

CERTIFIED

PRODUCT DIRECTORY

AHRI CERTIFIED™
www.ahridirectory.org

Direct Geoexchange HP
AHRI Standard 870

Direct Geo Exchange: 870

2009 Edition
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AHRI Air-Conditioning,
Heating, and
Refrigeration Institute

This directory and the directories listed below, are mailed regularly and free on a limited basis upon written request on business letterhead to AHRI from an individual or company in the air conditioning or allied industries. A directory will be sent automatically whenever a new printed edition is issued, unless AHRI is requested to stop sending them, or the Post Office Department advises that the new address is no longer deliverable.

The latest issue of the directory may be downloaded, at no charge, from www.ahridirectory.org.

For all other requests, price per copy is \$2.00.

Other certified products are published in AHRI directories and on the AHRI website as follows:

1. Directory of Certified
 - Unitary Small Air-Conditioners
 - Unitary Small Air-Source Heat Pumps
2. Directory of Certified Applied Air Conditioning Products
 - Air-to-Air Energy Recovery Ventilators
 - Air-Cooled Chilling Packages
 - Central Station Air-Handling Units
 - Forced Circulation Air-Cooling and Air-Heating Coils
 - Liquid to Liquid Heat Exchangers
 - Non-Condensable Gas Purge Equipment
 - Packaged Terminal Air Conditioners
 - Packaged Terminal Heat Pumps
 - Room Fan-Coil Air Conditioners
 - Single Package Vertical Systems
 - Unitary Large Equipment
 - Unit Ventilators
 - Variable Air Volume Terminals
 - Water-to-Air and Brine-to-Air Heat Pumps
 - Water Cooled Chilling Packages
3. Directory of Automatic Commercial Ice-Cube Machines and Ice Storage Bins
4. Directory of Certified Commercial Refrigerated Display Merchandisers and Storage Cabinets
5. Directory of Certified Direct Geoexchange Heat Pumps
6. Directory of Certified Refrigerant Recovery/Recycling Equipment
7. Directory of Certified Reclaimed Refrigerants
8. Directory of Certified Refrigerant Testing Laboratories
9. Directory of Certified Transport Refrigeration Units

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NOTICE

This Program is sponsored and administered by the Air-Conditioning, Heating, and Refrigeration Institute (AHRI).

At any time there may be some participants added or removed from the Program; also some models may be added, deleted or revised. The latest issue of the directory may be downloaded, at no charge, from www.ahridirectory.org. In the event of any question regarding the listing of any model or participant, communicate directly with

Air-Conditioning, Heating, and Refrigeration Institute
2111 Wilson Boulevard, Suite 500
Arlington, VA 22201
Phone: 703-524-8800

To the User of This Directory

This directory lists direct geothermal heat pumps.

The Air-Conditioning, Heating, and Refrigeration Institute sponsors and administers certification programs to help ensure that industry products perform as rated.

PERSPECTIVE

The Air-Conditioning, Heating, and Refrigeration Institute (AHRI) is a voluntary, nonprofit organization comprised of the manufacturers of air conditioning, refrigeration, and heating products. Members of AHRI produce more than 90 percent of the air conditioning and refrigeration machinery and components manufactured in the United States.

AHRI traces its history back to 1903 when the Ice Machine Builders' Association of the United States started. Air-Conditioning and Refrigeration Institute (ARI) was formed in 1953 through a merger of two related trade associations. Since that time several other related trade associations have been merged into AHRI, making it the strong association that it is today.

Over the past 30 Years, AHRI has emerged as the major voice for the HVACR industry. Manufacturers are drawn to AHRI membership in part because of the variety of services and benefits afforded those who participate in AHRI activities. These activities include:

- Establishing standards for testing and rating products.
- Testing products to verify certified performance ratings, and publishing certification rating data.
- Providing representation and technical assistance to government entities on federal, state, and local legislative and regulatory matters.
- International trade research and analysis.
- Public relations and promotional programs for the industry.
- Consumer education programs.
- Credit information services.
- Regular statistical reports on product shipments.

