

## Building Performance Equipment, Inc.®

Sustainable, Reliable, and Energy Efficient Ventilation Systems





BPE-XE-MIR-3000 ERV by BPE, Inc.



Duct sock or bag near ceiling

### LOCATION

Newport Tennis Club (Indoor tennis facility) Newport, NH

#### Challenge

As with most indoor sport facilities, an indoor tennis court can feel stuffy and smelly without a proper HVAC system installed for ventilation and temperature control. Uncomfortable temperatures can affect player performance, and air rebreathed umpteen times makes for unhealthy indoor air quality.

Another discomfort, humidity, is a serious problem for the facility thanks to player sweat and exertion. More importantly? This court is clay. Dry clay courts become hard, can crack, and create loose grit that affects player performance. To prevent that, an indoor irrigation system waters the court periodically—just like a lawn. So, now the building begins to sweat along with the players and all that extra humidity can rust equipment over time.

Such were the ventilation, thermal comfort, and excess humidity issues that Newport Tennis Club struggled to control. The club wanted a heathier and more comfortable experience for their players and employees, so they brought in Paul O'Loughlin of Horizon HVAC, LLC. as Lead Designer and Install Contractor, along with Richard Egan of <u>VentilationUSA, LLC</u>.

#### Solutions

The team chose a BPE-XE-MIR-3000 Energy Recovery Ventilator as the perfect air exchanger for bringing in 3000 cfm of pre-conditioned outdoor air for the supply side of the new HVAC system. Simultaneously, the unit captures as much as 80% of the heat energy from stale air that passes through the exchanger on its way out. In this way, the incoming air heats or cools using recycled energy. While the system will circulate 6000 cfm of air, only half of it needs thermal conditioning. For all these reasons, this system will lower energy bills and emit fewer carbon emissions over time.

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(Left to right) the exhaust side and supply side of the system; the filter box on the supply side for incoming air; the supply side of system with BPE-XE-MIR-3000 at the top.



There is more to this custom system, though: On the supply side, fresh air comes in through an outdoor louver before continuing through a filter box containing two 24" x 24" x 2" filters. From there, it is pulled into the BPE-XE-MIR-3000 via a supply fan. Traveling through the ERV air exchanger, the outdoor air is warmed or cooled by the heat energy of stale return air moving through the ERV in the opposite direction before leaving the building.

The fresh air continues upward through ductwork and into the supply duct sock which runs across the courts close to the ceiling. Holes on the underside of the sock ( $\frac{1}{2}$ " in diameter) release the fresh air. Holes on top of the sock allow some of that air to aid the exhaust side of this set up in pushing warm stale air downward for eventual release outdoors.

On the exhaust side, six filters suck in stale air from the playing area thanks to a second supply fan. Half of this air moves through the ERV to pre-condition outdoor air before it is pulled out of the building by an exhaust fan. The other half continues upward to recirculate the air through a second duct sock that travels across the courts. This sock's job is to push warm stale air downward with via ½"-diameter holes on its top side and to continue moving that air into the six filters through holes on the bottom side. In this way, the old air is displaced continuously as outdoor air comes in.



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Two 6" electronic air purifier discs were added to the system (one on the supply side, the other on the return side). The units use internal brushes that ionize or charge the air so that more pollutants will effectively become trapped when moving through the filters.

With the problem of healthier and more comfortable indoor air solved, what about the humidity? ERVs help control humidity by design, but the one used here incurs up to 34% Latent efficiency, thanks to BPE's patented *Regenerative Condensate Return*<sup>®</sup>!



Air purifier disc on return

Now, that's great—except the humidity control worked too well. To stop the clay court from drying out, Horizon HVAC introduced a balancing act by installing humidistats to cycle the system on and off.

What did players think of this new HVAC system? Immediately, everyone noticed a huge difference since they could breathe fresh air verses humidity-laden air.

Keeping the system running smoothly is simple for staff to stay on top of since maintenance only involves checking the series of six filters on the return side for grime. When those filters are visibly dirty, they'll need replacement along with the two filters on the supply side of the system.

So, what's the recipe for an amazing indoor tennis court experience? Innovative, experienced design, an installation professional, and great HVAC equipment!