



Eco-\$mart, Inc.
4411 Bee Ridge Rd. #344
Sarasota, FL 34233
www.ecosmartinc.com

Thank you for your interest in Eco-\$mart, Inc., a unique type of organization, with a unique approach to business. Though our company is a for profit venture, we operate under license from the nonprofit Florida House Institute for Sustainable Development (I4SD). This means that all of our products and programs are screened and approved by the nonprofit I4SD, and all purchases generate a donation to the nonprofit to further their educational mission.

Eco-\$mart was created for the sole purpose of making it easy and affordable to include energy efficient, resource efficient, disaster resistant, and health enhancing systems into commercial and residential projects.

Why Design Eco-\$mart Features into Homes and Buildings?

- Immediate Positive Cash Flow (reduction in utilities and maintenance costs are greater than any possible increased finance costs of features – some systems cost less than conventional)
- Increased Occupant Health, Safety and Productivity
- Increased Property Value
- Increased Positive Media Attention
- Reduced Maintenance Costs and Time
- Reduced Environmental Impact (and possibly impact fees)

Eco-\$mart Services:

- Lowest-Cost Efficient Construction Supply
- Free Materials Design Consultation
- Free Cost / Benefit Analyses
- Free Media Contacts and Releases
- Subcontractor Sourcing
- Energy Efficient Financing Sourcing
- Building Energy Ratings / Green Certification

Example Eco-\$mart Systems:

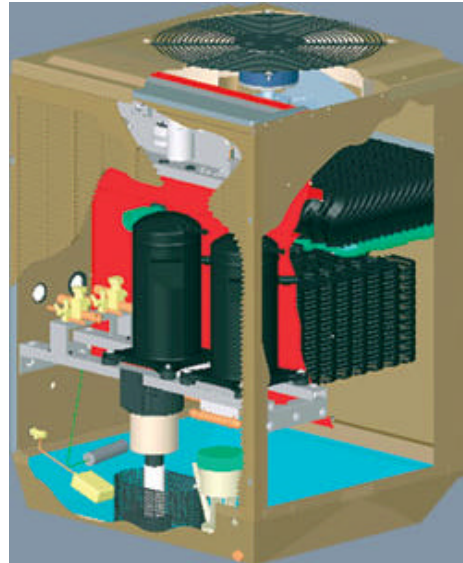
- Advanced Wall and Roof Systems (fire, pest, wind resistant, efficient)
- 18 EER / 22 SEER Water Cooled Air Conditioning
- Passive Dehumidifying Air Handlers
- Passive Solar Water Heating / Solar Attic No Panel Solar Pool Heating
- 100% Chlorine-Free Pool and Cooling Tower Sanitation
- Water Purification (under sink, whole house, commercial / industrial)
- Energy Efficient Lighting (T5, T8 Electronic Ballast, Daylighting, Controls)
- Recycled Plastic Decking, Recycled Rubber Porous Paving / Paths
- Bamboo and Cork Flooring, Natural Fiber and Recycled Plastic Carpets
- No-VOC Interior Wall Paint
- Water-Blown Foam Insulation / Radiant Barrier Roof Coatings
- 1.6 Gallon Flapperless Toilets
- Co-generation, Backup Power, Fuel Cells, Photovoltaics, and more!

For more information, call 888-329-2705, or email info@ecosmartinc.com

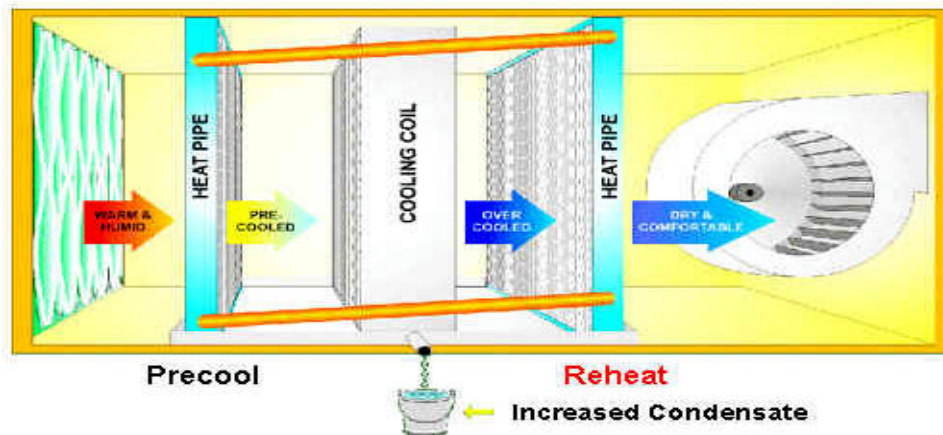
High Efficiency / Healthy Indoor Air Quality Air Conditioning Package

System Components:

18 EER / 22 SEER Freus Water Cooled Condensing Unit – Reduces energy consumption from air conditioning by 50 to 60 percent versus 10 SEER (standard) condenser. More efficient than 20 SEER air-cooled equipment. Fiberglass cabinet, 15 year limited warranty.



Heat Pipe Passive Dehumidification Air Handler – By passively pre-cooling and post-heating the air moving across the evaporator, your air conditioner becomes twice as powerful in dehumidification. Mold in ducts and wallboard is avoided and higher temperatures feel more comfortable, saving more a/c costs.



Intelligent Fan Recycler Fresh Air Controller – Installed with a 4" duct from outside air to the return of the air handler. Cycles the air handler on every 30 minutes to create more fresh air exchanges and positive pressure on the home, flushing toxins out and keeping humidity from being drawn in through air infiltration. We also recommend installing a humidistat in parallel with the thermostat, set to turn on the HVAC system any time the humidity level goes over 55%.



Eco-\$mart, Inc: 888-329-2705 ~ 941-377-9460 ~ www.ecosmartinc.com

All Eco-\$mart products are approved by the nonprofit Florida House Institute for Sustainable Development

For Immediate Release
Contact: Matt Ross
Phone: (941) 377-9460

**World's Most Energy Efficient Air Conditioner Comes to Florida
Introductory Seminar at Florida House October 5th**

Sarasota, FL, September 25, 2002: The Freus, the world's most energy efficient air conditioning condensing unit, is now available in Florida. Home and business owners can see a Freus unit in operation and learn more at an introductory seminar at 11:00 A.M., Saturday, October 5th at the Florida House Learning Center, 4600 Beneva Rd. South, in Sarasota. Local air conditioning contractors handling the Freus will be in attendance to answer questions, as well. The Freus is distributed in Florida by Eco-\$mart, Inc., the for-profit distribution company operated in partnership with the nonprofit Florida House Institute for Sustainable Development. All Eco-\$mart products are screened and approved by the nonprofit Florida House Institute.

The Freus was recently rated by the Air Conditioning and Refrigeration Institute (ARI) at a 16 EER, saving 50 to 60 percent on air conditioning bills versus standard air conditioners. This super high efficiency is achieved because Freus is a water-cooled condenser, versus standard equipment that is air-cooled. The water in the Freus is contained in a sump in the bottom, which cools the standard refrigerant coming out of standard interior cooling equipment. The water is then pumped up to the center of the Freus, which contains its own internal PVC cooling tower.

Water-cooled air conditioners can only be rated with an EER versus a SEER for air-cooled equipment. EER testing is done at 95 degrees outside air temperature and high humidity, where SEER testing is done at 82 degrees outside air temperature and moderate humidity. The most energy efficient (18 SEER) air-cooled equipment achieves only a 10 to 13 EER, compared to Freus's 14 to 16 EER. This means that on hot, humid Florida summer days, the Freus is 20 to 25 percent more efficient than the best air-cooled units.

The Freus is not only very energy efficient, it also is designed to last longer than standard air conditioners. The cabinet of the Freus is all fiberglass, and the condensing coils are constantly washed with water, protecting the unit from salt air corrosion that degrades standard equipment. The Freus uses the industry's most reliable, Copeland scroll compressor, which operates at lower temperatures and pressures due to the lower condensing temperatures achieved by the water – this means longer compressor life. In addition, the Freus contains no electronic circuitry to fail, unlike high efficiency air-cooled equipment. The Freus is also reasonably priced, making it a very attractive upgrade option with a short payback period for home and business owners.

