



June 2026

The Sage Report

A Monthly Newsletter of Insights, Projects, and Productivity



Sage Engineering Takes on the CDPHP Workforce Team Challenge



Representing Sage this year were (left to right in photo):
Luke D., Steve P., Charles Z., Aidan S., Kevin M., Dan B., Daneil N., Alva C., Marcus M., and Emily A.

Several Sage Engineering employees recently participated in the annual CDPHP Workforce Team Challenge in Albany. The event is one of the Capital Region's largest running events, bringing together thousands of participants from local businesses, organizations, and government agencies for a 3.5-mile run/walk through downtown Albany. The race promotes health, wellness, team building, and supports local charitable causes.

A special thank you goes to Alva Conklin for once again organizing the Sage Engineering team and helping coordinate participation in this outstanding community event.

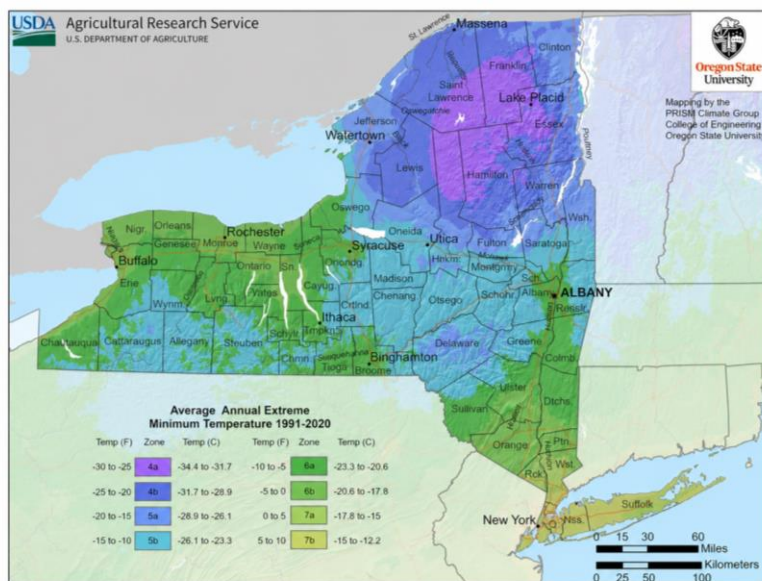
The Workforce Team Challenge is always a great opportunity to step away from the office, spend time with coworkers, and support a healthy lifestyle while representing Sage Engineering in the community. Congratulations to everyone who participated and completed the course.

The Heat Pump Myth: How Often Is It Really Below 0°F in New York?

One of the most common concerns about building electrification is what happens when outdoor temperatures drop below 0°F. Many residential cold-climate heat pumps can continue providing heat at temperatures approaching -20°F without supplemental heat. Commercial systems are often different. Many commercial air-source heat pumps and VRF systems require supplemental heating during periods of extreme cold to maintain building comfort.

The most common supplemental heat source is electric resistance heat, including electric boilers, duct-mounted heating coils, cabinet unit heaters, and electric baseboard radiation. This creates an important design consideration. The building's electrical service must be sized to handle the full supplemental heating load, even though those heating systems may operate only a small fraction of the year.

When engineers analyze historical weather data using temperature bin analysis, the results are often surprising. Even in cold New York climates, temperatures below 0°F represent a relatively small percentage of the 8,760 hours in a typical year. Most winter hours occur at temperatures where modern heat pumps operate efficiently without relying heavily on supplemental heat.



That does not mean backup heat can be ignored. The system must still be designed to meet the building load during the coldest conditions. However, it is important to recognize the difference between designing for a peak condition and operating at that condition.

Temperature bin analysis helps engineers understand how often various outdoor temperatures actually occur. This information can be valuable when evaluating electrical service requirements, operating costs, and heat pump system performance.

The next time someone asks whether a heat pump can handle a New York winter, the better question may be: how many hours per year does the building actually experience those extreme temperatures?



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Using AI to Generate Temperature Bin Data for Energy Analysis

AI can automate weather-data collection and processing that once required climate files, spreadsheets, and manual sorting. Temperature bin data is useful for energy calculations, load estimates, utility analysis, and evaluating air-source heat pumps. By grouping annual weather into temperature ranges, engineers can quickly see how often specific outdoor conditions occur. This is especially helpful when discussing heat pump performance with clients. Temperature bin data shows how many hours per year fall below a chosen temperature threshold. For example, if a heat pump operates efficiently down to 0°F, bin analysis can determine annual hours below that temperature. In many locations, those hours are minimal, helping clients understand that backup electric heat may run only during extreme weather events.

