the liquid, in feet of liquid, at the suction inlet nozzle."

$$h_{sv} = h_{sa} - h_{ypa}$$

where:

h_{sv} = available net position suction head, in feet of liquid

h_{sa} = total suction head, in feet of liquid, absolute

h_{ypa} = vapor pressure of liquid at suction nozzle, in feet of liquid, absolute

PRESSURE Conversion:

Head (ft.) = psi x 2.31 / sp. gr.

PSI = head (ft.) x sp. gr. / 2.31

Lbs./sq. in. = In. of Mercury x .491

= Atmospheres x 14.7

mm hg. = Atmospheres x 760

VISCOSITY

Centistokes x 4.64 = SSU(approx.)

Centipoises x Sp. Gr. = Centistokes

POWER

BHP = $\frac{GPM \times TDH \times \text{sp. gr.}}{3960 \times \text{Eff.}}$ (for centrifugal pumps)

BHP = $\frac{GPM \times PSI}{1715 \times \text{Eff.}}$ (for positive displacement pumps)

KW = 0.746 x H.P.

Torque = (Ft. Lb.) = $\frac{HP \times 5260}{RPM}$

HP = $\frac{E(\text{volts}) \times I(\text{Amps}) \times \text{Eff.} \times \text{P.F.} \times 1.732}{E(\text{volts}) \times I(\text{Amps})746}$

I(amps) = $\frac{HP \times 746}{E(\text{volts}) \times \text{Eff.} \times \text{P.F.} \times 1.732}$

TEMPERATURE Conversion:

$^{\circ}C = 5/9 (^{\circ}F - 32)$

$^{\circ}F = 9/5^{\circ}C + 32$

SPECIFIC GRAVITY

sp. gr. = $\frac{\text{weight of liquid}}{\text{weight of water}}$

weight of water = 62.4 Lb./cu. ft

8.3 Lb./gal.

COMMON O-RING / ELASTOMER MATERIAL PROPERTIES

Buna-N

- Temp range 10° F - 180° F

- Good for most petroleum products

Viton

- Temp range -20° F to 350° F

- Good for aromatic/chlorinated hydrocarbons and most acids

EPDM

- Temp range -40° F to 250° F

- Good for caustics and some milder acids

Neoprene

- Temp range 0° F to 180° F

- Good for water and non-aggressive, dilute fluids.
Best for food contact.