NEWSLETTER - DECEMBER 2019

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TECH TALK

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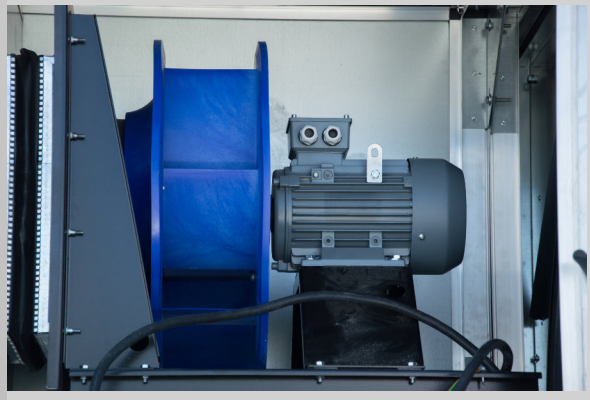
(973) 884-5000

SERVICE CALLS



Fan Vibration Corrected - A new client was referred to MSC when they began experiencing vibration and noise issues in a clean room manufacturing area. When our analysis revealed that the AHU fan vibrated excessively when the VFD operated between 47-49 Hz we eliminated the issue by programming the drive to bypass the frequency where the vibration occurred, leading the client to have MSC perform vibration testing on all of the facility's fans.

Compounding Pharmacy Humidity - When MSC responded to an emergency call from a compounding pharmacy with intermittently low humidity levels, our tech found significant calcification in several electric water-to-steam humidifier canisters, and total dissolved solids were measured at over 140 ppm. Our technician determined that the R/O membrane and associated filters required immediate replacement and canisters needed to be cleaned. Once completed, RH returned to and maintained at its proper level.

Project Recaptures Original Meaning of *Value Engineering*

To many construction industry professionals, the term *value engineering* refers to an upfront cost-cutting exercise that usually results in a lower quality end product. In actuality, value engineering was first developed to seek the **highest quality at the lowest cost for the duration of the product's entire life cycle**.

It was this type of value engineering that an entrepreneur was looking for when they recently sought out MSC's expertise on a new process manufacturing project that was still in the design phase. Given that MSC is usually called in during the startup and commissioning phase, or when problems occur, it was a surprising request and we were eager to participate.

The facility in question was to be the first of three for the promising new startup. This was to be their beta test module, and they wanted to anticipate and eliminate as many potential issues as possible, setting the standard for the other facilities to follow. Much was at stake, and the owners, who had previously worked with MSC, were determined to ensure the first plant's future functionality, reliability, and repeatability by having MSC recommend the most robust, reliable equipment and controls that would not add significant cost to the project.

MSC's first step was to establish what variable frequency drives would be used throughout the facility for both HVAC and process, with the criteria that they be easy to program and troubleshoot and had good factory technical support if needed. Next on the list was to determine the appropriate static pressure transmitters and temperature and humidity transmitters that would be most robust for the application and could be easily field-calibrated, followed by humidifier wands and controls. Lastly, the team discussed air handler and split systems known to be reliable, along with chilled water, hot water control valves, and actuator manufacturers. MSC examined each and every instrument and piece of equipment and provided detailed information on how we arrived at our recommendations.

This project is currently underway and progressing well, with MSC slated to assist in startup and commissioning.

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Public Schools Invest in the Best HVAC Systems

So why do they tend to go out of whack so quickly?

Here in the Northeast and Mid-Atlantic regions, almost all major HVAC projects in public schools start out with noble intentions. Most school districts invest in advanced, high-efficiency equipment and state-of-the-art building controls systems. Reputable contractors closely adhere to design parameters and strict startup and commissioning standards are met. Comparatively few private-sector building systems are as advanced as those commonly find in new public schools.

Why is it, then, that so many new school HVAC systems degrade in performance so soon after projects are completed?

First, in contrast to the meticulous attention to detail that occurs during design and installation, public schools tend to be very lax when it comes to properly maintaining their mechanical systems. At the end of a project, facilities should always have the commissioning agent write a comprehensive retro-commissioning plan to be performed on an annual or semi-annual basis to ensure the building continues to perform to the original design intent. Unfortunately, this rarely happens on school projects.

