HVAC/R • PROCESS COOLING • BUILDING AUTOMATION

TECHTALK

QUARTERLY NEWSLETTER
MARCH 2025 • VOL 18 • ISSUE 1

SPRING FORWARD: A Comprehensive Preparation Guide for Maximizing HVAC Performance During Cooling Season

With warm weather almost upon us, now is the time to prepare for the transition from heating to cooling operations. A comprehensive spring preparation strategy ensures optimal performance, energy efficiency, and system longevity. Here is your essential spring checklist:

Basic Maintenance Fundamentals

- Replace filters and clean evaporator coils, condensing coils, and drain pans
- Clean and test cooling towers and water filtration systems
- Flush and blow out chilled water systems and clean strainers
- Service reheat hot water systems
- Perform refrigerant leak detection on all DX systems

Enhanced System Checks

- Inspect and calibrate control sensors and thermostats
- Test and validate all safety controls and interlocks
- Check belt tension and alignment on belt-driven equipment
- Verify proper operation of variable frequency drives
- Inspect electrical connections and components
- Test and validate building automation system (BAS) sequences

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Water Treatment and Management

- Test water chemistry in all hydronic systems
- Clean and treat cooling tower fill and basin
- Verify proper operation of chemical treatment systems
- Check condition of tower fill media and drift eliminators
- Inspect and clean all spray nozzles

Energy Optimization

- Take advantage of warm days and cool nights by ensuring economizer cycles are programmed correctly
- Review and optimize start/stop scheduled
- Check and calibrate outdoor air dampers
- Verify proper operation of demand-controlled ventilation
- Update setpoints for seasonal changes

Predictive Maintenance and Specialized Testing

- Document baseline operating parameters
- Perform vibration analysis on critical equipment
- Use thermal imaging to identify potential issues
- Record and trend amperage draws on major equipment
- Monitor bearing temperatures on large motors and pumps

System Performance Verification

- Confirm all systems are operating to design intent
- Verify proper temperature differentials across heat exchangers
- Check cooling tower approach temperatures
- Monitor space temperature and humidity levels
- Review trend logs for irregular patterns.

Remember: A well-maintained system not only saves energy and extends equipment life but also ensures optimal indoor air quality and occupant comfort throughout the cooling season. MSC combines comprehensive HVAC preventive maintenance programs with advanced service, diagnostic, and engineering capabilities to meet our clients' diverse needs. Our integrated approach ensures both day-to-day reliability and the ability to resolve even the most complex challenges.

For more information on how to prepare your facility for cooling season, please contact MSC at 973-884-5000.

Engineering the Future: Paul Cacioppo Brings Fresh Talent to MSC

After a brief stint as a sales engineer following his graduation from Virginia Tech in 2023, Paul Cacioppo made the decision in October 2024 to join MSC. His B.S. in Mechanical Engineering, problem-solving skills, and rapidly growing technical knowledge have made him an outstanding addition to our team.

Paul said about his decision to study mechanical engineering, "I've always liked the idea of being able to build things and solve problems. That's why I pursued this field—it gave me the tools I needed to become that problem solver."

Since joining MSC, Paul has spent much of his time out in the field, learning under the mentorship of our leadership team. This hands-on experience has proven invaluable for his professional development. "Every problem has a different solution," he notes. "You can see the same type of equipment malfunctioning 20 different times, and each time, it's a unique problem. No matter how often you run into an issue, you have to always have to dig deep with your troubleshooting skills to find out what the root cause really is."

Paul particularly values the guidance he receives from colleagues. "The quality of in-field education I receive from Andy (Heilmann), Tony (Folk), and everyone in the office has created a fantastic learning environment for me. The great leadership here at MSC has helped me develop much stronger technical skills in a short amount of time."

While working full-time at MSC, Paul is also pursuing a Master of Engineering in Engineering Management at Stevens Institute of Technology, with an expected graduation date of August 2025. "It's definitely a challenge working long days, then going to what feels like a 'second' job," he admits, "but it feels rewarding to be able to push, improve, and grow daily."

As one of the younger professionals in the HVAC industry, Paul brings a modern perspective and fresh energy to his work. With the field facing challenges in attracting younger talent, Paul's technical background and enthusiasm are particularly beneficial to our operations. He has quickly adapted to the specific challenges of our industry while contributing valuable insights to the team.

For Paul, working in HVAC offers unique satisfaction. "This is the truest application of mechanical engineering. You learn all of these theoretical concepts in school, and in many jobs, you might only apply one or two. But in HVAC and construction, you get to apply practically every concept you learned. It's hard work, and you have to be at the top of your game, but you're never bored."

As he continues to gain knowledge and experience, Paul represents the next generation of HVAC professionals—technically skilled, intellectually curious, and ready to take on the complex challenges of our industry. His journey is just beginning, but he's already making his mark on MSC and our customers.

Rising Star in HVAC Excellence: Josh Tanis

MSC service technician Josh Tanis has quickly cemented his value in the field. Pictured here with a Smardt oil-free centrifugal chiller, Josh regularly tackles sophisticated equipment with exceptional skill and dedication. Working closely with our senior technicians, he continues to master complex systems and intricate technical challenges. Josh recently completed specialized training in Turbocor Compressors and Daikin WMC Chillers, further enhancing his ability to handle some of our industry's most advanced technologies.

