

Environmental Testing Laboratories for Aquatec and the University of Vermont

Aquatec, a division of Inchcape Testing Services, completed construction of its executive and laboratory facilities in Colchester, Vermont in September 1991. The modern 77,000 square foot building is used jointly by Aquatec and the University of Vermont for environmental testing using sophisticated laboratory equipment. At Aquatec, over 150 scientists conduct water and air quality analysis, biology and toxicity testing, and on site laboratory services.

The design of the building reflects the scientific nature of Aquatec's work and their concern for the environment. The structure was carefully situated to preserve the natural landscape. The building wraps around an existing pond abundant with plants and wildlife.

The interior spaces provide an excellent example of incorporating the exterior environment into the workplace. The office entrance includes a three story atrium with a waterfall and tropical aquarium. The office areas are filled with natural light from windows and a vaulted glass skylight. The laboratories have views of a natural pond and take advantage of natural light through the extensive use of glass in the interior walls.



Designed for Comfort and Energy Efficiency

The mechanical system, which was designed by Hallam Associates of Burlington, VT, is designed for comfort and energy efficiency by recovering waste heat or cooling through two major systems: a hydronic loop and Heat Pipe Heat Exchangers.

The hydronic systems are one way the facility uses waste heat and cooling. The building has 130 heat pumps, and through hydronic loops, energy is transferred from one system to another. Overall, the facility has five ways of generating heat and six ways of rejecting heat.



Heat Pipes: Year Round Energy Recovery

The Heat Pipe Heat Exchangers heat and cool the building by utilizing the waste energy from the facility exhaust air streams. The facility as a whole has eight different exhaust air streams and two supply air streams split 50/50 between Aquatec and the University of Vermont. Taking advantage of the unique properties of the Heat Pipes, multiple, separate exhaust air streams pass through individual Heat Pipe Heat Exchangers. In addition to summertime sensible cooling of building make-up air, the Heat Pipe Heat Exchangers are equipped with Indirect Evaporative Cooling (IDEC) to provide up to 50 tons of summertime air cooling if desired.

Colchester is located in Northern Vermont where winters can be quite severe. In typical winter conditions, one Heat Pipe Heat Exchanger may raise the temperature of 20,000 CFM of supply air 38 degrees, adding over 800 thousand BTU per hour of heat prior to the air handler. Mike Starbuck, Facilities Manager at Aquatec, believes that the Heat Pipe Heat Exchangers have paid for themselves several times over since their installation.

The most severe winter conditions can cause frosting on the heat exchange surface in the leaving air stream. The Heat Pipe Heat Exchangers are equipped with face and bypass dampers to

control frost build-up in cold weather. Typically the face and bypass dampers are modulated on the supply side to control the leaving air temperature. A control set point is determined by looking at the discharge set points of the air handling units and adjusting the Heat Pipe Exchanger set point accordingly. If the air leaving temperature on the exhaust stream is less than the defrost set point by the given differential, the face and bypass dampers are modulated to maintain the defrost set point.

If the outside air is less than 0 degrees F and within the defrost cycle interval, the dampers will modulate from their current position to full bypass over a twenty minute interval and remain full bypass until the defrost cycle is over.

Thermo-Wright Heat Pipe Exchanger

The Thermo-Wright Heat Pipe is an excellent means of reducing energy consumption and costs while meeting all outdoor air requirements of ASHRAE 89-62.

This completely passive heat exchanger has no external power requirements and provides an economical alternative to more expensive recovery methods.

The Thermo-Wright is a highly efficient air-to-air heat recovery device that controls energy costs in both commercial and industrial applications. These units are also available in packages with various options to suit any air quality and climatic condition.

FOR MORE INFORMATION ON A SPECIFIC APPLICATION, PLEASE CONTACT YOUR LOCAL REPRESENTATIVE OR CIRCUL-AIRE.

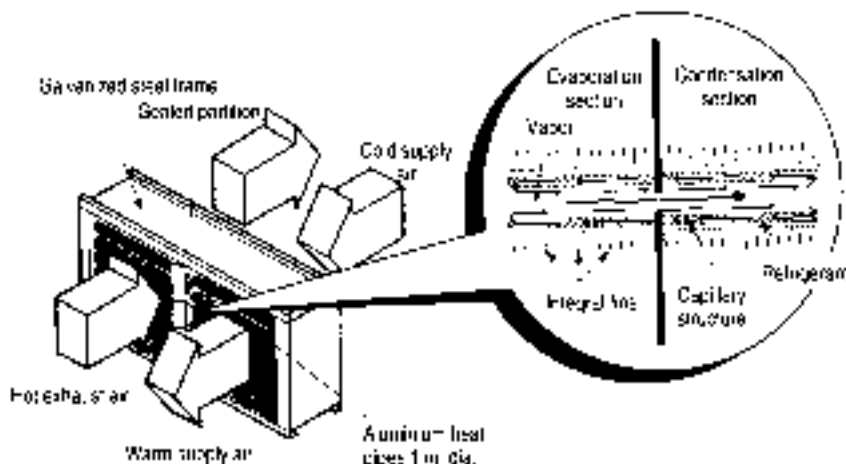
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Thermo-Wright Operating Principle in the Winter Mode