WHAT CERTIFICATION MEANS

Two of AHRI's most important functions are the development of performance rating standards and the administration of performance certification programs for eligible products. Each product section, with the support of the AHRI engineering staff, may develop certification programs for eligible products. Participation in the program is voluntary and open to members and nonmembers of AHRI on an equal level basis.

AHRI regularly selects random samples of equipment to be tested by an independent laboratory under contract to AHRI. The equipment is tested, using procedures stipulated in the corresponding AHRI standard, to verify that it meets the manufacturer's certified published performance ratings.

The AHRI certification label appearing on products has been an indication of verified performance for more than 40 years. Once a product is certified it is listed with its performance ratings in the appropriate AHRI directory. These directories serve as authoritative sources of specification and performance rating for manufacturers, wholesalers, retailers, contractors, utilities, architects, engineers, and consumers. The AHRI certification directories serve as reference manuals for many government agencies.

This directory of Certified Direct Geothermal Heat Pumps lists all eligible models, of this type of equipment, produced by each manufacturer participating in the certification program in the AHRI certification program.

Listing in the directory means that the models have been certified for the manufacturers to AHRI, under the applicable standard, to meet the performance ratings claimed under test conditions described in the standards. Listing does not constitute a recommendation by AHRI regarding safety or reliability of any listed product.

The direct geothermal heat pumps listed herein represent a significant percentage of the total U.S. output of this type of equipment falling within the scope of the program.

Under the program, participating manufacturers must file certification data with AHRI on all models produced within the scope of the program. Through the random testing program AHRI conducts standard performance tests of each manufacturer's models each year.

In addition to the evaluation of the certified data by the AHRI ongoing random testing program, participating manufacturers which question certified ratings of competitors' models may challenge those models separately.

The manufacturer of a model which fails to pass the specified tests has two basic alternatives: re-rate the model in question to reflect its tested performance, or immediately stop production of that model.

If neither of the above solutions is accomplished, the manufacturer's right to use the AHRI certification symbol on *all* of his models is withdrawn, and the manufacturer's name and listings are removed from the directory.

The AHRI certification programs are designed to assure contractors and other equipment specifiers as well as consumers, that products manufactured by a program participant have been accurately rated and thus are eligible for the AHRI certification label.

AHRI STANDARDS COVERED

AHRI standard 870 for *Direct Geothermal Heat Pumps* was prepared to establish: definitions; requirements for testing and rating; requirements for specifications, literature and advertising; and conformance conditions.

Copies of this standard may be downloaded from the AHRI website, www.ahrinet.org.

TOLERANCES

The consumer or user of the Directory should note the tolerance provisions that are outlined in this Directory. These tolerances are included in the Standards, in the AHRI Certification Programs, and in the testing procedures for the following reasons: testing instrumentation accuracies, variations between laboratories, and manufacturing tolerances.

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Scope of Program

A. Standard

The program references AHRI Standard 870-05 for *Direct Geoeexchange Heat Pumps* (formerly Standard 870-05 for *Direct Geoeexchange Heat Pumps*).

Certification by manufacturers of direct geoeexchange heat pumps under this standard includes the following:

1. That manufacturers' certified ratings are established at the Standard Rating Conditions indicated in Table 1 herein.
2. That the units will operate continuously without damage for a minimum of two hours under the adverse Maximum Operating Conditions indicated in Table 1, both at low and at high voltage conditions.
3. That the units will operate satisfactorily at the adverse Low Temperature Operating Conditions indicated in Table 1.
4. That condensate formed on the indoor coil under the most unfavorable conditions will be adequately disposed of (see Insulation Efficiency Test in Table 1).

B. Equipment Covered

All direct geoeexchange heat pumps rated below 72,000 Btuh at AHRI Standard Rating Conditions (cooling) in Table 1.

A direct geoeexchange heat pump consists of one or more factory-made assemblies, which normally include an indoor conditioning coil, compressor(s) and a refrigerant-to-earth heat exchanger(s), including means to provide both heating and cooling functions or both.

When such equipment is provided in more than one assembly, the separated assemblies are to be designed to be used together, and the requirements of rating are based upon the use of matched assemblies.

