ENGINEERED HVAC SOLUTIONS . PROVIDED BY JOHNSON CONTROLS . WWW . FISENUSA . COM

## Glycol Freezing Point Temperatures (F°)

| (% Glycol by volume) | 0% | 10% | 20% | 30% | 40% | 50% | 60% |
|---|---|---|---|---|---|---|---|
| Ethylene Glycol °F | 32° | 23° | 14° | 2° | -13° | -36° | -70° |
| Propylene Glycol °F | 32° | 26° | 18° | 7° | - 8° | -29° | -55° |

At Fisen, our primary business purpose is to help you sell more products by engineering and manufacturing unique solutions that give you a competitive edge *and* maintain the full factory warranty.

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## Unit Conversions

| | |
|---|---|
| 1 kW | 3.412 MBH |
| 1 Ton | 12 MBH |
| 1 HP | 0.746 kW |
| 1 CFM | 0.472 L/s |
| 1 in | 25.4 mm |
| 1 IWG | 249 Pa |
| 1 psi | 2.307 Ft $H_20$ |
| 1 lb | 0.4536 kg |

## TARGETED MANUFACTURERS*

| | | |
|---|---|---|
| AnnexAir | Customized Trane | Dectron |
| Des Champs | Engineered Air | Governair |
| Innovent | Mammoth | McQuay RPS |
| Motiveair | Munters | Pool Pak |
| Seasons 4 | Semco | Seresco |

## TARGETED PRODUCTS**

- Air Cooled Chillers with Free Cooling Multizones
- Packaged DX with Integral Heat Recovery (Plate or ERW)
- Chillers with Pump Packages
- All Custom Packaged DX Equipment, 100% OSA
- Outdoor Packaged Pool Units
- Low Sound Requirements
- Outdoor AHUs with Energy Recovery
- Desiccant Dehumidification
- Explosion Proof
- AHUs with Fan Wall
- Tight Space Requirements

*Targeted Manufacturers: Many JCI Branch Offices & Agents regularly beat these OEMs on price and performance with Fisen's engineered and modified products.

**Targeted Products: While the range of engineered modifications we're capable of is virtually boundless, this is a short list of products that Branch Offices and Agents are consistently successful with.

| | Subject | Rule of Thumb/Equation | Notes/Source |
|---|---|---|---|
| AIRSIDE | Typical RTU Airflow | 400 CFM/Ton | *Typical Comfort Cooling* |
| | 100% OA Unit Airflow | 200 CFM/Ton | *Typical Comfort Cooling* |
| | Typical Cooling Capacity | 400 Sq Ft/Ton | *Typical Comfort Cooling* |
| | Typical Airflow | 1 CFM/Sq Ft | *Typical Comfort Cooling* |
| | Cooling Coil Face Velocity | 500 Ft per min | *No Moisture Carryover* |
| | Return Air Temp | 75°/ 62.5° F db/wb | |
| | Cooling Coil Leaving Air Temp | 55°/ 55° F db/wb | *Typical Comfort Cooling* |
| | Cooling Total Capacity (MBH) | = 4.5 * CFM * ΔH / 1000 | |
| | Sensible Capacity (MBH) | = 1.085 * ΔT * CFM / 1000 | *Cooling & Heating* |
| | Cooling Latent Capacity (MBH) | = Total MBH - Sensible MBH | |
| | Humidification | = 7.5 Lb $H_2O$ per 1,000 CFM for | 10% |
| | Fan Motor HP | = (CFM) * (TSP) / 4000 | *Approximation* |
| WATERSIDE | CHW Flow | 2.4 GPM/Ton | *10° F ΔT (55°- 45°)* |
| | CNW Flow | 3.0 GPM/Ton | *10° F ΔT (95°- 85°)* |
| | Cooling Tower Makeup Water | 3 Gal/Ton-hr | *Due to evaporation* |
| | Equivalent Full Load Hours | 2,500 | *Varies by climate* |
| | Heating/Cooling Capacity (MBH) | = 0.5 * GPM * ΔT (°F) | |
| | Heating/Cooling Capacity (Tons) | = GPM * ΔT (°F) / 24 | |
| | Chiller Water Pressure Drop | 20 Ft Head | |
| | Pump Motor Horsepower | = (Ft Head) * (GPM) / 2500 | *Approximation* |
| ELECTRICAL | Motor Electrical (kW Input) | = .746 * BHP / Motor Efficiency | |
| | Equipment MCA | = Largest Motor FLA * 1.25 + All Other Loads | |
| | Equipment MOP | = Largest Motor FLA * 2.25 + All Other Loads | |
| | Efficiency (EER) | = Tons Refrigeration Effect * 12 / Total kW Input | |
| | Efficiency (COP) | = kW Refrigeration Effect / Total kW Input | |
| BUDGETS | Standard RTU | $ 750/Ton | |
| | AAON RTU | $1000/Ton | |
| | Custom RTU | $2000/Ton | |
| | Vertical Self Contained | $ 900/Ton | |
| | Standard AHU | $ 2/CFM | |
| | Mid Customized AHU | $ 3-5/CFM | |
| | Highly Customized AHU | $ 6-15/CFM | |
| | Water Cooled Scroll Chiller | $ 650/Ton | |
| | Water Cooled Centrifugal Chiller | $ 250/Ton | |
| | Air Cooled Scroll Chiller | $ 750/Ton | |
| | Air Cooled Screw Chiller | $ 450/Ton | |
| | Setting, Rigging, Installation | $ 60/Ton | |
| | Pumps | $ 250/HP | |
| | Closed Loop Cooling Tower | $ 125/Ton | |
| | Open Cooling Towers | $ 65/Ton | |

*Note: Prices at left are averages and approximations over broad equipment ranges and should be referenced only for rough budgeting purposes. Actual equipment prices may vary greatly with various options available.*