For more information, please contact Matt Ross, Eco-\$mart, Inc. at (941) 377-9460.

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How Much Can You Save by Switching to a Freus, the World's Most Energy Efficient Air Conditioner?

Freus 18 EER Water-Cooled Condensing Unit – The most energy efficient condensing unit on the market. By using water to cool refrigerant, then using a built-in cooling tower to cool the water, the Freus is efficient, quiet and low maintenance. The Freus also maintains its cooling capacity on the hottest, most humid days of the year much better than conventional air-cooled condensers. 15 year limited warranty is standard. (Note: EER testing is done at 95 degrees, where SEER testing is done at 82 degrees. The 18 EER is equivalent to over 22 SEER).

Projected Utility Cost Savings – Central Florida*

<u>Efficiency Vs:</u>	<u>Freus Ann. Savings</u>	<u>Freus 20 Yr. Savings</u>
10 SEER	\$831.00	\$16,620.00
12 SEER	\$554.00	\$11,080.00
14 SEER	\$312.00	\$6,240.00

Other Freus Benefits:

- Quieter Operation
- Longer Life and Lower Maintenance Due to:
 - Lower Pressures
 - Lower Operating Temperatures
 - Fiberglass Cabinet
 - Condensing Coils Protected from Salt Air by Water
 - No Electronic Circuitry
- Excellent Dehumidification (smaller compressor, more even cycle times)

*Utility costs and savings are based upon a 3-ton unit, operating 2800 annual hours at \$0.09 per kWh using actual historical weather data from Orlando, Florida and performance ratings issued by the American Refrigeration Institute, the National standards organization for air conditioning. Detailed calculations are available upon request. The chart above assumes no annual increase in utility costs. Note: for heat pump users switching to straight cool, reduce savings by \$75 per year. Typical water costs for Freus are between \$20 and \$25 per year.

All systems have been approved by the nonprofit Florida House Institute for Sustainable Development, creators of the Florida House Learning Center in Sarasota, FL. A portion of all proceeds from purchases of these systems is donated to the nonprofit Florida House Institute to support their environmental education and facilitation mission. See www.i4sd.org for more information about Florida House efforts. For more information on Freus, contact Eco-Smart, Inc at 888-329-2705 or www.ecosmartinc.com.

Freus Equivalent SEER Entry for Florida Building Energy Codes

The Freus water cooled condensing unit is not rated with a SEER, only an EER. Both ratios are expressed in BTU-hrs of cooling per watt-hr of energy used, but the SEER testing is done at 82 degrees drybulb, 65 degrees wetbulb, where the EER testing is performed at 95 degrees drybulb and 75 degrees wetbulb, a much hotter, more humid outside air condition. EER testing is done on every air conditioning unit rated by ARI to determine its full load cooling capacity.

According to ARI, since the Freus is water cooled it cannot publish a SEER, only an EER. Below is a table of SEER and EER values for the top rated air cooled condensing units and the Freus. The DCA, who oversees the energy code software for the State of Florida, recommends that energy raters use ratios of EER to SEER to calculate the SEER entries into the software, until such time as EER values are allowed as entries.

<u>Brand</u>	<u>Outdoor Model #</u>	<u>Indoor Model #</u>	<u>Cooling Capacity (mBtuh @95)</u>	<u>EER (@95)</u>	<u>SEER (@82)</u>
Freus	10M37	FK4BN006	36.0	16.0	See Note *
Carrier Weathermaker Two Speed	38TDB037300	CK3BA048+58U(H,X)V060-12	35.6	12.15	17.0
Trane XL1800	TTZ036A	TWE040E13	38	12.8	18.0

*** Note:** The Freus clearly performs better at high outside air temperatures than the 17 or 18 SEER air cooled units. Therefore, by ratio, the entry for the Florida Energy Code software for the Freus should be:

(using Trane 18 SEER data)	$18 / 12.8 = \text{Freus} / 16$	$\text{Freus} = (18 / 12.8) * 16 =$	22.50
or (using Carrier 17 SEER data)	$17 / 12.15 = \text{Freus} / 16$	$\text{Freus} = (17 / 12.15) * 16 =$	22.39
Averaged:		Freus =	22.44

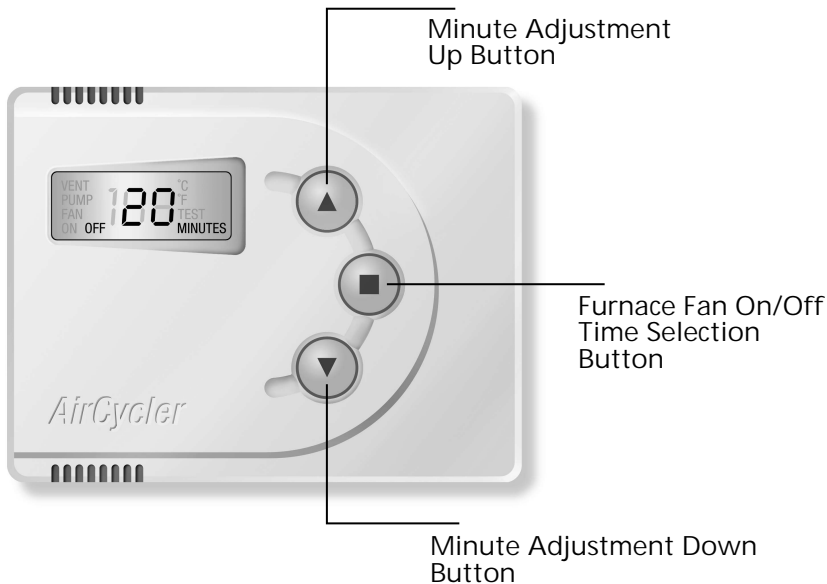
For more information, contact: Eco-\$mart, Inc. 888-329-2705 or ecosmart@comcast.net
 For more information regarding energy codes, contact: Dept.of Commnity Affairs: 904-488-8466

Advanced Controls

AirCycler Model FR

The AirCycler Model "FR"

A low cost device attached to the air handler cabinet and connected to the low-voltage thermostat wiring block inside the air handler. By periodically operating the central heating and cooling system fan, *AirCycler™* improves the effectiveness of the temperature control, humidity and filtration system in a house. Doing so "averages" the air temperature conditions throughout the house, helping to eliminate stagnant and uncomfortable air that a thermostat can't detect. What's "smart" about *AirCycler™* is that it turns the house fan on only after a selected period of time during which the central system fan has not operated.



The AirCycler Model "FR" control will operate the air handler unit fan for a selectable Fan ON time if the fan has been inactive for a selectable Fan OFF time.



AirCycler Applications:

- ▶ Ventilation Systems
- ▶ Enhanced Temperature Control
- ▶ Enhanced Humidity Control
- ▶ Air Cleaning Systems

S P E C I F I C A T I O N S

Operating Voltage: 24 VAC (up to 30 Vac max)

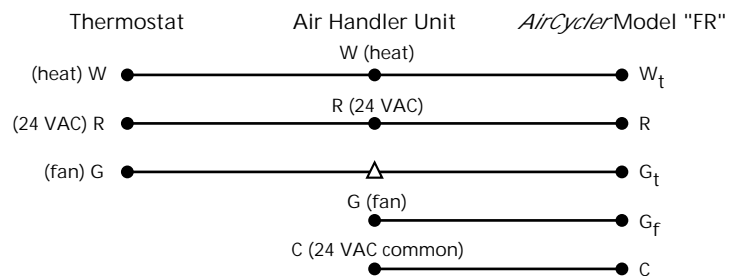
Current draw: 0.07 Amps

FAN ON and *OFF* delay settings "FR" Model:
1 to 199 minutes in 1 minute increments, plus an Unlimited setting for both ON and OFF.

Notes:
The AirCycler *ON/OFF* function enables or disables the fan recycling function, but all thermostat control signals operate normally regardless of the switch position.