Such units are to provide the functions of air-circulating, air cleaning, cooling and heating with controlled temperature, and dehumidifying, and may optionally include the function of humidifying.

C. Basis of Participation

Participation in this Program, by contract between each participating manufacturer and AHRI, consists of:

1. Certification by the manufacturer to AHRI that his models comply with AHRI Standard 870-05.
2. Participation by the manufacturer in the random test program at an independent laboratory under contract to AHRI. Units for test are selected from manufacturer's inventories by representatives of the laboratory.

The participating manufacturer may indicate his participation in the certification program in the following ways:

1. Display of the certification symbol on all units of certified models. On split systems, the symbol is displayed on the unit containing the refrigeration compressor.
2. The certification symbol, with the statement, "Certified in accordance with the Direct Geoeexchange Heat Pumps Certification Program", shall be displayed on all specification sheets, and also, if ratings are mentioned, on other literature and advertising.
3. Distribution of the directory, carrying the name of each participating manufacturer and a list of his certified models, together with their certified ratings.

THE MARK

The AHRI Certified Mark is illustrated below.



These symbols have been registered with the U.S. Patent Office. These symbols may not be reproduced or copied except by permission of AHRI. The symbols may be displayed on qualified units in the form of a label obtained from AHRI, or may be an integral part of the nameplate.

THE DIRECTORY

The directory lists the names, addresses and trade names of the participating manufacturers.

STANDARD CAPACITY RATING DEFINITIONS

Standard Rating. A Standard Rating is a rating based on tests performed at Standard Rating Conditions. The test methods and procedures are described in the AHRI Standard.

PERFORMANCE TESTS

Three performance tests must be passed. Conditions maintained throughout each test are as indicated in Table 1, with the indoor-air quantity corresponding to the Standard Rating maintained throughout the Maximum Operating Conditions Test and at the beginning of the other two tests.

Maximum Operating Conditions Test. (Heating and Cooling) Tests are run at 90 percent and 110 percent of rated voltage. The unit is operated continuously for two hours at the temperature conditions and voltage(s) specified; power is cut off for a period sufficient to cause the compressor to stop (not to exceed 5 seconds) and then restored. Requirements are:

1. Operation without damage to any part of the unit.
2. Continuous motor operation for first two hours without interruption.
3. The heat pump shall resume continuous operation within two hours of restoration of power and shall then operate continuously for one hour. Operation of safety devices prior to the establishment of continuous power is permitted.

Low Temperature Operation. (Cooling) the unit shall operate continuously for a period of not less than 30 minutes. Requirements are:

1. Operation throughout without damage.
2. For a dual voltage unit, unit shall operate continuously at the lower voltage.

Insulation Efficiency. This test is continuous, with controls, dampers and grilles set for maximum sweating, for four hours after establishment of specified temperature conditions. It is required that no condensed water shall drip, run or blow off from the unit casing.

APPLICATION RATINGS

Many applications of direct geexchange heat pumps require ratings under conditions other than Standard Rating Conditions specified in Table 1.

Specification sheets may show such application ratings, provided they include or are accompanied by the Standard Ratings clearly designated as such, including a statement of the conditions at which the ratings apply.

PENALTY FOR MISREPRESENTATION OF PERFORMANCE

If it is demonstrated that a manufacturer misrepresented the rating or other performance requirements of the AHRI Standard and has failed to make proper correction, the right to use the Symbol will be withdrawn, not only for the specific model concerned, but for all models produced by that manufacturer, and the manufacturer's name and listing will be removed from the Directory.

TABLE 1

OPERATING CONDITIONS FOR STANDARD RATINGS AND PERFORMANCE TESTS				
Test	Indoor Coil Air Entering		Outdoor Surface	
			Fluid Temperature in Tank	Air Temperature Surrounding Unit
	DB	WB		DB
	F	F	F	F
Standard Rating Conditions Cooling	80	67	77	80
Standard Rating Conditions Heating Cycle ¹	70	60	32	70
Maximum Operating Conditions Cooling Cycle ¹	95	71	100	95
Maximum Operating Conditions Heating Cycle ¹	80	----	75	80
Low Temperature Operations Cooling ¹	80	67	32	----
Insulation Efficiency	80	75	50	----

¹Water flow rate gpm as determined in Standard Rating, Cooling test.

