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TECH TALK
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SERVICE CALLS

MSC received a call from a building owner who had concerns about a re-heat hot water system. The system, which was set to maintain 160°F with a steam-to-hot water heat exchanger, was slowly losing temperature over time. When the controls checked out OK, our service tech opened up the heat exchanger and found significant calcium buildup. After a thorough cleaning, we recommended water hardness testing and treatment to avoid future problems.

A new PM customer asked MSC to look into ceiling tile water stains in the conference room. Building staff had been unable to tell whether there was a roof leak or an exhaust duct was sweating. Our technician found the uninsulated duct to be dry to the touch, but using a psychrometric chart, he was able to determine that the duct would reach dewpoint on hot, humid days, causing condensation to drip onto the ceiling. Duct insulation and new tiles solved the problem.

The Truth About Airside Economizers

The trick to reaping huge benefits from your economizer is making sure it works, because there's a very good chance it doesn't

The airside economizer is a mechanical device that draws in fresh outside air when temperatures are cool enough, enabling building owners to take advantage of free cooling and improve indoor air quality. Economizers are extremely effective in reducing energy costs, often to the tune of hundreds or even thousands of dollars a month, and are required by code in most commercial buildings.

The problem is, however, that most economizers don't function properly, and many simply don't work at all. Furthermore, when economizers aren't working right, most building operators don't even know it.

Before we go into the reasons why this is often the case, it's important to first understand what these devices are and the basics of how they work. The airside economizer is an automatically-monitored and -controlled system of outdoor air and return air dampers that's integrated into a building's air handling system. These dampers deliver measured amounts of outside air based on outdoor temperature and humidity to help meet the building's cooling load. When conditions are right, economizers eliminate the need for mechanical cooling altogether.

Some of the biggest reasons why things go wrong with economizers are poor design and/or installation. Common design problems include improper sensor type, poor sensor placement, return damper oversizing, and inadequate pressure relief, just to name a few, and these issues are especially prevalent in systems that were never properly commissioned. Compounding this is the fact that many of the mechanics who install

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The Truth About Airside Economizers

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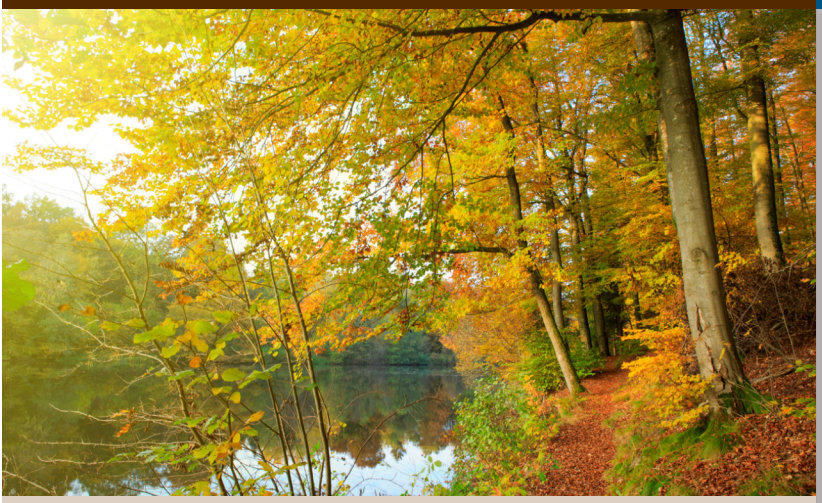
economizers have little idea of how they actually work, which is why proper commissioning is so very crucial. Sometimes, they don't bother to connect the economizer at all, and it sits idle for years. MSC has run across so many non-functional units in our travels that it rarely even comes as a surprise.