All outputs protected by a 3A self-resetting fuse.
Impossible to damage with wiring errors.

Figure 1 Model "FR"
Wiring Diagram (Basic Use)



Notes:

- Wire nut connection
- Δ Screw terminal

DAC100i

Indoor Model (50-150 cfm)



Specifications and Ratings

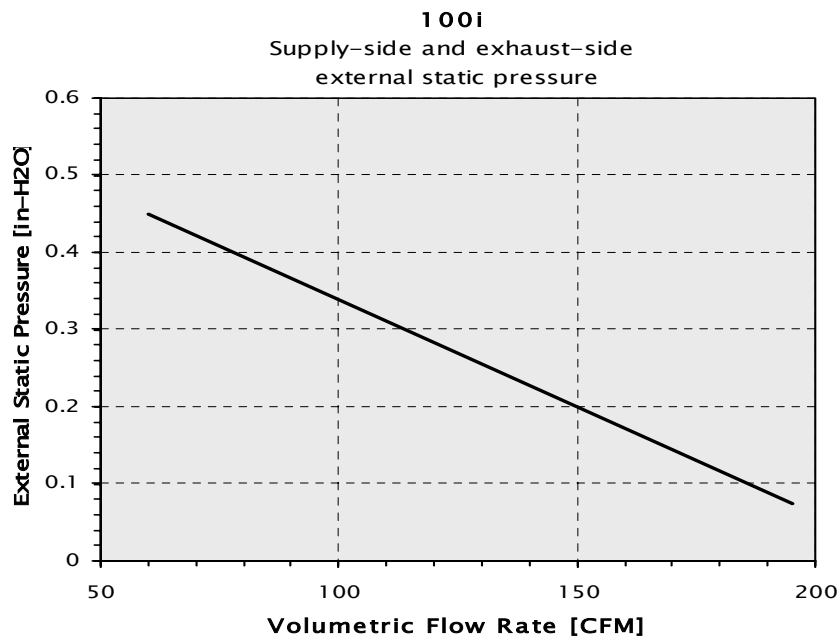
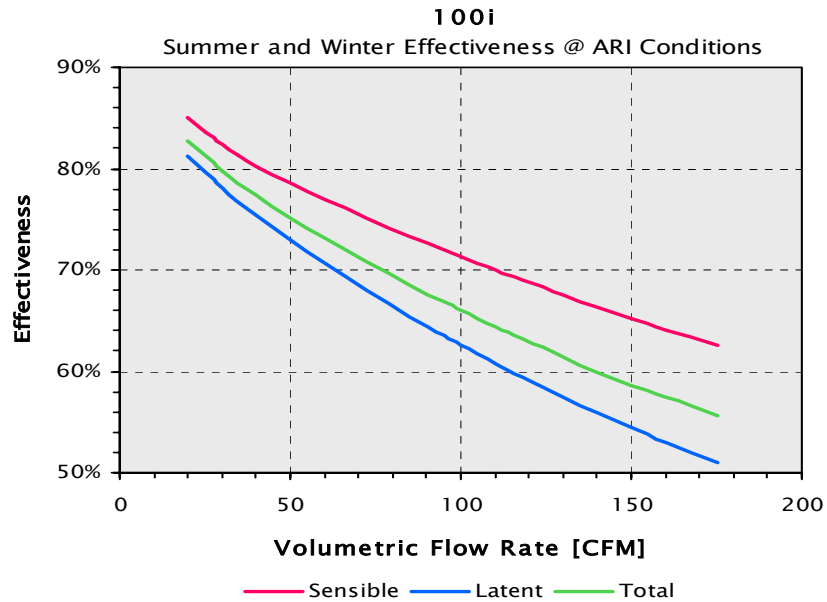
Ventilation Type: Fixed plate, sensible and latent energy transfer
Airflow Range: Typically 50-150 cfm
ERV Cores: Exclusive Dais-Analytic Corp. ConsERV™ Model C100, Quantity 1
Motors and Blowers: Included in unit housing. Each airstream has one centrifugal blower driven by a common PCS motor.
Differential Pressure: Unit capable of withstanding 2" H ₂ O differential pressure between airstreams at normal operation (Unit capable of withstanding 4" H ₂ O differential pressure between airstreams maximum and return to normal operation without damage)
Air Temperature Operation Range: -41 to 140 Deg F
Unit Size*: 14" wide x 31" long x 19" high
Unit Weight*: 65 lbs.
Control Voltage: 12 VAC
Electrical Specifications: Standard designated 120 VAC (60 Hz) electrical outlet with ground
Fan Controls: 5 speed fan control
Wattage: Low speed—80 Watts; High speed—164 Watts
Amp Rating: 1.4 amps
Mounting: Suspended or resting on a platform. Four (4) 10/24 " threaded inserts at corners of cabinet are designed to accept four PVC reinforced polyester straps that are supplied with the unit.
Accessories: Filters: Use on outside airstream and room exhaust airstream Cleanable, washable foam media Quantity - two (2) included with unit Mounting Accessories: Quantity—four (4) PVC reinforced polyester straps included with unit
Maintenance: Filter changes as necessary Vacuum outside and exhaust faces on ConsERV™ core twice per year Access panels allow for visual inspection and maintenance Laminar flow design allows for easy dust removal, no washing necessary
Limited Parts Warranty: 5 years for ConsERV™ core 2 years for unit housing and fans Additional terms, conditions and exclusions apply, refer to full warranty document for details
Safety: ConsERV™ core complies with UL94 HB and 5V flame spread

* All sizes and dimensions are approximate

DAC100i cont.



Airflow Performance

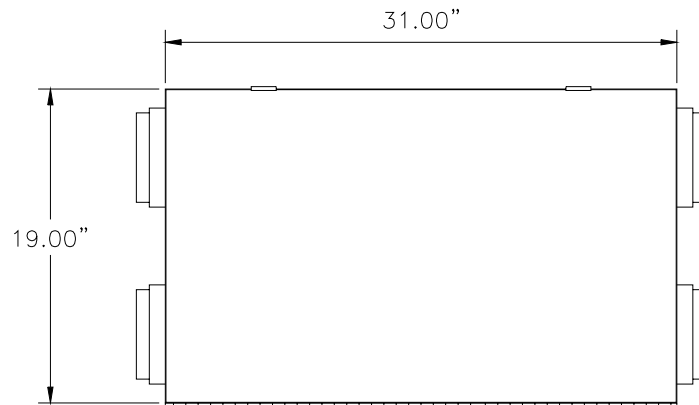


1. Unit pressure drop performance includes allowance for filters.
2. Unit pressure drop performance numbers are shown for the circumstance where outside air and exhaust air streams are equal (per ARI Standard 1060 measurement protocol).
3. Static pressure drop curve represents both airstreams.
4. Unit pressure drop curves shown refer to models supplied without internal or in-line fans.
Refer to In-Line Fan Options and Internal Fan Accessories for external static pressure of units supplied with fans.

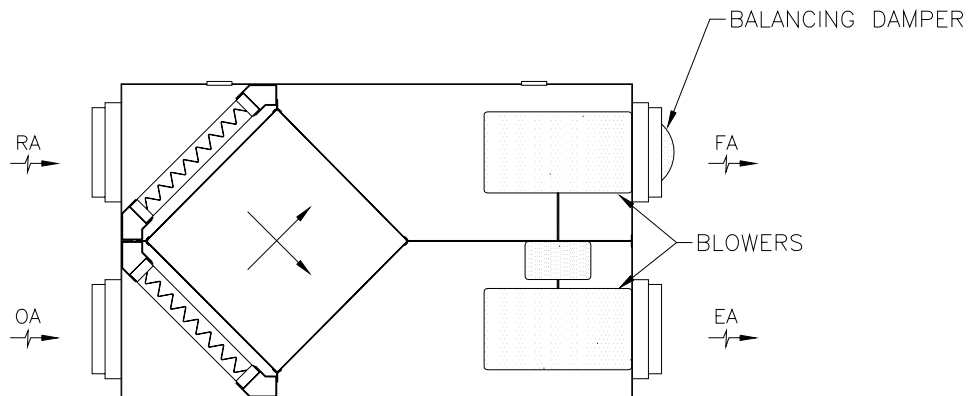
DAC100i cont.



