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TECH TALK

MSC - THE ONLY TRUE HVAC SERVICE COMPANY - WE FIX IT

NEWSLETTER - OCTOBER 2017

973-884-5000

SERVICE CALLS

Pressure Cascade Neutral Point
MSC was called in to find out why a pressurization system was not operating properly in lab and process areas at a new facility. MSC techs determined that the neutral pressure point was not actually neutral and was subject to pressure fluctuations. The issue was corrected along with VAV box speed reaction time and rebalancing.

Gas PRV Problem
A new facility was having issues with gas boilers and package AHUs shutting off due to erratic gas pressure. Incoming pressure was steady at 2 psi while downstream pressure fluctuated from 0-12 inches. MSC technicians found the installed pressure reducing valve was unsuitable for the system and replaced it with the correct remote-sensing PRV.

TIGHTEN ALL ELECTRICAL CONNECTIONS

There is a seemingly-basic preventive maintenance task that is far more important than people may think: tightening all electrical connections. Lack of attention to this simple task can cost you a pretty penny.

Power wires to motors, compressors, pumps and fans heat up during their normal, everyday operation. When the equipment isn't running, the wires cool down. This hot/cold cycle may cause electrical connections to loosen up, causing phase imbalance, high amp draws, damage to motors, and blown breakers.

MSC was recently called in to check out a 200-ton, three-year-old modular chiller on which two out of seven module sections had tripped. In the first tripped module, the compressor contactor had welded itself closed, rendering the compressor unable to shut off. This caused the heat exchanger to freeze solid, which in turn cracked and flooded the module's two compressors and piping with water, ruining both of them. In the second tripped module, two more compressors had failed as well, also due to issues with electrical connections. MSC's technician also found that loose connections had weakened the electrical breakers, causing many of them to trip before their rated amperage was ever met.

The estimated cost to replace the two damaged chiller modules? Nearly $120,000.

The lesson learned? TIGHTEN ALL ELECTRICAL CONNECTIONS.

INSIDE...

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CAVITATION & AERATION in a Chilled Water Pump System

A new hospital mechanical room was undergoing balancing recently when a distinct whining noise in a chilled water system pump was noted. The balancing contractor suspected a condition known as aeration and notified MSC, who was on the job performing commissioning. As it turned out, the balancer had made a common error. The actual problem was cavitation, a phenomenon that can cause pitting and erosion of the impeller, pump housing failure, excessive vibration, decreased flow, and energy inefficiency.

What is Cavitation?

Cavitation is the formation and collapse of vapor cavities in a flowing liquid due to rapid changes in pressure. When a pump demands more than can be delivered, air is pulled out of the liquid in the form of bubbles at the eye of the impeller. Once pressure is recovered in the discharge side of the pump, the air cavities implode, generating pressure waves that can damage the pump and its components. A telltale sign of cavitation is increased noise, often described as a high-pitched whine. Common causes include clogged suction strainers or filters, plugged breather caps, too-high drive speeds, poor piping design, or piping blockages.

What is Aeration?

Aeration is a condition that occurs when there is air in the suction inlet of a pump. The resulting noise is similar to cavitation, but it tends to be more erratic and often sounds as if marbles or bolts are rolling around in the pump. Aeration is frequently the result of misaligned or loose couplings, a leaking shaft seal, or reversed shaft rotation. Air leaks can often be identified by spraying oil on all of the fittings and connections in a suction line. When the sound of aeration stops momentarily, you've pinpointed the leak.

Cavitation Problem Solved

In the case of the chilled water pump at the new hospital, an MSC technician suspected cavitation, rather than aeration, after listening to the chilled water pump's steady whine, and promptly traced the problem to a plugged strainer. It turned out that, instead of using a chilled water strainer, the contractor had mistakenly installed a steam strainer that had quickly become clogged with accumulated debris. MSC replaced the strainer and the pump was soon up and running normally.

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HVAC & FIRE SYSTEMS WORK HAND IN HAND

HVAC plays an integral part in controlling the spread of smoke and fire via a building's air handling system to prevent injury and property damage in case of fire. Fire codes in most jurisdictions require duct smoke detectors be installed on the supply side of air handling units of more than 2,000 cfm and on each story of air return systems exceeding 15,000 cfm serving more than one story. When the presence of smoke is sensed within an HVAC duct system, a duct smoke detector will initiate an action appropriate to the situation, such as cutting power to individual air handling units or fans and opening or closing dampers, doors, or shutters.

Beam smoke detectors are often installed at upper levels of large, open areas with high ceilings where traditional smoke detection systems are difficult to install and maintain. These systems are designed to open floor-level doors and activate rooftop exhaust systems to purge smoke from the area in minimal time. Stairwells in high rise buildings employ somewhat of an opposite approach. When fire alarms are activated, static pressure sensors control the speed of rooftop fresh air intake fans to maintain positive pressure throughout the stairwell and prevent smoke from entering during emergency egress. In laboratories, fume hood systems are designed to reduce air flow to maintain just enough negative pressure to prevent chemical or biological hazards from escaping the hood when a fire occurs.

Intensive testing is required for all buildings to ensure that integrated fire protection and HVAC systems perform to design intent, during which local fire marshals and building inspectors use smoke emitters to mimic actual fire conditions. Testing is conducted under various scenarios, with normal power supply and on generator power and battery backup, to make sure alarms and emergency ventilation systems work in different situations. Fire system testing can be extremely demanding, with inspectors often requiring tests be repeated even after they've been passed successfully, and the entire inspection process can often take as long as two weeks in larger facilities.

GET READY FOR HEATING SEASON

Swing season is here! **As summer turns to fall and we make the transition from cooling to heating, now is the time to make sure economizer cycles are working properly to take advantage of the free cool nighttime air.** Autumn is also the time to perform preventive maintenance on all of your systems. Good PM goes well beyond changing filters and belts – MSC recommends inspecting heat exchangers, balancing hydronic systems, checking heat pump systems, and checking heating controls. If you are considering retro-commissioning, which can extend equipment life, reduce downtime and repairs, and substantially reduce energy cost, fall is the ideal time to do it.