200 E. Government St.
Suite 150
Pensacola, FL 32501

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CUSTOM AIR HANDLERS - MAGNETIC BEARING CHILLERS - PACKAGED MECHANICAL ROOMS - VRF SYSTEMS - FAN ARRAYS - ENERGY RECOVERY SYSTEMS - CHILLED BEAMS - CLEAN ROOMS - NATATORIUMS - LOW DEWPOINT PROCESS - COMPUTER ROOM UNITS - COMFORT COOLING

AAON

- Packaged Rooftop Units, Water Cooled and Geothermal Systems, 100% Outside Air DX Units, Modular AHU's, Energy Recovery Units, Condensing Units, Air Cooled and Evaporative Condensing Water Chillers, Packaged Chiller / Boiler Plants, Custom Modular Air Handlers, Magnetic Bearing Technology, High Performance DX & Chilled Water Systems, Pool Dehumidification (AAON-Dry).

www.aaon.com

ACOUSTIFLO

- FEG and AMCA Certified Direct Drive Fan Array Systems, High Efficiency, Low Operating Sound Levels with Integral Silencers.

www.acoustiflo.com

EMERSON

- Variable Speed Drives, Solid State Reduced Voltage Motor Starters.

www.hvacr-drives.com

DADANCO

- Active Chilled Beams, Replacement Induction Units.

www.dadanco.com

CONCEPTS AND DESIGNS (CDI)

- Packaged Desiccant Systems, Makeup Air Units, Custom AHU's, Heat Recovery Units, Direct and Indirect Fired Heating and Ventilating Units, Low Dewpoint Applications.

www.cdihvac.com

CARRIER CORPORAITON

- All Chilled Water / Hot Water Equipment, Air Cooled Chillers, Water Cooled Chillers, Absorption Chillers, Central Station Air Handlers, Fan Coil Units, Air Terminal Units, Geothermal and Water Source Heat Pumps, Indoor Self Contained Units, Induction Beams, Energy Recovery.

www.commercial.carrier.com

MULTISTACK

- Dedicated Heat Recovery Chillers up to 180°F, Modular Chillers, Medical Chillers, Air Cooled and Water Cooled Chillers, Water-to-Water Heat Pumps, Air-to-Water Heat Pumps, Air Cooled and Water Cooled MagLev Centrifugal Chillers, VFD Rotary Screw Chillers, AHRI Certification.

www.multistack.com

HAAKON

- Custom Air Handling Units for Hospital, Clean Room and Pharmaceutical Applications, Rotary Heat Wheel and Desiccant Wheel Dehumidification Units, Sprayed Coil Units, Welded Floors, Thermal Break and Low Leakage Casing Construction.

www.haakon.com

HONEYWELL

- Standalone or Networked Controllers Customized Specifically for the Demanding Requirements of the Equipment Represented by Hill Company. Support of All Major Open Protocols.

Honeywell Spyder

DESICCANT ROTORS INTERNATIONAL (DRI)

- Energy Recovery Wheels and Cassettes for Passive Dehumidification, Sensible and Total Energy Recovery.

www.drirotors.com

LG

- Multi-V VRF, 410A Ducted Vertical and Horizontal Air Handlers, Ceiling Cassettes, Floor Standing and ArtCool, Heat Pump and Heat Recovery, 6 thru 36 Tons, Air Cooled and Water Cooled, Ductless Mini Splits.

www.lghvac.com

POOLPAK

- Natatorium Environmental Dehumidification Systems.

www.poolpak.com

SEIBU GIKEN

- Energy Recovery Wheels and Cassettes for Passive, Sensible and Total Energy Recovery.

www.sgamerica.com

RAE CORPORATION

- DX, Chilled Water, Steam and Hot Water Coils, Fluid Coolers, Packaged Air Cooled Condensing Units.

www.rae-corp.com

XETEX

- Air-to-Air Plate and Frame Heat Exchangers and Heat Recovery Units, Rotary Wheel Heat Exchangers.

www.xetexinc.com

STARTUP AND WARRANTY FOR ALL PRODUCTS AVAILABLE THROUGH FACTORY CERTIFIED SERVICE AFFILATE

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HVAC/ENGINEERING USEFUL FORMULAS & REFERENCES

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FAN LAWS:

CFM1/CFM2 = RPM1/RPM2

$SP1/SP2 = (RPM1/RPM2)^2$

$HP1/HP2 = (RPM1/RPM2)^3$

Velocity = CFM/AREA

$$BHP = \frac{CFM \times Static\ Pressure(inches)}{6356 \times Static\ Efficiency}$$

ELECTRIC MOTORS:

$$kW\ Input = \frac{AMPs \times Volts \times Power\ Factor}{1000}$$

$$AMPS = \frac{746 \times BHP}{Efficiency \times Volts \times 1.732}$$

Conversion: 1.341 HP = 1000 Watts

ELECTRIC HEAT:

Single Phase: AMPS = Watts/Volts

Three Phase: AMPS = Watts / (Volts x 1.732)

Conversion: 3.412 BTUH = 1 Watt

$$kW\ Input = \frac{1.085 \times CFM \times \Delta T}{3{,}412}$$

CAPACITY CALCULATIONS:

1 ton = 12,000 BTUH

Water: BTUH = 500 x GPM x ΔT

Air: Sensible Heat BTUH = 1.085 x CFM x ΔT
Latent Heat BTUH = 0.68 x CFM xΔGrain
Total Heat BTUH = 4.5 x CFM x Δh

$$Sensible\ Heat\ Ratio\ SHR = \frac{Sensible\ Heat\ BTUH}{Total\ Heat\ BTUH}$$

EFFICIENCY:

$$EER = \frac{Capacity\ (BTUH)}{Power\ Input\ (Watts)}$$

kW/Ton = 12/EER

$$COP = \frac{Capacity\ (Watts)}{Power\ Input\ (Watts)}$$

WATER FLOW & PIPING:

Head H = psi x 2.31/SG* (ft)
SG = specific Gravity, SG Water = 1.0

Pressure Drop varies approximate as the square of the flow

$H2/H1 = (Q2/Q1)^2$

$Velocity\ V = (GPM \times 0.41)/D^2$

V = Velocity in fps
D = inside diameter, inches

MISCELLANEOUS:

Volume of liquid in a tank:
$Gallons = 5.875 \times D^2 \times H$
D = Tank Diameter
H = Height of Liquid

1 cubic foot (ft^3) = 7.48 Gallons (gal)
1 gallon of water = approx. 8.35 lb

1 ft of water = 0.433 PSI
1 PSI = 2.309 ft of water

DESIGN CONDITIONS:

2005 ASHRAE Handbook – Fundamentals (IP)
1% Cooling DB/MCWB

Location	(DB/MCWB)
Mobile, AL	91.8/76.4°F
Montgomery, AL	94.0/76.1°F
Dothan, AL	93.2/75.7°F
Pensacola, FL	91.6/77.3°F
Panama City, FL	91.0/76.9°F
Hattiesburg, MS	93.1/75.0°F