PRODUCTS

AHRI CERTIFIED®
www.ahrdirectory.org
Air-to-Air ERV
AHRI Standard 1060
Energy Recovery COMPONENT is certified. Actual performance in packaged equipment may vary.

ENERGY RECOVERY HEAT PIPES

Heat Recovery Modules (HRM™s)

HEAT PIPE TECHNOLOGY
a subsidiary of MiTek® • a Berkshire Hathaway company

6904 Parke East Blvd.
Tampa, FL 33610
Tel: (813) 470-4250
http://www.heatpipe.com
E-mail: info@heatpipe.com

ENERGY RECOVERY HEAT PIPES

AHRI CERTIFIED®
www.ahrdirectory.org
Air-to-Air ERV
AHRI Standard 1060
Energy Recovery COMPONENT is certified. Actual performance in packaged equipment may vary.

- **Made with High Quality Copper Tubes for Reliability and Longevity**
- **High Heat Transfer Effectiveness**
- **Bi-Directional Heat Transfer**
- **Can be equal heat and cool recovery, or**
- **Can be optimized for either heat or cool recovery**
- **No Mechanical Tilting for Seasonal Change-Over Necessary**
- **No Cross Contamination Between Air Streams**
- **AHRI Certified Performance**

ENERGY RECOVERY HEAT PIPES

Energy recovery heat pipes from Heat Pipe Technology (HPT) provide economical and reliable recovery of both heating and cooling. This means that the payback time of your investment is minimal. HPT heat pipes are economical because of their low initial cost and minimum maintenance requirement. The only maintenance required is periodic cleaning similar to any air conditioning coil. HPT heat pipes are reliable because they are passive with no moving parts (except for optional dampers).

For several years, energy recovery heat pipes have been constructed using relatively large diameter tubes. This is because they have been single tubes that must handle vapor flowing in one direction and liquid flowing in the opposite direction simultaneously. Also, to be able to transfer heat in one direction during the heating season, and the opposite direction during the cooling season, they have normally been equipped with a tilting mechanism. HPT utilizes a loop circuit that allows for equal heating and cooling recovery (see HRM-H™) or optimization for either the more prominent heat or cooling recovery while still allowing for appreciable recovery the rest of the time (see HRM-Z™)

Because of HPT's unique circuit design, heating and cooling recovery can normally be accomplished without a tilt mechanism or any other seasonal changeover procedure. To make use of this unique bi-directional energy transfer feature, the air streams should be arranged side-by-side as in A and B, or with one directional energy transfer featuring over-and-under as C.

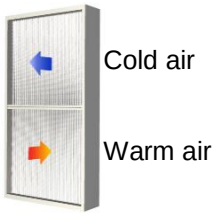
A. Side-by-side horizontal air streams with heat pipes in a vertical plane (HRM-H™)
B. Side-by-side horizontal air streams with heat pipes in a vertical plane optimized for heat or cool recovery (HRM-Z™)
C. Over-and-under horizontal air streams with heat pipes in a vertical plane (HRM-O™)

A
HRM-H™

Two way heat transfer

B
HRM-Z™

Two way heat transfer



C
HRM-O™

One way heat transfer

Comfort Energy Recovery

HPT energy recovery heat pipes can be used for comfort-to-comfort applications or for process applications. Comfort-to-comfort applications include heat only recovery for cooler climates, cooling only recovery for warm climates, or more often, both heating and cooling recovery. HPT heat pipes are used for heat/cooling recovery all the way from cold northern climates with harsh winters to the heat of the tropics.

For heat recovery during the heating season, the leaving temperature of the exhaust air stream may be lowered to near freezing or below freezing. Such conditions normally result in the formation of frost on the exhaust side of the heat pipe with partial or complete blockage of the air stream. To remedy this situation, HPT offers an optional bypass damper on the supply side of the heat pipe. With the bypass damper opened, air is bypassed around the supply side of the heat pipe so that the leaving temperature of the exhaust air stream is kept warm enough (36°F or higher) to prevent frost formation. For economizer operation, a bypass damper on the supply side may also be needed.

Process Energy Recovery

For process applications, heat/cooling recovery can also take place in either direction. Process applications frequently involve air temperatures elevated above normal room conditions. The heat pipes can be made to withstand temperatures up to 200°F. For air streams with corrosive components, the heat pipes can be provided with a protective coating resistant to a wide variety of acids and alkalis. Heat pipes can also be fabricated with both fins and tubes made of copper.