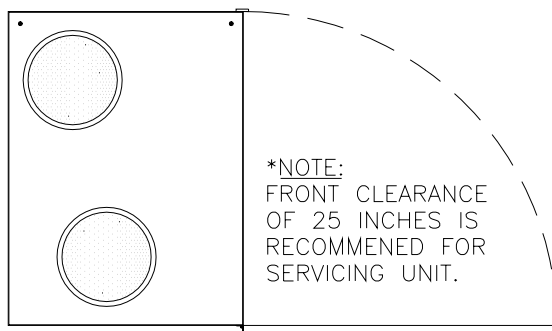
Dimensions



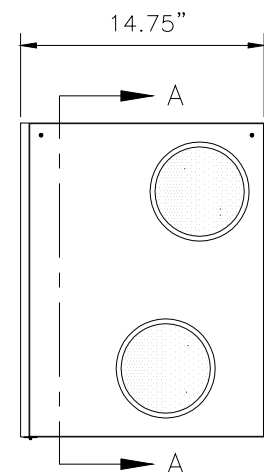
FRONT VIEW



SECTION A-A



LEFT SIDE VIEW



RIGHT SIDE VIEW



Introduce clean fresh air into your home for a healthier indoor lifestyle.

Reduce effects of harmful contaminants like:

- Molds and Fungi
- Pollen
- Dust
- Household Chemical Odors
- Tobacco Smoke
- Carbon Dioxide
- Radon
- Pet Dander
- Cooking Odors
- Dust Mites



Why ConsERV™ Energy Recovery Ventilator (ERV) ?

www.ConsERV.com

ConsERV™ improves the quality of the air inside your home by providing more outside to inside air exchanges, while cooling and drying the incoming air.

Benefits to Homeowner

The need for whole-house ventilation is necessary now more than ever to the homeowner.

The ConsERV™ benefits are:

- Moisture control
- Manage moisture to control mold and mildew
- Reduction of odors from bathrooms, kitchens, pets and tobacco smoke
- Removal of harmful indoor pollutants
- Convenience

ConsERV™ customers:

- Enjoy fresher air - better air quality
- Experience a healthier indoor air environment economically
- Control indoor air humidity problems
- Benefit from low maintenance

ConsERV™ units:

- Exhaust pollutants and surplus moisture to the outside of the home
- Cool and dehumidify incoming air during hot, muggy weather
- Efficiently recover heat from the exhaust stream during cold weather
- Are quiet and compact
- May be installed in a garage, basement (or crawlspace), mechanical closet or attic



Summer example above - the opposite occurs in winter

- A = Cool stale air from house
- B = Warm fresh air from outside
- C = Fresh cool air to house or A/C unit
- D = Stale warm air to outdoors

Pre-Conditioned Effect of ConsERV™

Effectiveness	Other Fixed Plate	ConsERV™
Temperature (summer)	70%	70%
Humidity or Moisture (summer)	25%	70%
Temperature (winter)	75%	75%
Humidity or Moisture (winter)	28%	75%

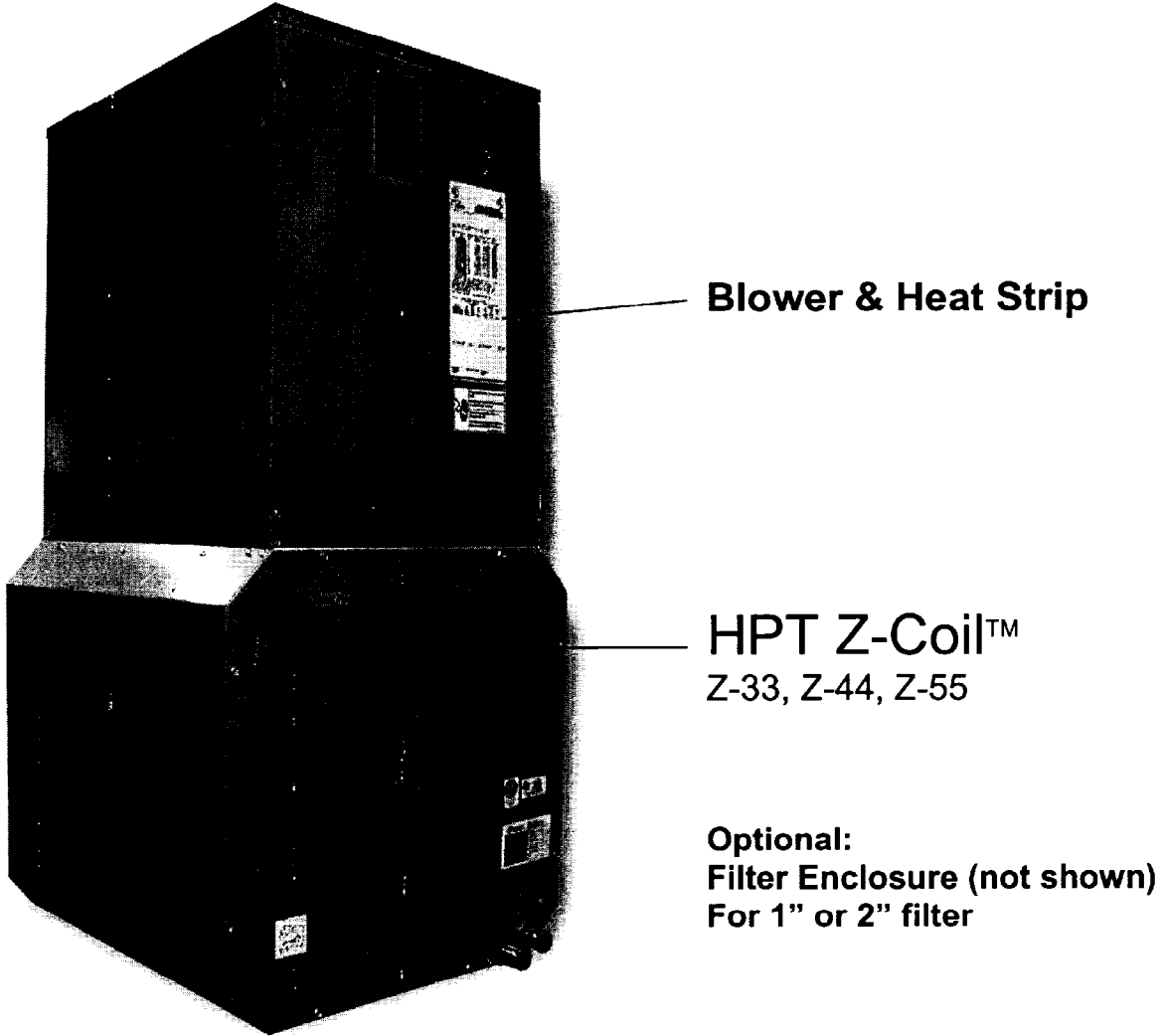
Contact

Please contact the representative listed below for more information.

AHR™

Small Systems

Modular Air Handler



Specifically Designed for Humidity Control

INDOOR ENVIRONMENTAL CONTROL

HPT AHR™ Modular Air Handler

The HPT AHR™ cooling/dehumidification system includes the following components:

- Blower Module Available in three models ranging from 845 to 2000 cfm
- Blower Motor B-12 -- 1/2 HP
C-16 -- 1/2 HP
D-20 -- 3/4 HP
- Heat Pipe Technology Dehumidifier Z-Coil™ Three models from 2 ton through 5 ton

The Blower Modules are sized to deliver design air quantity both efficiently and quietly. The direct drive, three-speed blower motors provide a selection of air quantities to match any application. All models include a one minute blower off relay as standard to enhance system efficiency ratings. The durable, prepainted steel protects the unit against rust and corrosion. All models have 1/2" fiberglass insulation.