ENERGY EFFICIENCY RATIO (EER)

Energy Efficiency Ratio (EER). A ratio calculated by dividing the cooling capacity in Btuh by the power input in watts at any given set of rating conditions, expressed in Btuh per watt (Btuh/watt).

COEFFICIENT OF PERFORMANCE (COP)

Coefficient of Performance (COP). A ratio calculated by dividing the total heating capacity provided by the refrigeration system including circulating fan heat but excluding supplementary resistance heat, (Btuh) by the total electrical input (watts) x 3.412.

Power consumed by water pump and/or cooling tower is not included. In order to determine total system performance, such power consumption must be included by system designer.

BASIC ORDER OF CLASSIFICATION

Type	Description
HRCU-DGX-CB	Split System Heat Pumps (Heating and Cooling)
HORCU-DGX-CB	Split System Heat Pumps (Heating Only)
HCRCU-DGX-CB	Split System Heat Pumps (Cooling Only)
HRCU-DGX-C	Split System W/No Indoor Fan (Heating and Cooling)
HORCU-DGX-C	Split System W/No Indoor Fan (Heating Only)
HCRCU-DGX-C	Split System W/No Indoor Fan (Cooling Only)

Revised since last directory.

WAS indicates a rating that has been involuntarily changed since the last directory.

 AHRI STANDARD RATINGS FOR DIRECT-GEOEXCHANGE HEAT PUMPS

Compressor Unit Assembly	Indoor Air Handler	Heating		Cooling	
		Capacity Btuh	COP	Capacity Btuh	EER Btuh/Watt

EarthLinked Technologies

Type: S Series models with Refrigerant R-22

SXX-018-XA	AFX-018-X	18,000	3.6	18,000	16.0
SXX-024-XA	AFX-024-X	24,000	3.6	24,000	16.0
SXX-030-XA	AFX-030-X	32,000	3.5	30,000	15.8
SXX-036-XA	AFX-036-X	38,000	3.6	36,000	16.0
SXX-042-XA	AFX-042-X	44,000	3.5	42,000	15.8
SXX-048-XA	AFX-048-X	50,000	3.6	48,000	16.0
SXX-060-XA	AFX-060-X	65,000	3.6	60,000	16.0
SXX-072-XA	AFX-072-X	68,000	3.5	66,000	15.2
SXX-018-XA	AVX-018-X	18,000	3.6	18,000	16.0
SXX-024-XA	AVX-024-X	24,000	3.6	24,000	16.0
SXX-030-XA	AVX-030-X	32,000	3.5	30,000	15.8
SXX-036-XA	AVX-036-X	38,000	3.6	36,000	16.0
SXX-042-XA	AVX-042-X	44,000	3.5	42,000	15.8
SXX-048-XA	AVX-048-X	50,000	3.6	48,000	16.0
SXX-060-XA	AVX-060-X	65,000	3.6	60,000	16.0
SXX-072-XA	AVX-072-X	68,000	3.5	66,000	15.2

Type: H Series models with Refrigerant R-22

HXX-018-XA	AFX-018-X	18,000	3.6		
HXX-024-XA	AFX-024-X	24,000	3.6		
HXX-030-XA	AFX-030-X	32,000	3.5		
HXX-036-XA	AFX-036-X	38,000	3.6		
HXX-042-XA	AFX-042-X	44,000	3.5		
HXX-048-XA	AFX-048-X	50,000	3.6		
HXX-060-XA	AFX-060-X	65,000	3.6		
HXX-072-XA	AFX-072-X	68,000	3.5		
HXX-018-XA	AVX-018-X	18,000	3.6		
HXX-024-XA	AVX-024-X	24,000	3.6		
HXX-030-XA	AVX-030-X	32,000	3.5		
HXX-036-XA	AVX-036-X	38,000	3.6		
HXX-042-XA	AVX-042-X	44,000	3.5		
HXX-048-XA	AVX-048-X	50,000	3.6		
HXX-060-XA	AVX-060-X	65,000	3.6		
HXX-072-XA	AVX-072-X	68,000	3.5		