Installation

See illustration on previous page showing two different energy recovery heat pipe orientations. A normal installation will have the two air streams arranged such that they are flowing in opposite directions through the heat pipe. This is called counter-flow. Counter-flow operation provides the maximum heat transfer. If necessary, due to design considerations, the air streams may need to flow in the same direction through the heat pipe. This is called parallel flow. Parallel flow can still provide valuable energy savings, but at a reduced rate

Drain Pans

Drain pans are required to capture moisture condensation or for coil cleaning purposes in both supply and exhaust sides of the heat pipes. Intermediate drain pans may also be required when heat pipes are installed in stackable sections. Drain pans are not provided by HPT.

Energy Recovery Heat Pipe Sizes

Heat Pipe Technology offers energy recovery heat pipes in sizes customized for the particular application. Options for these Heat Pipes include all the options for the standard size heat pipes. Heat pipes can have up to 8 rows of tubes, 10, 12, 14 FPI aluminum or 10, 12 FPI copper fins, and can be up to 200 inches long.

Energy Recovery Heat Pipes

Features

- ***Passive Operation***

No energy input is required to operate the heat pipes. When two air streams pass through the heat pipe, with one air stream through one side and the other air stream through the other side, the temperature difference between the two air streams activates the Heat Pipes and causes them to exchange heat by "heat pipe action". Heat Pipe action is a much more powerful heat transfer mechanism than convection flow. Heat pipe action utilizes the heat capacity available when the working fluid changes phase, from a liquid to a vapor and back again.

- ***Durability***

There is nothing in the heat pipes to wear out! The heat pipes are passive. They have no moving parts (unless they come equipped with a bypass damper). To guard against corrosion, the heat pipes can be ordered with a protective coating. The heat pipes are fabricated with a plurality of charged circuits. Under normal operations, there is no reason for these ever to leak. If some inadvertent mechanical damage were to occur on one circuit to cause it to leak, there would be little effect on performance even if the leak was not repaired. Furthermore, because the tubes in Heat Pipe Technology heat pipes are copper, leaks can be repaired. Most other energy recovery heat pipes are fabricated with aluminum tubes, which are very difficult to repair.

- ***Isolated Air Streams***

Partitions to separate the two air streams are an integral part of Heat Pipe Technology energy recovery heat pipes. The copper tubes carrying the heat pipe working fluid are expanded into the mating holes in the partitions, assuring an excellent seal to prevent cross contamination. HPT can also provide heat exchangers with a foam-filled separation for added assurance in critical applications.

