NEWSLETTER - MARCH 2021

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TECH TALK

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SERVICE CALLS

On a recent service call, our tech found low- and no-air conditions causing increased temps and occupant discomfort. Airflow static pressure and DP checks revealed **issues in multiple dampers throughout the facility** including bound linkage and blades, broken shafts, and non-operating actuators. Some dampers and actuators required replacement while others only required minor repairs. Damper testing and air balancing restored building systems to design intent.

A hospital called MSC to investigate intermittent vibration and noise in a large exhaust fan. After running the fan through various speeds, it became evident that the rotating fan shaft was creating **resonant vibrations** as it passed through critical speed at 41 to 43 Hz. We programmed the drive to pass quickly through this band to prevent damage while accurately maintaining negative static pressure.

In-Person Schooling: Ventilation & Coronavirus Mitigation

New COVID-19 relief packages inject funding into school reopening efforts

Providing safe in-person education has been a difficult undertaking for many schools around the country since the COVID-19 pandemic hit. Here in New Jersey, most K-12 schools are open in some form for in-person instruction, but few are open full time. Most are following a part-time hybrid model, and some remain remote-only due to the many challenges of meeting health and safety guidelines.

Now, with the Biden administration pushing for reopening the majority of K-12 schools by the end of April, a new COVID-19 relief package in the works, increasing vaccine availability, and new school reopening guidance recently released by the CDC, there is a renewed focus in schools on one of the key COVID-19 mitigation strategies: improved ventilation.

As service sub-specialist in HVAC, building automation, process cooling in commercial, industrial and institutional environments, MSC is ideally positioned to help schools help reduce concentrations of infectious aerosols to the greatest extent possible through ventilation system improvements. This includes ASHRAE, OSHA, and CDC-recommended strategies like increasing ventilation rates, increasing outdoor air, upgrading central air filtration to the highest compatible, sealing systems to limit bypass, running HVAC systems for longer hours to increase air exchanges, and ensuring ventilation systems are operating properly to provide acceptable indoor air quality based on occupancy. *(continued on page 2)*

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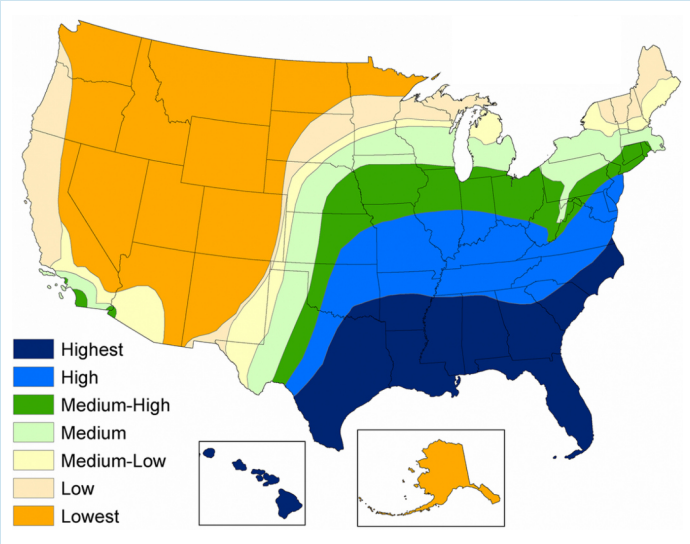
Green Buildings: Benefits of AHU Condensate Capture

Capture and reuse of condensate from large air-handling units is a method of water conservation proven to be highly effective. Treated water doesn't come free, so collection of thousands of gallons of condensate each year for onsite reuse makes perfect sense. A Condensate Capture Potential Map published by the Department of Energy and ASHRAE designates New Jersey's potential as High to Medium-High.



In a condensate capturing system, AHU condensate that is typically discarded into the sanitary sewer system is directed to a central storage tank or basin and distributed for reuse. One common use for reclaimed condensate is cooling tower make-up water. Because condensate is clean and low in mineral content (it's essentially distilled water) and cooling tower water is treated, no additional pretreatment is required. Other uses for reclaimed condensate include pre-cooling economizer, irrigation, ornamental fountains and ponds, industrial process makeup, and toilet and urinal flushing. When used in applications where the water may be aerosolized and inhaled, such as sprinklers and flushing, reclaimed condensate must be first be disinfected to remove any biological contamination.

Local climate, type, size and number of buildings and cooling systems, use patterns, and outdoor air requirements are factors that should be taken into account when considering whether HVAC condensate recovery is a good choice for your facility. Large laboratory buildings, which require a great deal of outdoor air, are ideal candidates for condensate capture, as are buildings with high-density occupancy. Payback is usually quick, occurring in as little as one year.

School Ventilation

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The real challenge for many educational facilities, however, is figuring out how to make these improvements happen. Many are hampered by aging buildings, poor ventilation systems, and lack of funding needed to correct these problems. Fortunately, there appears to be new hope on the horizon.

