

PRODUCT APPLICATION GUIDE

A technical bulletin for engineers, contractors and students in the air movement and control industry.

Energy Recovery Wheel Maintenance

The routine maintenance requirements of all equipment needs to be considered in the initial system design. If equipment is difficult to maintain, chances are it will be ignored, reducing the effectiveness and life expectancy of the equipment. The maintenance requirements of filters, blowers, and motors are well known, but the level of familiarity with energy wheels is not as high. Understanding and implementing maintenance requirements for energy wheels will improve performance, effectiveness, and the life of the wheel. *Greenheck's energy recovery products are designed with routine inspection and maintenance in mind; all components (wheel, filters, motors) are easily accessible through removable doors. The energy recovery cassette slides out of the unit, and the energy wheel is segmented to allow removal without the use of tools.*

Routine Energy Wheel Maintenance

Routine Inspection

As with all rooftop equipment, routinely inspecting the ERV is good practice. Typically, outdoor air filters need to be changed once a quarter. At that time, maintenance personnel can also quickly inspect the wheel.

Cleaning Schedule

Creating a regular cleaning schedule is critical to maintaining the performance of the energy recovery wheel. The schedule should be based upon particles present in exhaust airstream, operating hours, and climate. The following guidelines may be used in determining the appropriate cleaning schedule for several applications.

- Reasonably clean environments: Schools, office buildings. Reduction in airflow or latent effectiveness may not occur for four to five years. Energy recovery wheels are self-cleaning in nature with respect to dry material. Because of the counter-flowing airstreams and laminar flow through the wheel, smaller particles enter the media and pass through. Larger particles attempting to enter are blown away from the wheel as it rotates into the counter-flowing airstream.
- Environments with moderate occupant smoking. Measurable changes in latent energy transfer and some loss of airflow can occur in less than two years. Tars and fine oils present in cigarette smoke may condense on and cling to the wheel, clogging pores in the desiccant which are required for effective moisture transfer.
- High smoke environments: Lounges, nightclubs, bars, restaurants. Latent effectiveness may be severely reduced in less than six months along with some loss of airflow, due to the build-up of tars and nicotine.
- Industrial application: Welding shops or other machines ventilating high levels of smoke or oil particles. Applications like this may require cleaning every three to six months.

In all applications, loss of indoor moisture control during the cooling season could indicate the need to clean the energy recovery wheel.

Cleaning Procedure

Cleaning the energy wheel to regain latent effectiveness and full airflow is a relatively simple

process. Depending upon the severity of the application, the 10-minute soak or overnight soak method may be employed:

10-Minute Soak — Soak the segments in a solution containing any household detergent, such as 409™, Fantastik™, or a coil cleaning solution and water. Soak each segment for ten minutes and rinse under tap water.

The 10-minute soak method is sufficient for environments with moderate to no occupant smoking (clean application). Wheels in clean applications only need to be cleaned every 4-5 years.

Overnight Soak — Soak the segments in a solution containing any household detergent, such as 409, Fantastik, or a coil cleaning solution and water for approximately fifteen hours. Rinse the segments with tap water.

The overnight soak is most often used for high smoking applications where tars and oils have built-up on the wheel. Wheels in smoking applications should be cleaned every 3-6 months. Staining from the tars and nicotine may occur, however it will not affect the performance. It may be beneficial in applications where frequent cleaning is required to have a second set of segments on hand. The clean set of segments can replace the dirty set, and the dirty set washed and stored.

Other Wheel Maintenance Considerations

The focus of this article so far has been on the polymer energy wheel; the other common energy wheel medium is aluminum. The physical differences between the two media lead to differences in their maintenance requirements.

Will washing the energy wheel remove the desiccant? The continuous ability to transfer moisture between airstreams depends on the bond between the desiccant and energy transfer surface. The polymer energy wheel uses a solvent bonding process to permanently bond the silica gel desiccant to the surface of the polymer. This creates a mechanical bond between the two mediums, so no adhesive is required. Testing the effectiveness of

wheels applied in nightclub and lounge settings before and after repeated washings has proven that it does not significantly deteriorate the latent effectiveness of the wheels; those wheels showed less than a four percentage point reduction in latent efficiency after three years in operation.

Most aluminum wheel manufacturers recommend cleaning the wheel by vacuuming it, but because fine oils and tar cling to the wheel, vacuuming has been proven ineffective. Aluminum wheel manufacturers suggest NOT using any detergents on the wheel, because, as the owners manual states, it may destroy the bond between the desiccant and the aluminum.

Wheel Removal — The cassette of the polymer wheel slides out of the housing for wheels less than 56 inches in diameter. Polymer wheels larger than 26 inches are segmented, with the weight of each segment ranging from 4-23 pounds. The segments may be removed without the use of tools.

The majority of aluminum wheels are not segmented, therefore the entire hub assembly must be taken apart to remove the wheel from the cassette. On larger units, the wheel cannot be removed from the unit at all.

Durability — Polymer is obviously non-corrosive, and it's also flexible. If, during maintenance, a screw-driver or other tool would impact the media, it will go right through the media wraps without damaging the heat transfer matrix.

The face of an aluminum wheel is similar to the face of a coil; the fluted design is very delicate. If impacted with a tool of any sort, the flutes bend and block air from passing through the wheel.

Wheel cleaning is crucial to maintaining the energy recovery effectiveness and life of the wheel. Greenheck's energy recovery equipment is designed for easy access to all components making routine inspection and maintenance easy and efficient.