Electric Heaters

Heat strips are available in both single and three-phase models. All heaters include nickel-cromium elements with a five-year limited warranty on one-phase elements and one-year limited warranty on three-phase elements. Sequencers are provided to control heaters in all models. Circuit breakers are used in 208/230 volt single phase units of 13 kW and larger. Models equipped with circuit breakers may be altered in the field to use multi-source power supply. Over-temperature limit switches provide protection from air flow loss.

These units must be wired and installed in accordance with all national and local safety codes. Voltage limits are as follows:

Blower Voltage	Normal Operating Voltage Range
115-1-60	104-128
208/230-1-60 (06)	187-253
460-3-60 (46)	414-506

Heat strips are shipped separately and field installed.

The HPT Dehumidifier Z-Coil™ is a cased evaporator coil with passive Precool and Reheat Heat Pipes to greatly enhance the latent capability of the system. The Z-Coil™ has a built in expansion valve, and a stainless steel drain pan with dual drains. The Z-Coil™ has 1" duct flanges, top and bottom, for ease of connection to ductboard or metal duct.

Refer to the Z-Coil™ Specifications and Installation and Operations Manual for additional features and benefits.

Installation, operation and maintenance instructions and assembly instructions are included with each AHR™ Modular Air Handler.

A system check sheet is included in each Installation, Operations manual. This check sheet is required to be completed with each installation. Proper start-up and check-out of each system will ensure maximum performance at minimal operational cost to the owner.

Assembly Instructions for HPT AHR™ Modular Air Handler

1. Check all components for hidden damage.
2. Report any damage to the trucking company within 24 hours.
3. Start assembly using foam insulating tape on all connecting flanges to prevent air leakage.
4. Install the filter enclosure with the duct flange down into platform or duct.
5. Insert the bottom flange on the Z-Coil™ into the top of the filter enclosure.
6. Mount the blower over the flange on the Z-Coil™ .
7. Install heat strips in blower and connect wiring per instruction.
8. Wire to the single point connection per code and the instructions in the blower assembly.
9. Charge the system per the ac unit manufacturer's recommendations.
10. Complete the enclosed check sheet on the Z-Coil™ performance as required for warranty.
11. Return the enclosed warranty registration form to Heat Pipe Technology, Inc., 4340 NE 49th Avenue, Gainesville, Florida 32609.

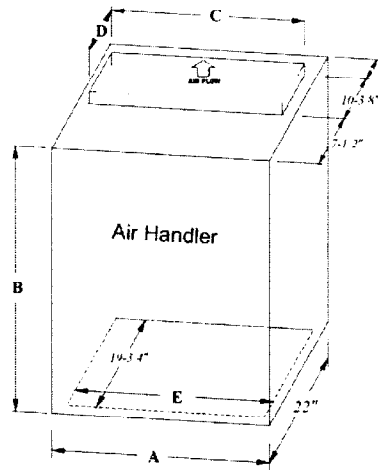
Notes:

In the process of assembly it is best to attach each component to the other with screws. If the installation is horizontal, make sure airflow is from left to right facing the access panel. Follow the instructions included with the Z-Coil™ for installation and charging.

AHR-33 Modular Air Handler

DIMENSIONS

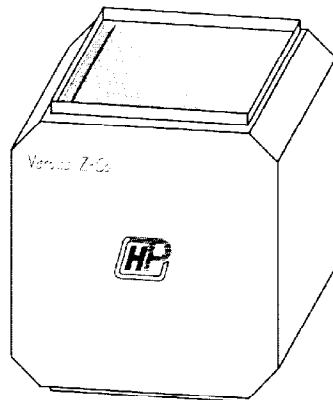
Blower



Air Handler Model N1AHB12

A – Overall Width (in)	17 1/2
B – Overall Height (in)	24 1/4
C – Duct Flange Width (in)	16 1/2
D – Duct Flange Depth (in)	10 3/8
E – Bottom Width Opening (in)	16 1/2

Z-Coil



FAN MODULE

Heat Strip Options:

1 phase @208/230 V	5 kW
	7.5 kW
	10 kW
3 phase @208/230 V	15 kW
	10 kW
	15 kW
	18 kW

Blower Drives:

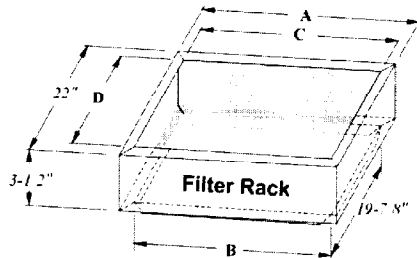
Available 920 cfm to 1120 cfm @ 0.50 ESP
3 speed, 1/2 HP, 1075 RDM

Filter Enclosure:

Designed for 1" or 2"

All components can be purchased separately or in any combination.

Filter Box

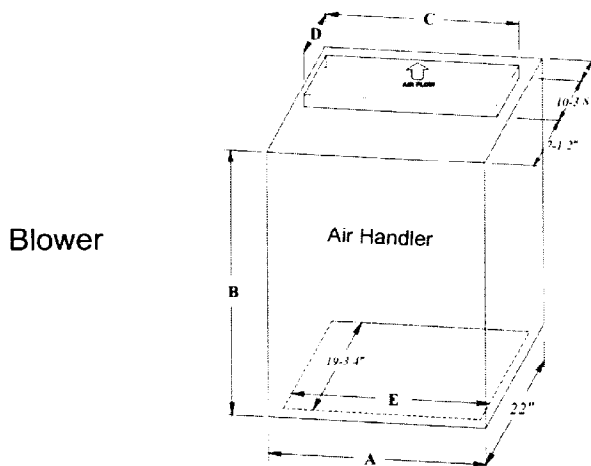


Filter Rack Model 1FR0617

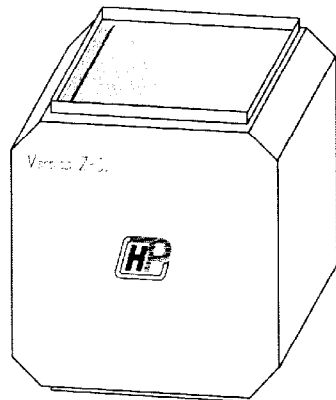
A – Overall Width (in)	17 1/2
B – Duct Flange Width (in)	16 3/8
C – Upper Opening Width (in)	15 1/2
D – Upper Opening Depth (in)	21

AHR-44 Modular Air Handler

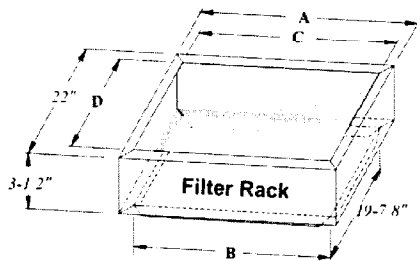
DIMENSIONS



Blower



Z-Coil



Filter

Air Handler Model N1AHC16

A – Overall Width (in)	21
B – Overall Height (in)	24 1/4
C – Duct Flange Width (in)	20
D – Duct Flange Depth (in)	10 3/8
E – Bottom Width Opening (in)	20

FAN MODULE

Heat Strip Options:

1 phase @208/230 V	5 kW
	7.5 kW
	10 kW
3 phase @208/230 V	15 kW
	10 kW
	15 kW
	18 kW

Blower Drives:

Available 1270 cfm to 1525 cfm @ 0.50 ESP
3 speed, 1/2 HP, 1085 RPM

Filter Enclosure:

Designed for 1" or 2"

All components can be purchased separately or in any combination.