BSL-3 Laboratory HVAC Commissioning: An MSC Case Study

MSC successfully completed comprehensive HVAC commissioning for a BSL-3 (Biosafety Level 3) laboratory facility. BSL-3 labs are specialized environments dedicated to research involving infectious agents and other biohazards that require meticulous attention to containment measures, specialized ventilation systems, and sealed environments to ensure researcher safety and compliance with stringent regulatory standards.

The MSC commissioning team executed a multi-phase testing and verification process that encompassed all critical lab areas. Our work included thorough pressure testing of lab spaces and airlocks to verify containment integrity through degradation testing. We performed extensive pressure testing on all ductwork, air handlers, exhaust systems, bubble-tight dampers, HEPA housings, and air valves to meet the facility's strict containment requirements.

During the installation verification phase, our technicians confirmed that all HVAC components—filters, fans, VFDs, sensors, and controls—matched approved submittals and met design specifications. We completed all necessary instrument calibrations to ensure accurate system monitoring and control.

The functional testing phase began with systematic equipment start-up and verification of basic operational sequences. MSC's air balancing specialists achieved all air change rates specified by the design engineer, meeting the strict requirements for this critical environment. While BSL-3 laboratories typically require between 6-10 air changes per hour as an industry standard, each facility's requirements are determined by its specific design and usage parameters.

Critical pressure differential testing was performed across the facility, focusing on:

- The non-containment area outside the BSL-3 lab
- The neutral reference point for pressure cascade initiation
- Strategic monitoring points throughout airlocks and high-containment areas

Maintaining stable differential pressures while ensuring proper air exchange rates required precise calibration and control. MSC utilized high-quality differential pressure transmitters and implemented precise control strategies to maintain the required pressure relationships.

After establishing stable baseline operations, MSC successfully conducted comprehensive performance testing that validated the system's response to various scenarios, including air handler and exhaust changeovers, airlock operation, fan failure conditions, decontamination procedures, and power loss scenarios.

Through detailed system knowledge and expertise, MSC's team achieved optimal PID loop tuning and system timing, delivering a fully functional, safe, and reliable laboratory environment that consistently meets all BSL-3 containment requirements.

This project adds to MSC's portfolio of successful BSL-2, BSL-3, and BSL-4 laboratory commissioning projects, further establishing our industry leadership in this specialized field.

HVAC at the Top of the World: Greenland Summit Station

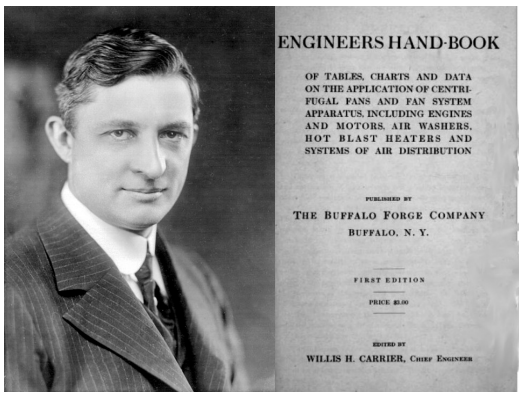
Perched at 10,551 feet atop Greenland's ice sheet, Summit Station stands as one of Earth's most remarkable HVAC engineering achievements. Conducting critical climate research and ice core studies year-round well north of the Arctic Circle, this facility showcases the extreme edge of environmental control technology.

Engineering challenges at the station are extraordinary. Maintaining a comfortable indoor environment means overcoming temperatures that routinely reach -60°F to -80°F in air pressure 30% lower than sea level. During winter months, operating in perpetual darkness in winds that can exceed 100 mph makes accessing external equipment for maintenance extremely hazardous. System reliability is paramount, both for human safety and for protecting sensitive scientific equipment that demand precise environmental control.

The heart of Summit Station's HVAC system is its innovative heat recovery technology, achieving efficiency levels over 90% through multi-stage heat exchangers. Specialized defrost cycles prevent critical component icing, while advanced moisture management systems prevent condensation freeze-up. The station's ventilation system handles extreme temperature differentials through custom-engineered air locks, advanced filtration systems, and sophisticated pressure management that compensates for altitude effects.

In an environment where system failure could be catastrophic, redundancy plays a crucial role. The facility maintains N+2 redundancy on all critical systems, with smart load shedding that prioritizes life-safety systems. Multiple backup power generation systems work in concert with thermal storage, ensuring continuous operation even during extreme events.

While few facilities face conditions as extreme as Summit Station, its innovations offer valuable insights for conventional HVAC applications. The importance of system integration, the benefits of advanced heat recovery, the value of predictive maintenance, and the critical role of redundancy planning are all applicable to more typical commercial and industrial settings.



Did you know that the concept of air conditioning was invented in 1902 not for human comfort, but to solve a humidity problem at a printing plant in Brooklyn, New York?

As a young research engineer at Buffalo Forge Company, Willis Carrier developed his groundbreaking invention to control humidity that was causing paper to expand and contract during the printing process, resulting in poor quality images. This industrial solution eventually transformed into the comfort cooling systems that homes and businesses rely upon today.