Split Passive HRM-V Energy Recovery Heat Pipes
ENGINEERING SPECIFICATIONS

Site or Factory Installed Energy Recovery Heat Pipes HRM-V Model with Modulating Control Valves

1.0 GENERAL

❑ Air Handler(s) ❑ Packaged Air Conditioning Equipment shall be equipped with Energy Recovery Heat Pipes supplied by Heat Pipe Technology, Inc. to transfer heat from the exhaust air to the incoming supply air. Supply and Exhaust heat pipe sections are separated horizontally by no more than 40 equivalent feet on the same level or separated up to 100 equivalent feet horizontally and 50 feet vertically as specified. Heat pipes shall be completely manufactured and fully assembled at the manufacturer's facility or on site by factory personnel. Conversion of third party coils is not acceptable. Interconnecting piping shall be by others in the field, but charged and started up by factory personnel only.

1.1 CONSTRUCTION

Coil tubes shall be oriented vertically and the fins run horizontally. One or two rows shall be manifolded together into one liquid line at bottom and one gas line at top and constitute one circuit. Lines shall be sized according to the performance requirements of the circuit. Each heat pipe section shall be installed level and connected to the other section by two horizontal copper lines, for each circuit, one for liquid and one for vapor. Heat Pipe circuits comprise multiple tubes connected in series, end-to-end to form a closed, continuous loop. Both vapor and liquid will travel in the same direction around the circuit in a single convectional path, making wicking and capillary action unnecessary for continuous heat transfer. Single tube circuits where gas and liquid travel in the same tube in opposite directions are not acceptable.

1.2 ❑ OPTIONAL MODULATING CONTROL VALVE FEATURE

All or a portion [SPECIFY] of the Heat Pipe circuits shall be equipped with modulating control valves to control the operation of the Heat Pipe circuits. Each circuit shall have one modulating step motor valve in the lower liquid line in an accessible location, between the two coils. Each valve will connect to a control board in a UL-listed NEMA box which also houses a 24 VAC transformer. Multiple circuit installations will have the several control boards in one NEMA box. The customer supplied electrical power to the control panel power supply transformer shall be: ❑ 120 VAC ❑ 208 VAC ❑ 230 VAC 1 phase 60 Hz. The NEMA box shall be located on the ❑ exterior or ❑ interior surface of the equipment cabinet as indicated ❑ or on a nearby surface.

The Building Automation System shall provide the sensors necessary for determination of heat pipe modulation operation and the BAS computer shall be programmed to send the operating control signals to the modulating valves' control boards as required for correct system operation. The control signal shall go through a BAS interface installed near the heat pipe NEMA box. The BAS control signal provided shall be 0 to 10 volt DC signal.

All additional wiring shall be provided and installed by others. With all control valves open, the energy recovery heat pipe assembly will operate at full capacity. Modulating one valve closed restricts the liquid return flow and reduces the heat transferred by the heat pipe until closing the valve shuts off that circuit. Frost control, if needed, is accomplished by closing or shutting off one or more circuits. Economizer operation is also accomplished by shutting off circuits to achieve

desired heat transfer. Manufacturer shall provide at least three (3) references for successful controllable energy recovery heat pipe installations in operation for at least three (3) years.

2.0 The Heat Pipe supplier shall have a minimum of 5 years of experience designing, manufacturing, and installing Heat Pipes specifically for split energy recovery applications.

2.1 The tubes shall be ½" 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. Tubes shall be no larger than 5/8" OD.

2.2 The fin surface shall be continuous plate type ❑ aluminum or ❑ copper fins of specific design to produce maximum heat transfer efficiency 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.

2.3 ❑ The Heat Pipe modules are available with an optional protective coating of ❑ E-Coat, similar to Electrofin or ❑ phenolic, similar to Heresite. When more than 2 rows of tubes are provided, coils shall be dipped and completely submerged to insure full coverage of coating - spray coatings are not acceptable.

2.4 Heat transfer fluid shall be classified as Safety Group A1 in ASHRAE Standard 34-2013 and comply with both ASHRAE Standard 15-2013 and UL Standard 207 safety guidelines.

2.5 Heat Pipe capacities, entering and leaving dry and wet bulb temperatures, and face velocity shall be as specified.

2.6 The Heat Pipes shall be installed as specified.

2.7 Frames and mounting structure shall be minimum 16 gauge ❑ galvanized steel or ❑ stainless steel.

2.8 Heat Pipe interconnecting piping and circuitry shall be as specified by Heat Pipe Technology design. Each circuit shall be individually processed, charged, hermetically sealed, and tested.

2.9 The heat pipe system shall be pressure tested on site under the supervision of the manufacturer's crew. Manufacturer's crew shall vacuum and charge the system. Vacuuming and charging by parties other than the manufacturer's own crew shall not be acceptable.

2.10 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.

2.11 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.