School systems also frequently fail to stay on top of making sure maintenance personnel are qualified to maintain and operate their building systems, and they neglect to train new employees when there is turnover. Further, poor HVAC system performance is often the direct result of misinformed actions of underqualified and/or unsupervised maintenance staff. When instruments drift out of calibration, parts fail, or operational issues occur, there is a high tendency for employees to remedy these problems by taking shortcuts, overriding controls, or switching systems to manual mode.

Finally, school systems tend to drop the ball when selecting a PM contractor. Advanced building systems call for contractors with advanced technical knowledge, but public schools usually opt for low-bidders who are seldom qualified to maintain and service high-tech geothermal, heat pumps, heat recovery wheels, air-to-air heat exchangers, run-around glycol systems and the like.

What can be done? Public schools could save themselves untold problems, expenses, and the grief of comfort complaints from students and faculty if they would only follow through on actually achieving their systems' promises of high efficiency and performance. This is done through regular maintenance and retro-commissioning and stringent personnel training and supervision. Expert HVAC specialists and commissioning agents like MSC can produce a comprehensive PM SOP for high-tech systems after the fact, as we have frequently done in the past for schools, hospitals, pharmaceutical manufacturing facilities, laboratories, etc.

7 Steps to Preventing Winter Freeze-Ups

- Check cooling tower sump heaters for proper operation
- Ensure that pipe heat tracing is monitored and alarmed
- Install temporary heaters in building cold spots and freeze-vulnerable areas
- Keep water circulating in closed loop systems and use freeze protection pumps
- Check glycol concentration levels which can dilute or diminish over time
- Check AHU freeze stat operation to protect coils from freezing
- Verify that building pressurization is positive to avoid drawing in cold air

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Windcatchers: Ancient Natural Ventilation Towers are Still in Use Today

The windcatcher is a tower-like architectural element that provides natural ventilation and cooling in buildings throughout the Middle East without the use of mechanical devices. There is some dispute whether the windcatcher originated in Egypt or Persia, but most experts agree they have been in use for several thousand years and are still widely used today.

As the name suggests, windcatchers are designed to harness breezes and direct them downward into the indoor space below to provide passive ventilation. There are three main types of windcatcher; the most common type features a tall, capped tower with a single opening facing the prevailing wind. The air is channeled down the tower, circulating through the building and venting out through openings at the top of the structure. Movement of the air provides a cooling effect.

A second type is used in conjunction with a qanat, or underground canal, to provide evaporative cooling. In this method, the tower is open on the side opposite the prevailing wind. Pressure differential on one side of the building causes air to draw down into the qanat access shaft on the other side. The air is cooled through contact with the cool water and tunnel walls, as well as through evaporation, then drawn up through the building to exit the windcatcher. This method has been shown to reduce temperatures by 20°F or more. In the absence of a breeze, a third type ofwindcatcher can also function as a solar chimney, creating a pressure gradient that allows hot air to travel upward and escape from the tower opening.

MSC is a Rare Expert in Pneumatic Controls

Before the advent of direct digital controls technology (DDC), pneumatic controls were used in the HVAC systems of most commercial and industrial buildings. Though DDC has largely taken over, pneumatic controls are still used in certain applications, and these systems still require expertise in their service and maintenance – a dying art among HVAC and controls contractors.

Pneumatic temperature control systems were first introduced in the late 1800's when the Johnson Electric Service Company (now Johnson Controls) figured out how to use compressed air to remotely modulate a valve. By the early 1900s, pneumatic controls made their appearance in buildings around the world, and their wide use continued into the late 1980's. These systems were easy to install and operate, but they required diligent maintenance as proper operation of pneumatic controls depends on dry air in the tubing as well as transducer and positioner accuracy. Bladders, springs, and diaphragms all require annual calibration, inspection, testing and leak checking as they have a tendency to drift out.

While some of the pneumatic controls in use today are older systems that have not yet been upgraded, many facilities still opt to install pneumatics over DDC for large control valves in HVAC and process, or as a cost-saving alternative to DDC in explosion-proof environments. Though pneumatic controls expertise is becoming increasingly rare, MSC has always provided expert calibration, diagnostics, repair and installation of these systems. For more information, please contact MSC at 973-884-5000.