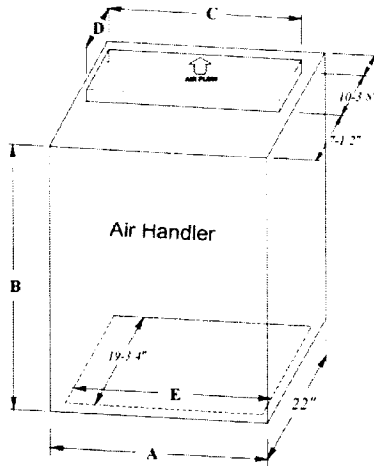
Filter Rack Model 1FR0621

A – Overall Width (in)	21
B – Duct Flange Width (in)	19 7/8
C – Upper Opening Width (in)	19
D – Upper Opening Depth (in)	21

AHR-55 Modular Air Handler

DIMENSIONS

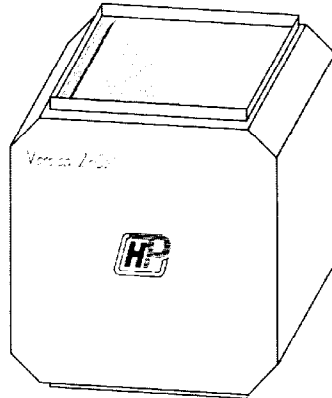
Blower



Air Handler Model N1AHD20

A – Overall Width (in)	24 1/2
B – Overall Height (in)	24 1/4
C – Duct Flange Width (in)	22 1/2
D – Duct Flange Depth (in)	10 3/8
E – Bottom Width Opening (in)	23 1/2

Z-Coil



FAN MODULE

Heat Strip Options:

1 phase @208/230 V	5 kW
	7.5 kW
	10 kW
	15 kW
3 phase @208/230 V	10 kW
	15 kW
	18 kW

Blower Drives:

Available 1505 cfm to 2000 cfm @ 0.50 ESP
3 speed, 3/4 HP, 1100 RPM

Adapter:

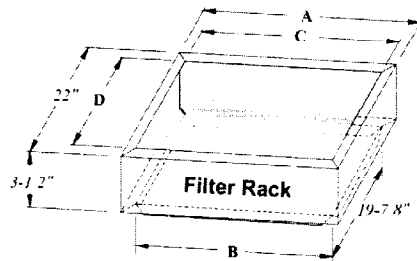
24 ga. Galvanized steel and insulated

Filter Enclosure:

Designed for 1" or 2"

All components can be purchased separately or in any combination.

Filter



Filter Rack Model 1FR-624

A – Overall Width (in)	24 1/2
B – Duct Flange Width (in)	23 3/8
C – Upper Opening Width (in)	22 1/2
D – Upper Opening Depth (in)	21



The Freus – An Overview

The Freus utilizes a unique, but proven approach to refrigerated air conditioning condensers. The patented system uses water to cool and condense the refrigerant, enabling the Freus to provide more consistent, quieter cooling performance, often at only half the energy costs of conventional “air-cooled” condensing units. Condensing temperatures achieved by the Freus can be over 20 degrees cooler than conventional equipment, reducing compressor power usage, and extending the life of mechanical components within the Freus. The Freus uses reliable, time-tested Copeland Scroll compressors and a simple, durable design to provide unsurpassed efficiency and long life. The Freus can be used in conjunction with most major manufacturers’ air handling equipment, in retrofit or in new construction.

Frequently Asked Questions

1. How Does the Freus System Work?

The Freus uses water instead of air to cool the refrigerant to a condensing temperature of around 90 degrees. An equal volume of water absorbs 3,500 times more heat than air. The water is then run through a PVC cooling tower inside the unit where moving air returns the water to the ideal condensing temperature. This low condensing temperature allows a smaller compressor to provide more cooling at half the pressures of air-cooled units. Looking at any manufacturer’s compressor chart, you will quickly see that all condensers are more efficient at lower condensing temperatures.

2. Why should a homeowner install a Freus?

The Freus is the most energy efficient unitary air conditioner on the market, reducing air conditioning costs by 40 to 60 percent versus standard equipment, saving hundreds of dollars a year. The Freus is also designed for low maintenance, with a fiberglass cabinet, triple thickness coils protected from salt air, and high pressures in the compressor only half the level of an air-cooled unit. Unlike other high efficiency condensing units, Freus has no expensive electronics on board to corrode, short or get surged by lightning. All these features mean longer life with lower maintenance. In addition, the steady efficiency performance of the Freus at high and low outdoor temperatures creates more even cycle times, providing for better household dehumidification in humid climates.

3. How easy is the Freus to install?

The Freus is installed in much the same manner as an air-cooled condenser, on a ground pad or as a roof-mounted unit. The compressor comes pre-charged with enough R-22 for a 15-foot run. The only difference in installation is the requirement to connect the ¼” water make up line to a water supply (connecting hose and splitter for hose bib provided for retrofit).

4. What about price?

The average Freus will cost about the same as a conventional 14 SEER unit. Due to the steady capacity, the condenser can be sized flat, not sized larger for hot climates like air-cooled units often are. This savings in tonnage can offset some of the cost difference between the Freus and air-cooled condensers. The Freus has the unique ability to service multiple air handlers from one condensing unit. The cooling tower section provides up to 10 Tons of cooling, so two or three compressors up to 10 total

Tons can be housed in one cabinet. Now homes or offices requiring several units can share a single condensing unit, reducing equipment costs, and requiring maintenance of fewer units. The Freus will typically qualify for the highest utility rebates, as well, further reducing initial costs.

5. How do I determine condenser size when using a Freus?

Freus sizing is somewhat more forgiving than with air-cooled units, as they do not diminish in cooling performance as outdoor temperatures rise nearly as much as air-cooled units (4% versus up to 25%). However, as with any HVAC system, sizing the Freus system should be done based on the Btu/h of cooling needed at design conditions. Refer to Freus capacity tables and compare them to air-cooled unit capacity tables to make comparisons for your local area.

6. My City Code says I can only use an Evaporative Cooler that is a “Water Conservation Device”. Does the Freus Qualify?

Yes. The Freus is technically not an “Evaporative Cooler”; it is a water-cooled condensing device. Many restrictive codes, (i.e. Fresno CA Section 14-201) limit the water consumption to a maximum of 9 gallons per full load hour per ton of capacity. The Freus uses a maximum of 1 gallon per full load hour per ton of capacity. This water use amount will drop by half, or more, if the condensate water is directed back into the unit, a procedure that is highly recommended (this makes the Freus even more efficient as the condensate water cools the Freus sump). One should also consider that the amount of water used to generate power at the power plant is reduced by much more than the Freus could ever use in performing its work. Therefore, the Freus qualifies as a “Water Conservation Device”.

7. The Freus uses water to cool the condenser, so what about the cost of water?

Generally speaking, Freus water cost is approximately \$20 per year per 1000 annual run hours.

8. Where does the water run off go?

To keep the system clean of mineral deposits, the Freus periodically bleeds off water, which is replaced via a simple float activated valve. This can be run into the garden near the home, into a French drain, or suitable drain as may be required by local codes.

9. How does the Freus perform in a hot and humid environment?

EER refers to the BTU's of cooling per unit of electricity a system provides, tested at 95 degrees outside air temperature with a 75 degree wet bulb temperature (higher wet bulb is more humid). SEER is the same test, performed at 82 degrees with a 65 degree wet bulb (less humid). Compare the 15-16 EER of the Freus to the 12-13 EER for air-cooled 18 SEER equipment. Freus is up to 25 percent more efficient than the 18 SEER air-cooled units at those higher temperatures and humidity. This is due to the fact that the water temperature in the Freus stays relatively constant throughout the year, and low condensing temperature is the key to low energy use. The widespread use of commercial cooling towers in Florida demonstrates their practicality.

10. Why is the exhaust from the Freus so much cooler than the exhaust from my old air conditioner condenser?

First, one must understand that the exhaust air from the Freus is only being drawn across water, not across a hot condenser coil. When the air moves across the water, heat is drawn out of the air via evaporation and moisture is added to the air, which will actually lower the air temperature as it crosses the evaporative media. For this reason, the air temperature coming out of a Freus is up to 20 degrees cooler than the outside air, as compared to exhaust air from air-cooled units which can be 30 degrees warmer than the outside air. These cooler temperatures will increase the compressor life, the fan motor, and the overall life of the Freus.

11. What is the difference between SEER and EER?

Freus units are rated under ARI standard 210/240-94 along with residential air conditioners. Section 5 of ARI Standard 210/240 specifies that only air units less than 65,000 Btu/h are rated with an SEER rating (which is tested at 82 deg. db/65 deg. wb ambient) and all other units are rated with an EER rating (which is tested at 95 deg. db/75 deg. wb ambient). Both ratings are performed with an indoor condition of 80 deg. db/67 deg. wb, and so the SEER rating performed at a lower ambient condition has a much higher efficiency number.