So how is a building owner to know whether their airside economizer is functioning properly, if at all? Through proper preventive maintenance – which brings us to the other main reason why these devices often don't work. Even in buildings that have a maintenance program in place for their air handling system, economizers are frequently overlooked, misunderstood, or both. Without proper PM, sensors drift out of calibration, dampers get stuck, linkages break, seals fail, and actuators stop working properly. On the controls side, there may be problems with sequences and settings that can seriously reduce system efficiency. Still another common problem is that facilities personnel will frequently disable economizers to remedy unrelated HVAC problems because they don't understand what they are and how they work, and building owners oftentimes are none the wiser.

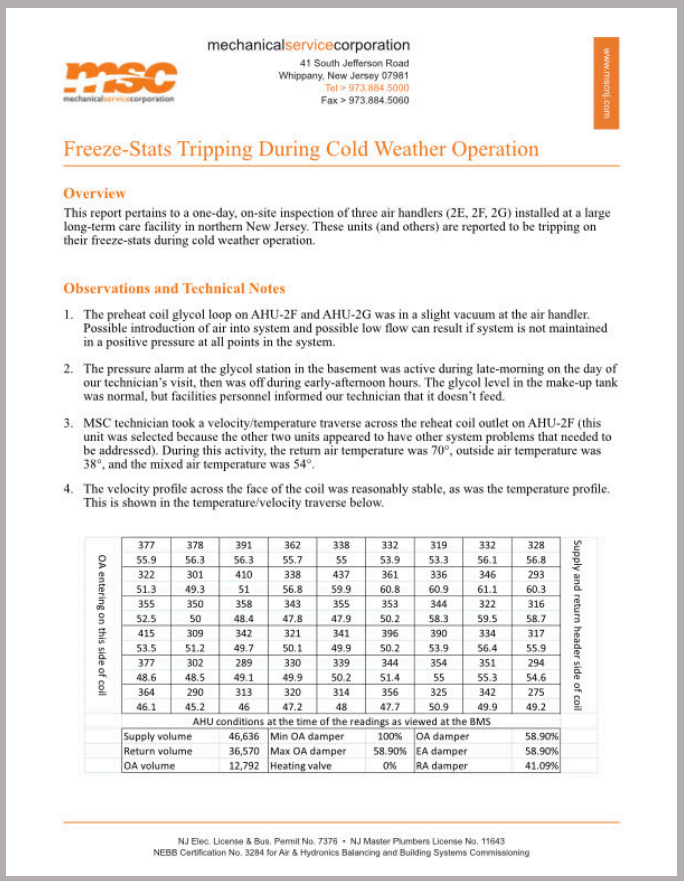
MSC is expert in economizer system design, service, diagnostics, commissioning, and retro-commissioning, and detailed economizer maintenance is included in all of our PM programs. For more information, please contact us at (973) 884-5000.

Get Ready for Heating Season



As summer turns to autumn and we make the transition from cooling to heating, now is the time to make sure your economizer is working properly. It's also important to perform maintenance on all of your systems, and make sure your PM program goes well beyond changing filters and belts. We recommend inspecting heat exchangers, balancing hydronic systems, checking heat pump systems, and checking heating controls. If you've been considering retro-commissioning your building systems, the fall season is the ideal time to do it.

CASE STUDY: Tripping Freeze Stats



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Freeze-Stats Tripping During Cold Weather Operation

Overview

This report pertains to a one-day, on-site inspection of three air handlers (2E, 2F, 2G) installed at a large long-term care facility in northern New Jersey. These units (and others) are reported to be tripping on their freeze-stats during cold weather operation.

Observations and Technical Notes

1. The preheat coil glycol loop on AHU-2F and AHU-2G was in a slight vacuum at the air handler. Possible introduction of air into system and possible low flow can result if system is not maintained in a positive pressure at all points in the system.
2. The pressure alarm at the glycol station in the basement was active during late-morning on the day of our technician's visit, then was off during early-afternoon hours. The glycol level in the make-up tank was normal, but facilities personnel informed our technician that it doesn't feed.
3. MSC technician took a velocity/temperature traverse across the reheat coil outlet on AHU-2F (this unit was selected because the other two units appeared to have other system problems that needed to be addressed). During this activity, the return air temperature was 70°, outside air temperature was 38°, and the mixed air temperature was 54°.
4. The velocity profile across the face of the coil was reasonably stable, as was the temperature profile. This is shown in the temperature/velocity traverse below.

