

# **ACT Air-to-Air Heat Pipe Heat Exchanger (AAHX) Engineering & Mechanical Specification**

The ACT Air-to-Air Heat Pipe Heat Exchanger (AAHX) shall be part number series ACT-HP-ERS as manufactured by Advanced Cooling Technologies, Inc. The heat pipe shall transfer heat between the outgoing and incoming airstreams in a counter flow arrangement, and shall be labeled for direction of airflow, noting inlets and outlets of exhaust and supply. The heat pipe heat exchanger shall be a passive device, requiring no other means for heat transfer, and shall be capable of operating at temperatures ranging from -50°F minimum to 180°F maximum.

Heat Pipe Heat Exchanger performance data is derived from laboratory testing in accordance with AHRI testing standards for Air-to-Air heat exchangers. Air-to-Air Heat Pipe Heat Exchanger performance shall be rated in accordance with applicable AHRI testing procedures.

Manufacturers of alternate equipment must be approved to bid via addendum, in writing by the specifying engineer, at least two weeks prior to bid time in order for their bid to be accepted by the contractor. If the equipment is not pre-approved then under no circumstances shall the contractor invest time or money in receiving submittals or considering the equipment.

The AAHX shall be installed vertically: with the warmer air stream under the cooler air stream. If the air stream at the top is warmer than the bottom, the AAHX will not transfer heat in reverse. The AAHX shall be installed horizontally: with 1/8 to 1/4 inch per foot tilt angle with the warmer stream passing through the lowest end of the AAHX and the cooler stream passing through the highest end. With this type of installation, if the warmer stream changes to the highest end, the AAHX will not transfer heat in reverse.

The AAHX shall be installed horizontally: level to within 1/8 inch end-to-end for heat transfer in either direction depending on which stream is warmer.

Costs associated with dimensional, performance, or other deviations from the specified equipment, including engineering costs to evaluate such deviations, shall be paid by the contractor.

The manufacturer must have a quality management system in place, equal to the quality management system in accordance with ISO-9001-2008, for the design, manufacture, and service of heat exchangers. The manufacturer must also have a net worth greater than five times the value of the equipment being bid and must have been a manufacturer of heat pipes and heat pipe assemblies for at least five years prior to bid time. The heat pipe heat exchanger must be manufactured in the United States of America. The manufacturer shall have a LIFE TIME LIMITED WARRANTY on the performance and operation of the heat pipes in the heat exchanger.

## **DESIGN AND CONSTRUCTION FEATURES**

### **1. Air-to-Air Heat Pipe Heat Exchanger:**

Heat pipes shall be 0.5 inch outer diameter, seamless, internally rifled copper tubes. The finned tube coils shall have aluminum fins, 0.006" minimum thickness, with enhancement (corrugated wave, sine wave, or louvered) to meet the performance and pressure drop requirements. Fin density shall be 10-12 fins per inch. Heat pipes shall be a maximum of 1.25 inches on center in the face and shall be 1.08 inches on center row-to-row.

Heat pipes shall be individually processed, individually charged, and hermetically sealed. AAHX Heat Pipe Heat Exchangers shall be installed as shown on the manufacturer's submittal drawings.

### **2. Protective Heat Pipe Heat Exchanger Enclosure:**

The heat exchanger frame shall be fabricated from minimum 16-gauge galvanized steel. The frame shall be supplied with a minimum of 1.50 inch wide flanges on all four sides, both front and back. Intermediate heat pipe supports and lifting points shall be furnished as required.

The heat exchanger shall be provided with a partition to isolate the outgoing and incoming airstreams; there shall be no cross contamination. The partition shall be fabricated from a minimum 16-gauge, galvanized steel and shall extend beyond the finned surface with a 3.0 inch mid-seal (1 ½ inches to supply side and 1 ½ inches to exhaust side).

End cover plates shall be provided to protect the heat pipe ends from possible installation damage. End plates shall be fabricated from minimum 16-gauge galvanized steel.

Note: Drain pans are recommended under all coils and are not included.

### **3. Working Fluid:**

The Air-to-Air Heat Pipe Heat Exchanger working fluid refrigerant shall be selected on the basis of heat pipe operating temperature and compatibility with heat pipe tube material. Heat pipe heat exchanger refrigerant used shall be classified as ASHRAE safety group A1.

### **4. AAHX Protective Coating (When Specified):**

E-Coat to protect against corrosion: Coating to be factory applied to entire unit after final fabrication.