



HEDRICK Associates



Excellence Since 1981

World Class Products and Expertise for the Precision Power and Heat Transfer Industry



Precision Cooling, Power, and Monitoring for Mission Critical Systems

- Precision Cooling Systems
- Uninterruptible Power Supplies - Power Distribution Equipment
- Transient Voltage Surge Suppression (TVSS)
- DC Power Systems - World Class Service and Support

HVAC and Industrial Cooling Products and Technologies

- Cooling Towers - Evaporative Fluid Coolers
- Evaporative Condensers - Dry Cooling



www.marleyct.com



Water Filtration Systems for Heat Transfer Systems

- Full Stream Liquids / Solids Separators
- Side Stream Liquids / Solids Separator Systems
- Cooling Tower Basin Cleaning Systems

Air Purification Systems

- Duct Mounted and Air Handler Mounted Systems
- Bi-Polar Ionization - Gas Phase Filtration
- Recirculation Systems - High Efficiency Electronic Filters



www.bioclimatic.com



Chemical-Free Water Treatment Technology

- Cooling Towers - Fountains - Humidifier Systems

High Efficiency Transformers

- High Efficiency, Harmonic Mitigating Transformers



www.powerquality.net



Emergency Power Transfer Products

- Automatic Transfer Switches
- Generator Paralleling Gear

Heat Exchangers for HVAC Applications

- Plate and Frame Heat Exchangers



www.alfalaval.com



Engineered Process Fluid Chillers

- Indoor / Outdoor Process Chillers
- Customized Chiller Solutions

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Useful Conversions and Formulas:

Temperature

Degrees Fahrenheit = (9/5 x Degrees Celsius) + 32
 Degrees Celsius = (Degrees Fahrenheit - 32) x 5/9

Power / Energy

Watts = Horsepower (Electric) x 746
 BTU/Min = Horsepower (Electric) x 42.44
 BTU/Hr = Watts x 3.4129
 kW = kVA x Power Factor
 kVA (1-Phase) = (Volts x Amps) ÷ 1,000
 kVA (3-Phase) = (Volts x Amps x 1.732) ÷ 1,000

Cooling Tower

Evaporation = 1% of System Flowrate
 Bleed Off = .33% of System Flowrate
 Drift = .002% of System Flowrate
 Typical Make-Up Water for 10° ΔT Design = 1.332% x System Flowrate
 1 Cooling Tower Ton = 15,000 BTU/H
 1 Cu Ft of Water = 7.5 Gallons of Water
 1 HP = 2,545 BTU/H
 BTU/H = 500 x ΔT x GPM
 Range = BTU/H ÷ (GPM x 8.33lb/gal) ÷ 60
 GPM = (BTU/H) ÷ (ΔT x 500)
 1 PSI = 2.31 Ft of Head

Refrigeration / Heat Transfer

BTU/Hr = Tons of Refrigeration x 12,000
 BTU = Horsepower Hrs x 2,547
 Watts = Tons of Refrigeration x 3,517.2
 Kilocalories/Hr = Tons of Refrigeration x 3,024.117

Refrigerant Piping—Equivalent Lengths:

Copper Pipe O.D.in.	90 Deg Elbow Copper	90 Deg Elbow Cast	45 Deg Elbow	Tee	Gate Valve	Globe Valve	Angle Valve
1/2	0.8	1.3	0.4	2.5	0.26	7.0	4.0
5/8	0.9	1.4	0.5	2.5	0.28	9.5	5.0
3/4	1.0	1.5	0.6	2.5	0.3	12.0	6.5
7/8	1.45	1.8	0.8	3.6	0.36	17.2	9.5
1-1/8	1.85	2.2	1.0	4.6	0.48	22.5	12.0
1-3/8	2.4	2.9	1.3	6.4	0.65	32.0	16.0
1-5/8	2.9	3.5	1.6	7.2	0.72	36.0	19.5

Filtration: Particulate Size Information

Particulate Size	Mesh	Micron	
.063	10	1600	
.036	20	890	← Beach Sand
.024	30	600	
.015	40	380	
.009	60	230	
.007	80	180	
.0055	100	140	← Human Hair
.004	150	100	
.003	200	80	← Pin Point
.0016	500	40	
.0012	700	30	← Milled Flour
.0006	—	15	
.0002	—	5	
.00004	—	1	

Interconnect Piping—Refrigerant Charge

Line Size O.D. inches	R-407C, lb/100 feet	
	Liquid Line	Hot Gas Line
1/2	6.9	—
5/8	11.0	2.2
3/4	15.7	3.1
7/8	23.0	4.5
1-1/8	39.3	7.8
1-3/8	59.8	11.8

Mission Statement: "To help our customers maximize the availability and efficiency of their critical business systems by providing superior products, service and support; before, during, and after implementation; for each individual, unique application."