Specific problems

Once again, the owner's manual is your friend. In the back of the manual, you should see a list of troubleshooting steps. Read it before there is a problem so you can know the sorts of things to look for. For instance, if your ice cubes start looking funny then there can be serious problems with your ice machine head that must be addressed before the whole machine breaks down.

Set up a maintenance schedule after you get your machines so you can get a good return on the value of your investment. Commercial ice machines and refrigerators are not cheap! Keep them in good condition and they'll serve you well.

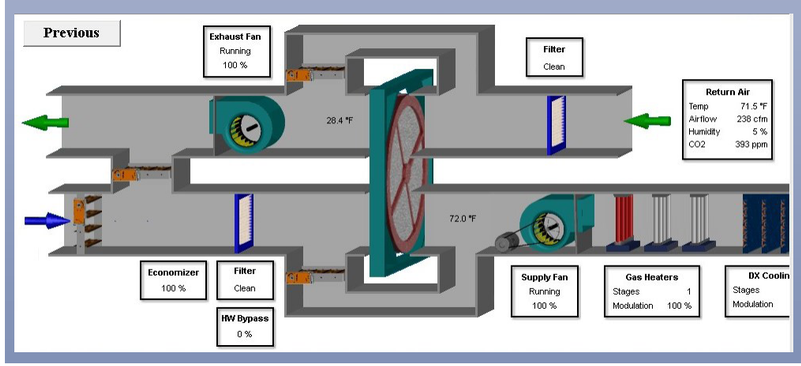
Written by Guest Blogger Mark Masterson from www.icemachinesplus.com

Energy Recovery Units – What's Behind the Wheel?

I recently got a phone call from a Facility Manager who had found my blog about Energy Recovery Units online. He had a great follow up question that I want to share here. He asked whether the wheel spins faster in the heating season or the cooling season? I like this question for a couple of reasons. First, because it points out that the ERU works for both the heating and cooling season. And second, because it leads to other cool questions about what controls the speed of the wheel and WHY? I'm like a five-year-old with the question "Why?" I love it! Thank God I have a blog and have a weekly reason to keep asking that question! To view the blog or subscribe to weekly blog emails, visit us online at www.advanceair.net.

My original Energy Recovery blog happened to be posted during the heating season, so I (very shortsightedly on my part) only talked about the operation of the ERU in the heating season, but it absolutely does provide energy recovery for BOTH the heating and cooling seasons. For cooling, it basically does the same thing, absorbs heat from air. But in the summer, it provides the reverse benefit, removing heat from outside air before it comes in versus inside air before it goes out. Wait, huh? Let me start over and say that another way… During the heating season, any air that is taken out of the building by exhausting is heated air and the air that is coming in is freezing cold. So the wheel absorbs heat from the exhaust air before it leaves the building and transfers it to the air coming in, so it gets heated up before it enters the building. In the cooling season, the wheel absorbs the heat from the outside air, removing it before it enters the building. The wheel spins, taking the heat into the exhaust air stream, making the heat do an abrupt about-face when the exhaust air blows it right back outside. Take THAT heat wave! So in both the heating and cooling season, the heat gets removed from one air flow and redirected into another. Cool, right?

But that still doesn't answer the question about whether it spins faster in the heating season or the cooling season. The quick answer is this. The wheel's speed varies based on the level of need for heat exchange. It operates faster when the greater heat exchange is required. So its not necessarily faster in heating or cooling season, it's fastest when there are extreme temperatures in either direction, hot or cold. During temperate times when less heat exchange is needed, like Spring and Fall, the wheel can spin more slowly. Sounds simple, right?



Well, although the ideas behind most energy efficiency upgrades are generally simple, the engineering and programming that make them run is almost always COMPLICATED. I don't know about you, but reading physics and engineering papers makes my eyes bleed. So to avoid mass eye-bleed trauma, I've made an attempt to summarize the delightful words of the engineers into my own to try and get into the how's and why's of ERU operation. However, if you're the sort who enjoys the pain and anguish of reading about maths and looking at graphs, you can find the link to the full article from the awesome folks at Johnson Controls on our website. There are all sorts of equations with x's and q's to solve for. Proceed at your own risk and don't say I didn't warn you.

The article talks about an equation that calculates the ideal speed of the energy recovery wheel to get maximum heat transfer. Generally speaking, the faster the wheel turns, the greater heat transfer, however, there is a point at which the wheel can spin too fast for ideal transfer, so the equation is about finding the sweet spot. So, to point out the obvious, as the rotational speed of the wheel decreases, the heat transfer capacity also decreases. However, what I found interesting is that it doesn't necessarily decrease proportionally. According to the article, reducing the speed of the wheel by 50% may only result in a 10% reduction in energy transfer from the wheel. For this reason, the speed of the wheel is not the only factor in controlling the rate of heat transfer. A bypass is often used as well.

The ERU's actual energy transfer rate is controlled by two things: the speed of the wheel which is usually controlled by a VFD and the percentage of air that takes a detour and gets bypassed around the wheel. You can see the bypass in the graphic above. It's the section of ductwork at the very top of the picture that allows air to go around the wheel. There's a damper on the left that can be opened a little or a lot depending on the amount of bypass air needed. The calculations that control the operation of the wheel and the bypass are figured out by a control module and/or controls system that can read and evaluate the input data that makes up the equation (enthalpy from SA, RA, OA, CFM, differentials, etc.) so that it can figure out the most efficient operation of the units based on current operating conditions. Basically it decides which air is better to use – outside or inside – based on the levels of heat, humidity, etc. of one air compared to the other. Again, something that sounds fairly straightforward, but requires eye-bleeding algorithms to control. Thank God for user interfaces that do not require re-writing the algorithm to make adjustments!

So, in that long-winded explanation, what I discovered was that the wheel's speed varies, but would operate at its fastest when you need the greatest heat exchange, which would be in extreme temperatures (hot or cold). During more temperate times, it would need less transfer and slow down and/or bypass more. Question answered!

An Energy Recovery Unit is a great tool to have in your energy efficiency arsenal, especially if you require a significant amount of fresh air in your building. To find out if one will work in your building, give us a call!

Advance Air Gets Published in HVACR Magazine!

An article written by Advance Air's Karen Lamy DeSousa was featured in the Women in HVACR edition of the HVACR Distribution Business Magazine in July. The special edition featured about twenty women in HVACR across the country, and Advance Air was thrilled to be included. Find a link to the article and the rest of the magazine one our website at: http://www.advanceair.net/this-is-not-your-fathers-hvacr-industry/