The $900 bill Coronavirus Response and Relief Supplemental Appropriations Act (CRRSA) signed into law in December 2020 included $82 billion for K-12 and higher education, and the proposed American Rescue Plan dedicates another $170 billion to help shore up schools. CRRSA allows a broad range of uses for funding allotted to schools, including "repairing school facilities, especially ventilation systems, to improve air quality and reduce the spread of COVID", and President Biden's proposed plan specifically mentions ventilation improvements, as well. For more information on improving and upgrading school ventilation systems, please contact MSC at (973) 884-5000.

COMING SOON: Cooling Season

Spring is just weeks away, almost time to turn off heating systems and perform the necessary PM to prepare for warmer months. Replace winter filters and clean evaporator coils, condensing coils, and drain pans. Cooling towers and tower water filtration systems should be cleaned and tested. Flush and blow out chilled water systems and clean strainers; the same goes for reheat hot water systems. Check for refrigerant leaks in all DX systems. Spring is swing season when we run cooling during the day and heat at night, so make sure economizer cycles are programmed correctly. Lastly, make sure all systems operate to design intent to conserve energy and extend equipment life.

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Clean Condenser & Evaporator Tubes a Must for Chiller Efficiency

Keeping evaporator and condenser tubes as clean as possible is critical for maintaining chiller efficiency. According to the Department of Energy, inefficient chillers can expend as much as 30% more energy than a well-maintained unit. When interior tube surfaces become fouled with scale, mud, algae, sludge, or other contaminants, even in small amounts, thermal resistance causes the chiller to work harder and energy efficiency plummets. Chiller manufacturers typically recommend that condenser tubes be cleaned annually; evaporator tubes should be cleaned about once every three years in closed systems, more often in open systems.

There are two basic methods of cleaning chiller tubes: chemical and mechanical. In chemical tube cleaning, an acid solution is circulated through tube bundles to break down or soften calcium, lime, rust, and other deposits. This process should always be followed by a thorough mechanical cleaning. While chemical cleaning can, in many cases, be quite effective, it can also be costly and time-consuming.

Mechanical cleaning is effective for removing accumulate materials like mud, sand, and algae from smooth-bore tubes, and there are several means with which to do it. The old-fashioned rod and brush method is sometimes still used, but it's time and labor intensive and only moderately effective. The chiller tube cleaning gun, which is a good choice for lighter buildup, propels brushes, rubber bullets, or scrapers through tubes using compressed air and water, or high-pressure water alone, to remove deposits. A third method that is affordable and very effective, the rotary tube cleaner, utilizes a motor to rotate a flexible shaft that can be fitted with a variety of brushes and other tools. It's the best choice for cleaning internally-enhanced chiller tubes, which employ spiral grooves to provide better heat transfer.

Many new chillers come equipped with on-line tube cleaning systems, which can also be retrofit onto existing chillers. A brush tube cleaning system consists of two catch baskets fitted into the ends of each tube and a nylon brush. The direction of cooling water flow is periodically reversed, propelling the brush to the opposite end of the tube before it returns to its original position when flow direction returns to normal. Another type of system features sponge balls that circulate through the tubes and scour off scale and fouling in their travels. With proper water treatment, automatic systems can be extremely effective and eliminate the need for tube cleaning. Retrofit tube cleaning systems can be somewhat pricey up front, but payback typically occurs in under two years.

IAQ Trends: Businesses are Using CO2 Sensors to Assess COVID-19 Risk

Monitoring of indoor carbon dioxide levels has long been used as a key indicator for ventilation quality. Now, businesses, schools, and private citizens are measuring indoor CO2 levels with commercially-available instruments to quantify the risk of airborne coronavirus transmission and provide insight into the quality of building's ventilation. The theory is that, while there is currently no device that measures infectious aerosols in a space, carbon dioxide can stand in as a proxy. CO2 concentrations can indicate how many people have been breathing in a space and how much their exhalations may be lingering in the air due to poor ventilation; higher concentrations may translate to higher infection risk. According to aerosol scientists and IAQ experts, this concept is supported by science.

This heightened interest in ventilation and IAQ is highly encouraging, but there is some concern that CO2 readings could be misinterpreted by nonprofessionals. A CO2 reading of 1,000 ppm would far more alarming in a space with 5 people in it, for example, than in a space occupied by 25, and elevated CO2 counts in spaces served by HVAC systems with good filtration or portable HEPA filters don't necessarily indicate increased Covid risk. Also, handheld CO2 sensors may be inaccurate or need calibration, and readings can be affected by the presence of other greenhouse gases. But with a proper understanding of how to use these devices, the growing consensus is that they can be effective day-to-day risk assessment tools for helping building owners identify areas of poor ventilation. Please contact MSC for more information on CO2 and building ventilation.