Conversions and Formulas

To Convert	Into	Multiply By
Cubic Feet (cu. ft.)	Gallons U.S. Liquid	7.48052
Liters Per Minute (LPM)	Gallons Per Minute (GPM)	0.2642
Gallons Per Minute (GPM)	Cubic Inches Per Minute	231
Kilowatts (Kw)	Btu / hr	3415
Horse Power (HP)	Btu / hr	2545
Joules	Btu	.000948
Kilogram Calories	Btu	3.968
Kilograms	Pounds U.S. (lbs)	2.205
Degrees Celcius	Degrees Fahrenheit	(1.8) + 32
Tons of Cooling (chiller)	Btu / hr	12000
Tons of Cooling (cooling tower)	Btu / hr	18000
Gallons U.S. (water)	Pounds U.S. (lbs)	8.3453
Milimeters	Inches U.S.	25.4
Centimeters	Inches U.S.	2.54
Bar	Pounds Per Square Inch (PSI)	14.5
Inches of Water	Pounds Per Square Inch (PSI)	.03613
Inches of Mercury (Hg)	Pounds Per Square Inch (PSI)	.4912

Formula For	Word Formula	Letter Formula
Reservoir Cooling Capacity	Heat (Btu/hr) = 2 x Temperature Difference Between Reservoir Walls and Air (°F) x Area of Reservoir (Sq. ft.)	Btu/hr = 2.0 x △T x A
Heat In Hydraulic Oil (approx.) due to system inefficiencies (SG = .89 - .92)	Heat (Btu/hr) = Flow Rate (GPM) x 210 x Temperature Difference (°F)	Btu/hr = Q x 210 x △T
Heat In Fresh Water (approx.)	Heat (Btu/hr) = Flow Rate (GPM) x 500 x Temperature Difference (°F)	Btu/hr = Q x 500 x △T
Heat In 50% Ethylene Glycol and Water (approx.)	Heat (Btu/hr) = Flow Rate (GPM) x 450 x Temperature Difference (°F)	Btu/hr = Q x 450 x △T
Heat In Dry Air (approx.)	Standard Cubic Feet Per Minute x 1.13 x Temperature Difference (°F)	SCFM x 1.13 x Temperature Difference (°F)
Fluid Power In Horse Power	Horse Power = $\frac{\text{Pressure (PSI) x Flow (GPM)}}{1714}$	HP = $\frac{PQ}{1714}$
Velocity Through Piping (in feet / second velocity)	Velocity = $\frac{.3208 \times \text{Flow Rate through I.D. (GPM)}}{\text{Internal Area (Square Inches)}}$	V = $\frac{.3208Q}{A}$
Internal Area of a Pipe (square inches)	Internal Area = Pipe I.D. squared x .7854	A = d^2 x .7854
Specific Gravity of a Fluid	Specific Gravity = $\frac{\text{Weight of One Cubic Foot of a Fluid}}{\text{Weight of One Cubic Foot of Water}}$	SG = $\frac{W}{62.4283}$
Convert ACFM to SCFM	SCFM = $\frac{\text{ACFM x (Pounds Per Square Inch Gauge + Atmospheric Pressure) x 528}}{\text{(Temperature of Air Inlet + 460) x Atmospheric Pressure}}$	SCFM = $\frac{\text{ACFM x PSIG + 14.7 x 528}}{T_1 + 460 \times 14.7}$
Steam Required (lbs / hr)	lbs / hr = $\frac{\text{Btu per hour}}{\text{Enthalpy of Steam at Operating Pressure}}$	lbs/hr = $\frac{Btu/hr}{Btu/lb}$
F_s or Btu / lb °F	F_s = $\frac{\text{Horse Power to be Removed x 2545 x Correction Viscosity}}{\text{(Oil Leaving °F - Ambient Air Entering °F)}}$	F_s = $\frac{HP \times 2545 \times Cv}{T_2 - t_a}$

3905 Route 173 Zion, IL 60099 tel: 1 (847) 731-1000 fax: 1 (847) 731-1010 www.aihti.com