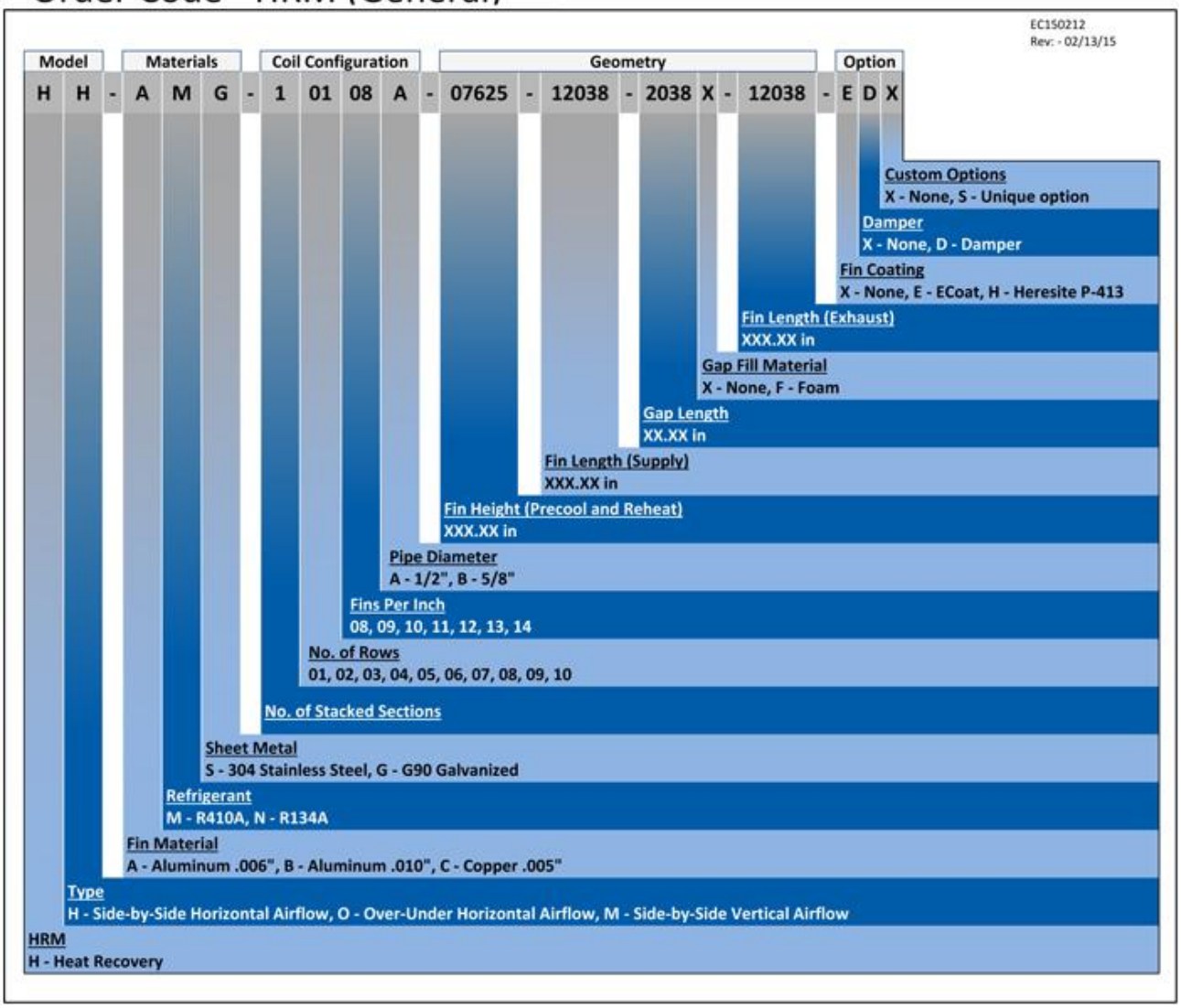
- ***Minimum Maintenance***

Since the heat pipes have no moving parts (except for optional bypass dampers), the only maintenance recommended is periodic cleaning. A coil cleaner may be applied for this purpose just as for any cooling coil.

- ***Minimum Size***

Energy recovery heat pipes from Heat Pipe Technology take up much less space than other energy recovery schemes. Generally, they are also considerably thinner than other heat pipes. A six-row energy recovery heat pipes normally fabricated with a thickness of 9 inches.

Order Code - HRM (General)



Energy Recovery Heat Pipes

ENGINEERING SPECIFICATIONS

1. GENERAL

Air-to-Air Energy Recovery Heat Pipes to be supplied by HPT to exchange heat/cooling between two air streams for heat or cooling recovery. The heat pipes shall be inside and integral to the equipment cabinet or located in the ductwork. In either case, drain pans are required and to be provided by others. Heat Pipe circuits comprise multiple tubes connected in series, end-to-end. The heat pipe circuits shall be:

- ❑ Level to attain equal amounts of heat and cooling recovery (HRM-H™);
- ❑ Optimized for greater recovery in heating mode with appreciable recovery in cooling mode (HRM-Z™ for heating);
- ❑ Optimized for greater recovery in cooling mode with appreciable recovery in heating mode (HRM-Z™ for cooling);
- ❑ Vertical over/under configuration to attain maximum recovery in one mode only (HRM-O™).

Energy recovery heat pipes shall be tested and certified to AHRI standard 1060. Performance printouts as well as the product itself to carry AHRI 1060 compliance logo. Documents showing testing in accordance with AHRI 1060, but not certified by AHRI, will not be acceptable. Tests shall also show zero EATR (Exhaust Air Transfer Ratio) from exhaust to supply air.
Any deviation from the specifications must be approved by the engineer no less than ten days prior to the project bid date. No consideration of alternates will be given after that time. Heat pipes shall be completely manufactured and fully assembled at the manufacturer's facility by factory personnel. Conversion of third party coils is not acceptable.

❑ HRM-O only: A moisture eliminator shall be installed immediately downstream of the lower side (warm side) of the heat pipe to capture condensate that may spit from the heat pipe fins. Condensate shall drain out of the bottom into a drain pan (supplied by others). The moisture eliminator shall be capable of capturing at least 99.75% of condensate when the coil is producing condensate at a rate of 0 to 15 lbs. water/sqft/hour and coil airflow is ≤ 700 SFPM. Static pressure loss shall not exceed 0.18 in.wg. at 500 SFPM.