Ask yourself – Which testing condition is more like the condition that exists where you live – EER at 95F or SEER at 82F.

ARI has prohibited us from publishing an equivalent SEER at 82F, but they have allowed us to make application rating comparisons. Following is a comparison of a Freus, a Carrier, and a Trane unit, tested under the same conditions, so you can draw your own efficiency conclusions.

Brand	Outdoor Model #	Indoor Model #	SEER @ 82	Mbtub @ 95 Capacity	EER @ 95
Freus	10M37	CD5BXA060	N/A	35.6	16.1
Carrier Weathermaker Two Speed	38TDB037300	CK3BA048+58U(H, X)V060-12	17	35.6	12.15
Trane XL1800	TTZ036A	TWE040E13	18	38	12.8

12. What about freezing temperatures? Will the customer have to do anything to protect the unit?

A flush and fill kit with freeze protection is available, as an option. This kit automatically drains the water at low temperatures, and prevents water from coming into the unit. The customer can winterize by shutting off the water supply and draining the unit, which takes about 5 minutes and no tools.

13. What compressor do you use and why?

Freus units have Copeland Scroll Compressors. These are installed because they are quiet, efficient, and reliable. Copeland Scroll Compressors are widely regarded as the premier compressors on the market today.

14. Since the Freus is water-cooled, how are Algae, Bacteria, and Legionnaires' disease concerns addressed?

The primary point of prevention of water-borne disease is the municipal water treatment plant. Most public water supplies are treated with chlorine to control microbiological contaminants and checked regularly by public health officials. After decades of research there has never been a single case of water borne disease linked to an evaporative cooler or residential water-cooled evaporative condenser like a Freus unit.

Freus engineers have taken care to design the Freus to inhibit the amplification of microorganisms. Some of the main design features for these purposes are:

1. The Freus unit is a split system air conditioning condenser, connected to an indoor section where the water is completely separate from the indoor components, keeping the water and humidity outdoors.
2. The sump temperature is kept lower than commercial evaporative condensers to make bacterial growth more dormant.
3. The Freus sump is shaded to prevent growth of algae.
4. The evaporative media is designed to drain water down into the sump, dry out, and thereby kill aqueous bacteria in the media.
5. The sump water is exchanged periodically by a bleed off system. This purges the sump, brings in municipally treated water, and prevents microbiological concentration.
6. Freus recommends the unit be cleaned during annual servicing.

For these reasons, Freus does not recommend any chemical treatment beyond what the public water authorities perform.

15. How do you make water and electricity in the same environment safe?

Freus housing is fiberglass. Electrical elements are isolated. All Freus designs meet or exceed UL requirements.

16. Do mineral deposits accumulate on the condenser copper tubing? What about corrosion?

Yes, minerals are left behind as water evaporates and they do get on the condenser coil, however, they do not accumulate to great enough thickness to measurably reduce the performance of the Freus. The Freus has been designed to minimize these deposits and avoid corrosion problems with the following features:

1. Freus units purge the sump water periodically to prevent heavy concentrations of minerals from accumulating.
2. The copper condenser coil has a .032 wall thickness which is far thicker than the common .012 copper wall thickness used on air cooled condensers, reducing the chance of corrosion damaging the piping.
3. The Freus copper condenser coil is continually washed with fresh water during operation, reducing contact with air, greatly slowing the corrosion process. The entire coil is also coated with an electrostatically applied commercial coil coating to give added corrosion resistance.
4. The intertwined helical copper condenser coil naturally expands and contracts with temperature changes at a different rate than mineral deposits do. As a natural consequence, as minerals eventually build up on the coil (to a slight thickness) this expansion and contraction process tends to break loose the minerals and shed them off.
5. The Freus is shipped with a sacrificial anode to prevent water scaling and corrosion, similar to most water heaters on the market.
6. Freus recommends annual servicing to clean the Freus unit. This includes spraying out the sump/coil with a water hose to clean out mineral deposits.

For these reasons Freus provides a limited 10 year warranty on the copper condenser coil as part of its standard limited warranty.

17. What is the background of the manufacturer of the Freus?

Management of the manufacturer has been involved in the development, sales and servicing of water-cooled air conditioners for over 25 years. The Freus is the manufacturer's latest model, integrating many advancements developed during years of experience with water-cooled, self-contained condensing units.

Distributed By:



888-329-2705

FREUS, Inc.
8240 Donithan Drive
Vinton, TX 79821



WARRANTY INFORMATION

Cabinet—15 year limited warranty. If within 15 years, (starting no more than one year after date of manufacture), any fiberglass cabinet part should prove defective and non-serviceable in materials or workmanship, return the defective part, freight prepaid, to your Freus dealer for replacement or repair at factory option. The part will then be shipped at factory expense to sender.

Condensing Coil Copeland Scroll Compressor—10 year limited warranty. If within 10 years, (starting nor more than one year after date of manufacture), the Copeland Scroll Compressor or the copper condensing coil used in the Freus should prove defective and non-serviceable in materials or workmanship, return the defective part, freight prepaid, to your Freus dealer for replacement. The part will then be shipped at factory expense to sender.

All other parts-5 year limited warranty All other parts are covered by a 5 year warranty. If any part not covered by a 10 or 15 year warranty fail during the first 5 years of use (starting not more than one year after date of manufacture), return the defective part, freight prepaid, to your Freus dealer for replacement or repair at factory option. The part will then be shipped at factory expense to sender.

Freus provides a labor allowance for repairs for the first year. Any additional service or installation is between dealer and purchaser and not the responsibility of Freus. Freus does not pay the cost of the service call at the site of installation to diagnose the cause of trouble, the cost of labor to install the part or remove it (beyond the labor warranty period), or mileage to and from the installation site.

This warranty is in lieu of any other expressed or implied warranty and all other obligations on the part of Freus. Freus does not authorize any other person to extend or alter any portion of this warranty.

This warranty gives purchaser specific legal rights. In addition, purchaser may have other rights that vary from State to State.

REGISTRATION CARD

Date of Purchase

Place of Purchase

Freus Model number

Freus Serial Number

Name

Address

City

State

Zip Code

Mail Registration Card to:

Freus Inc.
Attn: Warranty Registration
8240 Donithan Drive
Vinton, TX 79821
915-886-9050



Buying an Air Conditioner? Remember the EER!

When buying a new home cooling system, be sure to get the whole story on its energy efficiency. Central air conditioners and heat pumps are rated by the Seasonal Energy Efficiency Ratio (SEER). But SEER tells only part of the energy story. Another rating, the EER or Energy Efficiency Ratio, is also important in selecting the best system. They probably sound similar but they are different.

Why two efficiency ratings? Just as your car's gas mileage is rated for city and highway driving conditions, SEER measures cooling system efficiency at low temperature (82°F) while EER is a high temperature (95°F) performance rating.

*So what should you do? Ask for an air conditioner with **both** a high SEER (13 or greater) and a high EER (11 or greater). This assures you of high efficiency at the full range of California summer temperatures.*

It's easier with room air conditioners: They are tested only for EER, so just look for a high number.

Some air conditioners and heat pumps are more energy-efficient than others when running on a very hot day. Others may be superior in moderately warm temperatures. But since your air conditioning system faces both cooling conditions, it needs to be efficient in both seasonal and peak day operations.

Two different efficiency ratings provide the information you need to choose the best unit. These are the Seasonal Energy Efficiency Ratio (SEER) and the Energy Efficiency Ratio (EER). When buying a new cooling system, it is important to consider its energy efficiency under different operating conditions.

WHAT DO THESE RATINGS TELL YOU?

The SEER measures a cooling system's average efficiency throughout the whole cooling season. This number is based on a national "standard" cooling load and climate. Testing for SEER is conducted at an outdoor temperature of 82°F. Since approximately one third of California's annual cooling requirement occurs when temperatures are over 95°F, air conditioning performance at high temperatures is very important. The EER provides a measure of cooling system performance at 95°F. The math behind it is really quite simple—peak cooling capacity in Btu/hour divided by power input in watts. A higher EER, means you're getting more cooling output for every unit of power input. You may forget the math but make sure that your new air conditioner or heat pump has both a high SEER and high EER.