OA entering on this side of coil										Supply and return header side of coil
	377	378	391	362	338	332	319	332	328	
	55.9	56.3	56.3	55.7	55	53.9	53.3	56.1	56.8	
	322	301	410	338	437	361	336	346	293	
	51.3	49.3	51	56.8	59.9	60.8	60.9	61.1	60.3	
	355	350	358	343	355	353	344	322	316	
	52.5	50	48.4	47.8	47.9	50.2	58.3	59.5	58.7	
	415	309	342	321	341	396	390	334	317	
	53.5	51.2	49.7	50.1	49.9	50.2	53.9	56.4	55.9	
	377	302	289	330	339	344	354	351	294	
	48.6	48.5	49.1	49.9	50.2	51.4	55	55.3	54.6	
	364	290	313	320	314	356	325	342	275	
	46.1	45.2	46	47.2	48	47.7	50.9	49.9	49.2	

AHU conditions at the time of the readings as viewed at the BMS

Supply volume	46,636	Min OA damper	100%	OA damper	58.90%
Return volume	36,570	Max OA damper	58.90%	EA damper	58.90%
OA volume	12,792	Heating valve	0%	RA damper	41.09%

NJ Elec. License & Bus. Permit No. 7376 • NJ Master Plumbers License No. 11643
NEBB Certification No. 3284 for Air & Hydronics Balancing and Building Systems Commissioning

Click the image to view our detailed report on persistent freeze stat problems at a long-term care facility

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MSC Breathes Life Back into Long-Dormant Lab Facility

MSC was recently involved in bringing a mothballed laboratory facility back online after an extended vacancy. The four-story, multi-space 150,000 sq. ft. facility had been unused for nearly five years, and during this time the building had received little-to-no preventive maintenance other than an occasional check to make sure the heat was still on.

Needless to say, many of the building systems were in poor condition and would require intensive work to return them to working order, but with the stipulation that it be done as cost-effectively as possible. We were to repair and replace only what was necessary to get the building back up and running. After thoroughly assessing all equipment and systems as a whole, we developed a detailed three-pronged approach.

Step one was to get all the utilities and equipment up and running after implementing lockout/tagout and confined space safety measures. Hydronic systems were drained and flushed, strainers were cleaned, and all air handler filters were replaced. Air compressors underwent complete PM, and several shell-and-tube heat exchangers received a thorough cleaning. Two electrical breakers, four starters, and two VFDs were found to be inoperable and required replacement, and bearings of different sizes were replaced on several pumps and fans as well. We were able to have two condenser water pumps, a 60 HP motor, and a 40 HP AHU motor rebuilt. The cooling towers, as you can see from the photos above and left, were in a severe state of disrepair and needed a thorough cleaning. The sump had to be rebuilt and leaking basins were repaired and recoated with epoxy.

Once all utilities were up and running, we began the second prong of the project: identifying heating and cooling issues. This included replacement of six bad RH control valves, a chilled water control valve, a DPT, and several temperature and pressure transmitters. The last step was system commissioning. More than a dozen data loggers were placed throughout the facility in carefully-selected areas to track around-the-clock system performance. As a result, we made significant airflow adjustments and brought in a third party for laboratory hood and flow sensor repairs. Because there were no drawings or sequence of operation available, our technicians had to go into the BAS software to read the sequence and found several items needing improvement.

Finally, we compiled a tiered list of repairs and replacements categorized as “very important”, “somewhat important”, and “nice to have” to help the client develop short-term and long-term budget plans. New tenants are now moving into the building and MSC has been engaged to perform all future preventive maintenance.