The moisture eliminator blades will be constructed of ABS plastic and meet UL Standard 94 classification V-0, which requires blades to self-extinguish within 10 seconds. It will incorporate an additive that protects against fungal and bacterial deterioration to provide long-term protection against fungal and bacterial attack and help prevent surface growth, permanent staining, embrittlement and premature product failure. The anti-fungal and anti-bacterial additive shall be mixed with the polymer and shall not be a coating, which could wear off over time.

2. HEAT PIPES

1) The Heat Pipe supplier shall have a minimum of 5 years of experience designing and installing Heat Pipes specifically for energy recovery applications.

2) The tubes shall be 1/2“ OD copper, of specific design for Heat Pipe application, permanently expanded onto the fin collar to form a firm, rigid, and complete pressure contact at all operating conditions. Aluminum tubes will not be allowed.

3) The fin surface shall be continuous plate type ❑ aluminum ❑ copper fins of specific design to produce maximum heat transfer effectiveness for heat pipe applications. Airside pressure loss shall be as given on the schedule or otherwise specified. Fin density and the number of rows of tubes shall be as specified.

4) The Heat Pipe modules shall have an optional protective coating of ❑ E-Coat, similar to Electrofin or ❑ phenolic, similar to Heresite. Coils shall be dipped and completely submerged to ensure full coverage of coating - spray coatings are not acceptable.

5) Heat transfer fluid shall be classified as Safety Group A1 in ASHRAE Standard 34-2013.

6) Heat pipe capacities, entering and leaving dry and wet bulb temperatures, and face velocity shall be as specified.

7) The frames and mounting structure shall be minimum 16 gauge ❑ galvanized steel ❑ stainless steel. The supply and exhaust air streams shall be isolated from each other by ❑ a single separating partition, ❑ a double separating partition, or ❑ a foam-filled double separating partition. Cross contamination between the air streams is not acceptable.

8) Heat pipe circuitry shall be as specified by HPT design. Each circuit shall be individually processed, charged, and hermetically sealed.

9) Scheduled effectiveness or heat recovery shall be met at a minimum and total pressure drop shall not be exceeded. The resulting Recovery Efficiency Ratio, or RER, shall therefore be met at a minimum.

10) The Heat Pipes shall be ETL or UL listed to UL standard 207 and CSA standard C22.2.140.3

11) The Heat Pipe heat exchanger shall have a five (5) year limited warranty. All components such as valves and dampers shall carry a 12 month warranty.

3. OPTIONAL BYPASS DAMPER

1) The bypass damper shall bypass air around the supply side of the energy recovery heat pipe for freeze protection. Damper shall be of low leakage design.

2) Blades and frames shall be made of roll formed galvanized steel, minimum 16 gauge. Frames shall

be constructed with hat shaped channels, reinforced, or with welded corners.

3) Axles shall be plated steel. Dampers shall be incorporated with face linkage or concealed linkage in the frame to interconnect all the blades.

4) The damper shall be equipped with a modulating motorized actuator package. The motor shall operate on ❑ 24 VAC ❑ 120 VAC ❑ 208 VAC ❑ 240 VAC ❑ 265 VAC ❑ 460 VAC 60 Hz. Actuator motion shall be modulated by a 2 to 10 VDC proportional output from an adjustable proportional temperature control responding to a temperature sensor in the exhaust leaving air stream. Damper motion shall be spring loaded to fail ❑ normally closed (NC) ❑ normally open (NO).

Installation List

Recent Domestic Installations
Energy Recovery Heat Pipes (HRM™)

State	City	Location
Alabama	Huntsville	TEDAC
	Tuskegee Institute	Tuskegee Institute National Historic Site
	Opelika	Pharmavite Manufacturing Facility
Alaska	Ft. Wainwright	FTW-373 Hangar
	Anchorage	University of Alaska Engineering Building
Arizona	Tucson	University of Arizona Bioscience Research Lab
California	Freemont	Delta Americas HQ
	Davis	UC Davis Memorial Hall
	Culver City	Sony Studios - Barrymore
Colorado	Littleton	Jefferson County Sheriff's Office
	Colorado Springs	DAI Data Center
	Boulder	E. Boulder Recreation Center
Connecticut	New Haven	Yale – Connecticut Mental Health Center
	Winsted	North Western Community College – Joyner Hall
	Northampton	VA Northampton
Florida	Valparaiso	Eglin Air Force Base
	Pensacola	Naval Housing
	Bradenton	Coastal Animal Medical Center
Georgia	Albany	Mars Chocolate
Hawaii	Honolulu	Straub Hospital
Illinois	Chicago	1kfulton fitness center
	Waukegan	Lake County Courthouse Expansion
	Chicago	Malcolm X College
Indiana	Lebanon	Lebanon Senior High School Pool
Maryland	College Park	University of Maryland Edward St. John Learning & Tech Center
	Baltimore	Morgan State University Behavior & Social Sciences Center
Massachusetts	Amherst	University of Massachusetts Physical Science Building
	Merrimack	Anheuser Busch
	Cambridge	Harvard Innovation Laboratory
	Plymouth	Plymouth South High School
	Cape Code	Cape Cod Hospital ER Expansion
Michigan	Berriern Springs	Andrews University Halenz Hall
	Mattawan	MPI Research - Cyclotron
Minnesota	St. Paul	Concordia University Science Building
	Minneapolis	Minneapolis Children's Hospital
	Ellsworth	Ellsworth Middle School