CHECKING THE RATINGS

The SEER is shown right on the system's yellow Energy Guide Label and in its published specifications. To find the EER, however, you will need to ask your contractor who can obtain comprehensive equipment specifications, including EER, from the distributor or manufacturer. Your contractor should know the EER of the equipment he is proposing to install because it's important. Particularly if you live in a hot climate, a system with a good SEER but a low EER probably won't deliver the energy savings and cost savings you're counting on.

FINDING A BALANCE OF SEER AND EER

New equipment choices have many combinations of SEER and EER ratings. A high SEER rating does not necessarily mean the system will also have a high EER, or vice versa. For example, as shown in the table below, two air conditioners with the **same SEER** have quite **different EER** ratings. Due to System B's higher EER,

Performance Ratings for Two SEER 14 Central Conditioners*

	SYSTEM A	SYSTEM B
SEER	14	14
EER	10.52	11.37
Cooling Capacity	36,000 Btus	37,800 Btus
Power Consumption	3,420 watts	3,320 watts

* Data from PG&E report, *Evaluation of Four High-Efficiency Residential Split System Air Conditioners*, August 2000, p. 2.

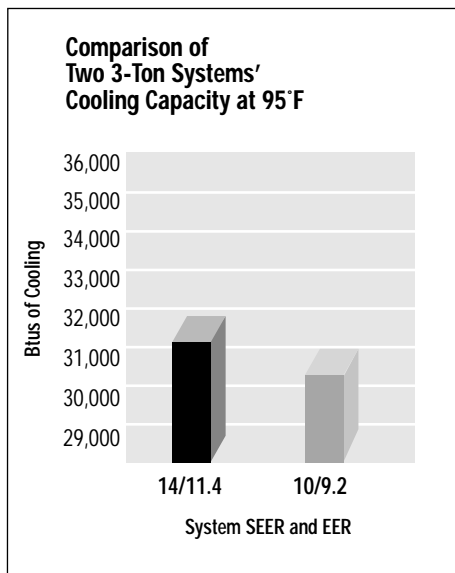
it delivers more cooling and has lower power consumption. In other words, you get more cooling for less money.

You may notice that the EER is always smaller than the SEER. This is because it's measured under tougher conditions. Again, the objective is to find a good combination of relatively high SEER and EER.

HOW HIGH SHOULD THE RATINGS BE?

Federal law sets minimum SEER ratings. For central air conditioners and/or heat pumps, the minimum SEER is 10. Far more efficient systems are available, with SEERs reaching 18 or greater. An EER of 14 is close to the upper limit of current technology. It's usually best to look for a SEER of at least 13 and an EER no less than 11. It should be higher on both measures if you live in a hot climate.

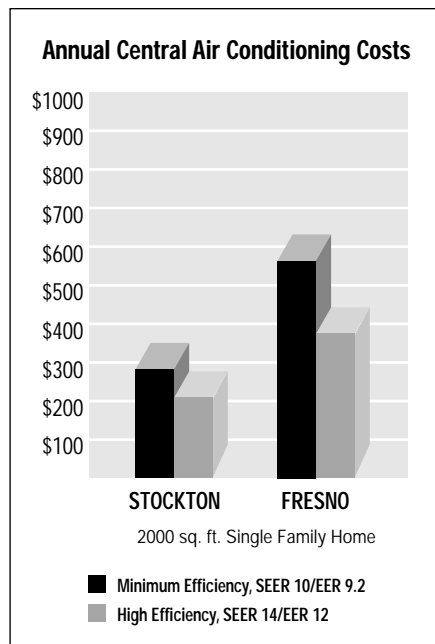
When you select a high EER system you receive more than energy savings, you also get more cooling when you need it most. The graph below compares the cooling capacity of two three-ton systems at 95°F. The graph shows the Btu's per hour of cooling delivered by an EER 9.2 system and a higher efficiency EER 11.4 system. The higher efficiency system (SEER



14/11.4 EER) provides 18% more cooling when the outdoor temperature is 95°F than the lower EER (SEER 10/EER 9.2) system.

IS A HIGHER EFFICIENCY SYSTEM WORTH ITS EXTRA COST?

In general, more energy-efficient systems have higher price tags. However, lower electricity bills may amply repay this extra initial investment. The tradeoff between energy cost savings and this higher purchase price depends on a lot of factors, such as how often you're home, where you live, the size and age of your house, and how its windows and walls absorb heat, etc. For example, the following graph compares the annual estimated cooling costs for different SEER and EER systems cooling 2,000 square foot homes in Stockton and Fresno that are ten years old.



This Technical Sheet is provided for your general information and is not intended as a recommendation or endorsement of any particular product or company. Funding for this Technical Sheet is provided by California utility customers and administered by Pacific Gas and Electric Company, under the auspices of the California Public Utilities Commission.

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WHAT ABOUT ROOM AIR CONDITIONERS?

Unlike central systems, room air conditioners are labeled with EER ratings only. The Federal minimum efficiency varies by cooling capacity. Remember, the higher the EER on the Yellow Energy Guide Label, the more efficient the air conditioner.

FINDING OTHER IMPORTANT AIR CONDITIONING TIPS

- Be sure your contractor calculates your home's cooling needs and selects the most appropriate equipment size. An oversized air conditioner or heat pump uses more energy for the same cooling, and may make more noise, wear out sooner, and produce annoying drafts due to turning on and off too frequently—so you lose all around.
- Have your ducts tested for leaks, and sealed if necessary. Leaky ducts can waste more energy than your new air conditioner saves...and can cause other serious problems too.
- Hire only licensed air conditioning contractors who understand the importance of SEER and EER ratings and can help you make the best choices to meet your needs for comfort and economy.

For more energy efficiency information, call the Smarter Energy Line at 1-800-933-9555, or visit www.pge.com.

RELATED FACT SHEETS AVAILABLE TO YOU FROM PACIFIC GAS AND ELECTRIC COMPANY

- Home Cooling
- Home Heating
- Heat Pump
- Why is Duct Testing Important?
- What is HVAC System Sizing?
- A Whole-System Approach to Heating and Cooling

RESIDENTIAL HVAC							
CENTRAL STRAIGHT COOL & HEAT PUMPS - WATER SOURCE							
INCENTIVE PER PARTICIPANT							
COOLING CAPACITY BTUH	FROM	TO	EER	EER	EER	EER	
			11.5	12.0	13.0	14.0	15.0
			11.9	12.9	13.9	14.9	
			>15				
9000	14999		\$75	\$105	\$135	\$160	\$180
15000	20999		\$115	\$160	\$200	\$240	\$270
21000	26999		\$155	\$210	\$265	\$315	\$360
27000	32999		\$195	\$265	\$335	\$400	\$450
33000	38999		\$230	\$320	\$400	\$475	\$535
39000	44999		\$270	\$370	\$465	\$555	\$625
45000	50999		\$310	\$425	\$535	\$635	\$715
51000	56999		\$350	\$475	\$600	\$715	\$805
57000	65000		\$395	\$540	\$675	\$795	\$910
	>65000		\$185	\$315	\$455	\$585	\$685

- NOTES: 1) WATER SOURCE EQUIPMENT MUST BE CERTIFIED TO ARI STANDARD 320-93 AT 85 DEGREES F (WSHP).
- 2) GROUND WATER SOURCE EQUIPMENT MUST BE CERTIFIED TO ARI STANDARD 325-93 AT 70 DEGREES F (OR GREATER TEMP). WELL WATER ONLY.
- 3) GROUND WATER SOURCE CLOSED LOOP EQUIPMENT MUST BE CERTIFIED TO ARI STANDARD 330-93 AT 77 DEGREES F (OR GREATER TEMP).
- 4) USE THIS TABLE FOR SYSTEMS USING COOLING TOWERS LAKES & WATERWAYS.