 AHRI STANDARD RATINGS FOR DIRECT-GEOEXCHANGE HEAT PUMPS

Compressor Unit Assembly	Indoor Air Handler	Heating Capacity Btuh	COP	Cooling Capacity Btuh	EER Btuh/Watt
Type: S Series models with Refrigerant R-407C					
SXX-018-XB	AFX-018-X	18,000	3.5	18,000	15.0
SXX-024-XB	AFX-024-X	24,000	3.5	24,000	15.0
SXX-030-XB	AFX-030-X	32,000	3.5	30,000	15.0
SXX-036-XB	AFX-036-X	38,000	3.5	36,000	15.0
SXX-042-XB	AFX-042-X	44,000	3.5	42,000	15.0
SXX-048-XB	AFX-048-X	50,000	3.5	48,000	15.0
SXX-060-XB	AFX-060-X	65,000	3.5	60,000	15.0
SXX-072-XB	AFX-072-X	68,000	3.5	66,000	15.0
SXX-018-XB	AVX-018-X	18,000	3.5	18,000	15.0
SXX-024-XB	AVX-024-X	24,000	3.5	24,000	15.0
SXX-030-XB	AVX-030-X	32,000	3.5	30,000	15.0
SXX-036-XB	AVX-036-X	38,000	3.5	36,000	15.0
SXX-042-XB	AVX-042-X	44,000	3.5	42,000	15.0
SXX-048-XB	AVX-048-X	50,000	3.5	48,000	15.0
SXX-060-XB	AVX-060-X	65,000	3.5	60,000	15.0
SXX-072-XB	AVX-072-X	68,000	3.5	66,000	15.0
Type: H Series models with Refrigerant R-407C					
HXX-018-XB	AFX-018-X	18,000	3.5		
HXX-024-XB	AFX-024-X	24,000	3.5		
HXX-030-XB	AFX-030-X	32,000	3.5		
HXX-036-XB	AFX-036-X	38,000	3.5		
HXX-042-XB	AFX-042-X	44,000	3.5		
HXX-048-XB	AFX-048-X	50,000	3.5		
HXX-060-XB	AFX-060-X	65,000	3.5		
HXX-072-XB	AFX-072-X	68,000	3.5		
HXX-018-XB	AVX-018-X	18,000	3.5		
HXX-024-XB	AVX-024-X	24,000	3.5		
HXX-030-XB	AVX-030-X	32,000	3.5		
HXX-036-XB	AVX-036-X	38,000	3.5		
HXX-042-XB	AVX-042-X	44,000	3.5		
HXX-048-XB	AVX-048-X	50,000	3.5		
HXX-060-XB	AVX-060-X	65,000	3.5		
HXX-072-XB	AVX-072-X	68,000	3.5		

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 AHRI STANDARD RATINGS FOR DIRECT-GEOEXCHANGE HEAT PUMPS

Compressor Unit Assembly	Indoor Air Handler	Heating		Cooling	
		Capacity Btuh	COP	Capacity Btuh	EER Btuh/Watt

EARTH SOURCE ENERGY SOLUTIONS, INC.

Trade Name: EarthSource Geo Direct

ZR24K3-PFV-230	N/A	25,000	3.7	28,000	16.6
ZR30K3-PFV-230	N/A	30,000	3.7	33,000	16.6
ZR36K3-PFV-230	N/A	36,000	3.7	39,000	16.6
ZR42K3-PFV-230	N/A	42,000	3.7	45,000	16.6
ZR49K3-PFV-230	N/A	47,297*	3.7	47,983*	12.94*
ZR61K3-PFV-230	N/A	45,703*	3.03*	52,255*	10.85*

*Indicates rating has been revised

TRADE OR BRAND NAME INDEX

<i>Trade or Brand Name</i>	<i>Company</i>
EarthSource Geo Direct	Earth Source Energy Solutions, Inc.
EarthLinked	EarthLinked Technologies

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