Mississippi	Pascagoula	Lakeside Naval Support Facility Housing
Missouri	St. Louis	Monsanto Greenhouse Expo
	Springfield	Fisk Howard School
	Cape Girardeau	Cape Girardeau Waste Water Treatment Plant
	Berkeley	Boeing Bldg. 101
Montana	Grand Coulee	Grand Coulee
Nebraska	Lincoln	University of Nebraska Alvine UNL Sapp Recreation Center
Nevada	Reno	University of Nevada -Reno Great Basin Hall
	Reno	Truckee Meadow Water Reclamation Facility Lab
	Reno	Nevada Army National Guard Repair Building 84
New Jersey	Bridgewater	Ethicon Learning Institute
	Bell Meade	Carrier Clinic
	Princeton	Princeton University Carl Icahn Lab
New York	Germantown	Taconic Farms Mice Lab
	Staten Island	Curtis High School
	Cortlandt Manor	NY Army National Guard Camp Smith Training Site
	Bronx	Ocean Wonders Aquarium
	Wappingers Falls	Castle Point VA Hospital
	Buffalo	State University of New York Buffalo School of Medicine
North Carolina	Hickory	Lenoir-Rhyne University Minges Science Building
	Durham	Duke University Primate Center
	Morrisville	Fujifilm Diosynth Biotechnologies USA Inc.
North Dakota	Valley City	Valley City State University - Rhoades Science Center
	Grand Forks	University of North Dakota
Ohio	Lima	Allen-Oakwood Correctional Institution
	Menton	Sergis Corporation
Oregon	Klamath Falls	Sky Labs Medical Center – Lab Relocation
	Columbus	Ohio State University Valley Football Center
	Bend	New Bend-La Pine Middle School
	Portland	Hyatt House
Pennsylvania	Philadelphia	University of Pennsylvania – Stemmler Hall
	State College	Pennsylvania State University – Greenberg Laboratory
Tennessee	Memphis	Rhodes College - Science Building
Texas	San Antonio	Lackland Air Force Base Dorm #4
Utah	Salt Lake City	University of Utah
	Salt Lake City	City Center Plaza
	Ogden	Fresenius Medical Care
Virginia	Chesapeake	Norfolk Highlands Primary School
Washington	Pasco	Columbia Basin College – Social Sciences & World Languages
Wisconsin	Lac Du Flambeau	Lake of the Torches Resort Casino
	De Pere	St. Norbert College

Recent International Installations
Energy Recovery Heat Pipes (HRM™)

Country	State/Province	City	Location
Canada	Alberta	Edmonton	Dodge Dealership
	Alberta	St. Paul	Xtreme Oil Field
	Alberta	Fort McMurray	Basset Petroleum
	Alberta	Edmonton	CFB Edmonton Health Service Centre
	Alberta	Calgary	University of Calgary – Schulich School of Engineering
	Ontario	Ancaster	Stockpole International
	Ontario	Kitchner	Kitchner Waste Water Treatment Plant
	Ontario	North York	Audi Midtown Dealership
	Quebec	Montreal	Montreal Fire Safety Service – Barracks 71
Colombia	Valle del Cauco		Laboratorios Franco Colombiano Lafranco
	Calle	Bogota	Clinica Ciudad Roma
India		Chennai	Hospital
Philippines	Philippines	Manila	Manila Bay Resort
UAE		Dubai	Jumeirah Beach Club Resort
		Dubai	La Mer Jumeirah Open Beach Retail
		Dubai	Fish Farm
		Al Ain	Al Ain Wildlife Park
		Abu Dhabi	City Mall
Qatar		Doha	Al Emadi Hospital
		Doha	Asset Affairs Building
		Doha	Expansion of Football performance center (Aspire Academy)
		Doha	Lusail Tower
		Doha	Chemical Lab at Qatar Foundation

Energy Recovery Heat Pipes

Heat Pipes Selection Procedure

The Heat Pipe cloud-based selection software, SelectPlus™, developed and copyrighted by HPT is designed for selecting and sizing HPT energy recovery heat pipes. Please logon to www.heatpipeselect.com to get your user name and password for full accessibility.