The same data can also be used to:

- Estimate annual heating energy consumption
- Compare heat pump operating ranges
- Evaluate electrical demand impacts
- Assess load shifting and electrification opportunities
- Develop simplified life-cycle cost analyses
- Support decarbonization discussions and Executive Order 22 goals

The prompt below can generate a ready-to-use Excel workbook for virtually any U.S. location:

Create an Excel spreadsheet of annual temperature bin data for [CITY, STATE] using the nearest NOAA TMY3 weather station.

Requirements:

Determine the nearest NOAA TMY3 weather station to the specified city.

Use the station's hourly dry-bulb temperature data.

Create temperature bins in 5°F increments from -20°F to 100°F.

Count the number of annual hours that fall within each temperature bin.

Verify that the total annual hours equal 8,760.

Create a worksheet named "Temperature Bins" containing only two columns:

Column A: Temperature (°F)

Column B: Hours

At the bottom of the worksheet, include the following summary information:

Weather Station Name

Weather Station ID

Data Source

Total Annual Hours Below 0°F

Percentage of Annual Hours Below 0°F

Include the following note:

"Temperatures below 0°F occurred for [X] hours per year ([Y]% of annual hours). A temperature of 0°F is a common low-temperature operating threshold for many commercial air-source heat pump systems."

Provide the completed Excel workbook for download.

With modern AI tools, obtaining climate data is no longer the challenge. The challenge is knowing how to use that information to make better engineering decisions.

ChatGPT Plus Thinking Mode

For those using ChatGPT Plus, use GPT-5.5 Thinking mode for more of the work we ask ChatGPT to do at Sage. Thinking mode is best for tasks that require technical reasoning, judgment, sequencing, and careful review. Much of our engineering work falls into this category. For scopes, reports, proposal language, code reviews, specifications, meeting minutes, RFI responses, QA/QC comments, and engineering explanations, it generally produces more accurate and complete results. A good example is the weather bin analysis prompt recently shared. Generating annual temperature bin data requires selecting the correct weather station, obtaining climate data, processing thousands of hourly records, verifying totals, and producing a usable spreadsheet. Fast mode remains useful for quick edits, simple summaries, and brainstorming.

To access Thinking mode, click the model name at the top of the chat window and select the Thinking option. The goal is not to use Thinking mode for everything. Use it when accuracy, technical reasoning, and defensible results matter.



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A2L Refrigerant Piping: Fact vs Myth

As HVAC manufacturers transition to lower-GWP refrigerants, R-32 and R-454B have become common in heat pumps, VRF systems, rooftop units, and split systems. These A2L refrigerants introduce new code requirements, but one of the biggest misconceptions involves refrigerant piping. Many designers assume that every refrigerant pipe joint is automatically treated as a potential leak source for A2L compliance calculations. In reality, ASHRAE 15-2022 provides a more practical approach.

Section 7.2.3.1.1 states that spaces containing only continuous refrigerant piping, or only joints and connections that have been leak tested in accordance with Section 9.13, do not need to be included in the Effective Dispersal Volume Calculation (EDVC). In other words, a small room does not automatically become a problem simply because refrigerant piping passes through it. The greater concern is refrigerant-containing equipment located within the space, including indoor units, branch controllers, service valves, filter-driers, and other components that could release refrigerant into the room.

For piping design, the focus should be on approved materials, proper joining methods, pressure testing, routing restrictions, and protection from physical damage. ASHRAE 15 Section 9.11 prohibits soldered joints for A2L refrigerant piping, while Section 9.13 requires field-installed refrigerant piping to be pressure tested and leak tested before concealment.

These requirements are also reflected in the 2025 International Mechanical Code (IMC), which references ASHRAE 15-2022 for refrigerating systems. The refrigerant concentration limits, machinery room provisions, leak detection requirements, and EDVC concepts discussed above originate from ASHRAE 15 and are incorporated into the IMC through those references.

The takeaway is simple: a properly installed, pressure-tested refrigerant piping system is generally treated as a sound refrigerant boundary. Designers should focus less on counting brazed joints and more on refrigerant charge, equipment location, room volume, and compliance with ASHRAE 15 and the Mechanical Code.

A2L Refrigerant Piping Checklist

- Verify approved piping materials.
- Do not specify soldered joints (ASHRAE 15 §9.11.2).
- Specify brazed, welded, or listed mechanical joints only.
- Verify press fittings are listed and manufacturer-approved.
- Require pressure testing and leak testing (ASHRAE 15 §9.13).
- Keep piping exposed until testing is complete (§9.13.2).
- Avoid exposed piping in rated exit corridors (§9.12.1.3).
- Provide physical protection for concealed piping (§9.12.2.1).
- Label refrigerant piping (§9.12.1.8).
- Evaluate rooms containing indoor units, branch controllers, valves, or other refrigerant-containing equipment.
- Do not assume every leak-tested piping joint creates an EDVC concern.

