Case Study: Turtle River Montessori School

Energy Recovery System Reduces Cost of Cooling Outside Air by 70% at Florida School

The developers of Turtle River Montessori School in Jupiter, Florida, wanted students to have the best possible indoor air quality. They also wanted to provide it in the most energy-efficient manner.

Looking for suggestions as to how to make this new school’s HVAC system “green,” Brad Brown of KAMM Consulting, the mechanical engineer for the developer, approached Charles Eno, sales engineer for Florida Air Conditioning Distributors. Eno immediately thought of high-efficiency air-to-air Energy Recovery Ventilation (ERV) to reduce outside air (OA) load — the required rate of heat removal from outside air.

Eno recommended an ERV system that contained an energy recovery wheel (also known as a heat wheel or enthalpy wheel). With rising energy costs and climate concerns, these wheels are an ideal way to reduce HVAC costs while complying with code-mandated outside air requirements. ERV wheels dramatically reduce this cost by recycling the heating and cooling energy in exhaust air (not the air itself), thereby reducing the load on the HVAC system by as much as 80%. This reduction in load not only translates into significant ongoing cost savings, but also allows the downsizing of HVAC equipment, thereby reducing first cost and providing an immediate return on investment.

Florida Air Conditioning Distributors prefers ERV wheels manufactured by Airxchange, of Rockland, Massachusetts, because of their long history of reliable service, AHRI-certified performance, and ease of maintenance. Airxchange offers a full line of ERV wheels that are sold through HVAC equipment manufacturers in integrated packaged systems, as accessories for packaged units, or as ERV options. Through its patented designs, new materials, and innovative manufacturing techniques, Airxchange provides practical ener-
gy recovery solutions for all HVAC systems (100–35,000 CFM). In addition, Eno knew that, with a standard 5-year warranty, Airxchange ERV wheels would outlast the competition’s aluminum energy exchange devices in the salt air of Florida’s east coast.

Florida’s air is usually quite warm and humid, but Eno was able to demonstrate that by recovering 70% of the school’s exhaust-air energy and recycling it, the ERV system he recommended would allow the architect to reduce the required size of the school’s packaged HVAC unit by half. Because the ERV would dramatically lower the OA load, the school could get by with a much smaller, much less expensive HVAC system. The design was modified accordingly, and the ERV system was paired with a high-efficiency unitary air-conditioning unit on a single plenum curb to minimize internal duct connections and to simplify the installation on the roof of the school.

The Airxchange energy recovery wheel was mounted horizontally, keeping the height of the packaged HVAC system to a minimum and preserving the building’s architectural profile. With the ERV wheel in this configuration, it is very easy for maintenance personnel to check its operation and change filters.

Most energy recovery wheels are difficult and time-consuming to clean, and contaminant build-up in the wheels can significantly reduce performance over time. The Airxchange wheel’s unique design, however, includes lightweight, durable segments (shaped like pie slices) that can be easily removed for cleaning on or off the site. In less than 30 minutes, one person can replace all segments with new or previously cleaned spares and return the wheel to service. If properly filtered, and if the filters are maintained in accordance with the manufacturer’s recommended schedule, however, energy recovery wheels installed in schools rarely need cleaning.

In effect, the downsizing of the overall HVAC system paid for the ERV system. In addition, thanks to ERV, the school saves approximately $500 every month on its utility bill.

Humidity is well controlled by the school’s HVAC system despite the very high intake of outside air, and indoor comfort levels are excellent. According to Eno, the system manages all of the outside air ventilation for the whole building, conditioning it and feeding it into the returns of all the air handlers. The air handlers are a part of a building-wide variable refrigerant flow (VRF) system that modulates the refrigerant flowing through the coil. This maintains desired humidity without overcooling the building and prevents the coil from icing up as well.

“The indoor air quality is excellent. The building is very comfortable, and the air always smells fresh and clean.”

Bubli Dandiya, Owner
Turtle River Montessori School

The success of the HVAC system at the Turtle River Montessori School has led engineers at KAMM Consulting to make use of this same type of ERV design on several other projects, specifying the Airxchange energy recovery wheel for each one.

About Airxchange

Established in 1982 Airxchange has extensive experience in the design, manufacture, sale, and support of energy recovery ventilation components to manufacturers of Heating, Ventilating and Air Conditioning (HVAC) equipment. The company played a pioneering role in the formation of industry standards and third party performance certification programs, which validate their transformative technology. Airxchange technology is now widely available through leading HVAC manufacturers.

For more information about Airxchange, please visit www.airxchange.com.