Energy Recovery Heat Pipes (Module Only)

Five-Year Limited Warranty

Subject to the following conditions, **Heat Pipe Technology, Inc. (HPT)**, warrants this product to be free from defects in material and workmanship for a period of FIVE YEARS for the heat exchanger only from the date of installation but not to exceed 90 days from date of shipment. Dampers and HPT provided controls carry a 12 month warranty. This warranty is in lieu of all other warrants not expressly set forth herein, whether expressed or implied by operation of law or otherwise. In the event this product fails under normal use and service within the applicable period, HPT will correct, repair or, at its sole discretion, replace the defective product or refund the purchase price of products which are returned freight prepaid to HPT for inspection, when accompanied by proof of purchase and written claims of defect, and which upon inspection by HPT, do comply with the terms of this warranty.

This warranty applies to the first retail buyer and extends to any subsequent owners of the systems.

The cost of replacement parts or components shall be determined by the price schedule in effect at the time of submission of warranty claim.

Repair or replacement parts will be furnished F.O.B. factory in all cases.

If HPT elects to replace or provide a refund, the defective product must be returned to HPT free and clear of liens or other encumbrances.

Limitations on Liability

This warranty does not cover and no warranty is made with respect to:

A. Failures not reported to HPT within the period specified above;
B. Failures or damage due to misapplication, misuse, abuse, improper storage or handling, abnormal conditions of temperature, water, dirt, corrosive substances or other contaminants;
C. Products which have been repaired with parts or materials not furnished or approved by HPT or by its authorized dealers or representatives, or products which have been in any way tampered with or altered;
D. Products damaged in shipment or storage or otherwise without fault of HPT;
E. Normal maintenance as outlined in the installation and servicing instructions or owner's manual including coil cleaning, filter cleaning and periodic flushing of systems;
F. Damage or repairs required as a consequence of faulty installation or application by others;
G. Damage or repairs required as a consequence of any misapplication, abuse, improper servicing, unauthorized alteration or improper operation;
H. Damage as a result of floods, winds, fires, lightning, accidents, corrosive atmosphere or other conditions beyond the control of HPT;
I. Damage resulting from freezing of domestic water or condensate, inadequate or interrupted water supply, use of corrosive water, fouling or restriction of the water circuit by foreign material or like causes;
J. Damage resulting from operation with an inadequate supply of air or water;
K. Dampers or other mechanical options.

HPT total responsibility for any claims, damages, losses or liabilities related to the product covered hereunder shall not exceed the purchase price of such product. In no event shall HPT be liable for any special, indirect, incidental or consequential damages of any character, including but not limited to loss of use of productive facilities or equipment, lost profits, property damage, transportation, installation or removal, lost production, or personal injury whether suffered by Purchaser or any third party. HPT disclaims all liability for any and all costs, claims, demands, charges, expenses or other damages, either direct or indirect, incident to personal injury or property damage arising out of any cause of action based on strict liability.

Some states do not allow the exclusion or limitation of incidental or consequential damages or limitations on how long an implied warranty lasts, so the exclusion or limitation above of consequential damages or the limitation of time above on implied warranties may not apply to you.

This warranty gives you specific legal rights and you may have other rights which may vary from state to state.

Energy Recovery Heat Pipes (Module Only)

Warranty Registration

To insure your warranty protection, please fill in the Warranty Registration Form and mail or e-mail it to:

Heat Pipe Technology, Inc.
6904 Parke East Blvd.
Tampa, FL 33610
info@heatpipe.com
Phone: (813) 470-4250

WARRANTY REGISTRATION FORM	
Customer Name:	
Customer Address:	
Phone: ( ) -	Fax: ( ) -
Please check one: ☐ Owner	☐ Dealer
Serial No:	Model No:
Type of Product:	
Date of Installation:	Dealer/Installer:
Name & Address of Dealer/Company You Purchased from	
Name:	
Address:	
Customer Signature:	