WHAT DESIGNERS SHOULD FOCUS ON

						
PRESSURE TESTING	APPROVED JOINTS	PIPE ROUTING	PHYSICAL PROTECTION	LABELING	BRANCH CONTROLLERS & INDOOR UNITS	SERVICE VALVES & COMPONENTS
Test all field-installed piping in accordance with ASHRAE 15-2022 §9.13.	No soldered joints. Use brazed, welded, or listed mechanical joints only.	Avoid exposed piping in exit access corridors and exit passageways.	Protect concealed piping from physical damage.	Label piping every 20 feet max with flammable refrigerant warning.	These are refrigerant-containing equipment and drive EDVC considerations.	Valves, driers, filter driers, and other components create potential release points.
ASHRAE 15-2022 §9.13.	ASHRAE 15-2022 §9.11.2	ASHRAE 15-2022 §9.12.1.3	ASHRAE 15-2022 §9.12.2.1	ASHRAE 15-2022 §9.12.1.8	ASHRAE 15-2022 §7.2, §7.3	ASHRAE 15-2022 §7.2.3



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UPCOMING LIVE WEBINARS AND SEMINARS

This month's lists of free live webinars and seminars is below. Each offers at least one PDH and qualifies as a *Course of Learning* – a format that includes traditional classroom-style courses or live webinars with real-time interaction with an instructor. As a reminder, New York State requires that 18 of the 36 total continuing education hours for professional engineers be completed through *Courses of Learning*.

All webinars listed below are free. The ASHRAE and ASPE meetings are in-person and have a cost of \$50 which reimbursed by Sage for Sage employees.

Date	Event Name	Host / Organization	Time (ET)	Registration
June 2	The Impacts of Improper Installation on Anchor Performance (ANC203)	Hilti	12:00 PM - 1:00 PM	Register here
June 2	System-Level HVAC Strategies for Manufacturing: Optimization, Electrification, and Advanced Controls	NoonPi	1:00 PM - 2:00 PM	Register here
June 4	Firestop: A Life Safety Issue (FS101)	Hilti	12:00 PM - 1:00 PM	Register here
June 9	Unlock the Future of Fire Safety with Siemens Acend Intelligent Notification	Consulting-Specifying Engineer	2:00 PM - 3:00 PM	Register here
June 12	Designing Electrical Systems in Operating Rooms: A Case Study	Electrical PE Review / OhmGurus	2:00 PM - 3:00 PM	Register here
June 16	How to Design Electrical Systems for High-Density Data Centers	Consulting-Specifying Engineer	2:00 PM - 3:00 PM	Register here
June 18	Professional Ethics for Engineers	NoonPi	12:00 PM - 1:00 PM	Register here
June 18	How to Manage the Design of Plumbing Systems	Consulting-Specifying	2:00 PM - 3:00 PM	Register here
June 18	Challenges to Air Flow Containment in Critical Facilities: Healthcare and Data Center Focus (FS202)	Hilti	12:00 PM - 1:00 PM	Register here
June 25	One Switch, Zero Delays: The Value of Multi-Voltage Transfer Switches	Consulting-Specifying	2:00 PM - 3:00 PM	Register here
June 30	Anchor Design Requirement Updates in CSA A23.3-24	Hilti	12:00 PM - 12:30 PM	Register here
June 30	Fault Detection and Diagnostics (FDD) for HVAC Systems and Building Controls	NoonPi	1:00 PM - 2:00 PM	Register here



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Convenient Care Renovation

Bassett Medical Center, Cooperstown, NY

The Convenient Care Renovation project transformed an existing office space into a new 6,200-square-foot outpatient Convenient Care facility. Originally constructed in 2010, the facility was renovated to support a modern urgent care environment, including upgrades to the interior architecture, HVAC, plumbing, fire protection, and electrical systems. The project included modifications to support healthcare ventilation requirements, patient care functions, and a new radiology suite with diagnostic X-ray equipment.

Sage Engineering Associates, LLP provided HVAC, plumbing, electrical, lighting, and fire protection engineering design services for the renovation. The HVAC upgrades were designed to meet healthcare ventilation standards while providing appropriate space pressurization, occupant comfort, and energy-efficient operation. Mechanical improvements included modifications to the air distribution systems, upgraded filtration, DDC controls integration, and extensive coordination within the existing building infrastructure and limited ceiling spaces.

Electrical system improvements included new lighting, power distribution, emergency power modifications, nurse call systems, fire alarm system modifications, and infrastructure upgrades to support clinical equipment and future operational flexibility.

Plumbing and fire protection work included modifications to domestic water, sanitary, and sprinkler systems to support the renovated patient care environment. The project required extensive coordination with existing building systems, careful phasing, and integration with ongoing facility operations to minimize disruptions during construction.

The project reflects Sage Engineering's experience delivering complex healthcare renovations that modernize patient care environments while maintaining reliable facility operations. Through careful planning and coordination, the project was successfully completed within an accelerated construction schedule while supporting continued healthcare services.

