



**Nortek Air Solutions
Partners with Dallas College
on New Construction
Sciences Building (CSB) to
Boost Construction Trades
Workforce Development.**

AT A GLANCE

- Dallas College and the Construction Education Foundation (CEF) has bolstered construction trades workforce development by building a 97,000-sq. ft. school in the Dallas/Fort Worth (DFW) suburb of Coppell, TX. The new center trains and certifies tradespeople for mechanical HVACR/electrical/plumbing (MEP), carpentry and other construction careers, as well as continuing education credits.
- Nortek Air Solutions donated six custom air handling units (AHUs) and two dedicated outdoor air systems (DOAS) ranging from 2,500 to 17,500 CFM. The AHUs feature the latest advancements in FANWALL TECHNOLOGY®.
- Architects designed the building where working AHUs, piping, ducting and other HVACR equipment are visible to visitors and accessible for student learning through glass and open walls and ceilings.
- Dallas College challenged engineers and architects to design the CSB with three popular, but vastly different methodologies—AHUs, variable refrigerant flow and chilled beams—to help students learn a variety of commercial HVACR concepts.



CONSTRUCTION SCIENCES BUILDING's (CSB) MAIN PLAYERS:

Owner

Dallas College, Dallas.

Project Partner

**Construction Education Foundation
(CEF) of North Texas, Coppell, TX.**

Engineer

ME Engineers, Dallas.

Architect

The Beck Architecture LLC, Dallas.

General Contractor

Joeris General Contractors, Dallas.

Mechanical Contractor

Dallas Mechanical Group, Dallas.

Industry Contribution Facilitator

Texas AirSystems, Dallas.

CONSTRUCTION INDUSTRY LABOR SHORTAGE CHALLENGE:

The U.S. is amid one of its worst construction trade labor shortages.

Construction Education Foundation (CEF), Coppell, TX, research predicts a 1.5-million shortfall of skilled/journeymen trade professionals by 2033. "The average age of all trade professionals currently working in the field is 47 years old and 40% of today's construction workforce will retire by 2033," said Jane Hanna, President/Executive Director, CEF.

Consequently, Dallas/Forth Worth construction industry members conceived several plans to bridge the gap between Dallas' booming construction economy and the lagging labor workforce.

One workforce development solution is now bearing fruit. The 97,000-sq. ft. Construction Sciences Building (CSB) was built for the sole purpose of training and certifying students in mechanical HVACR/electrical/plumbing (MEP), carpentry and other construction trades.

The CSB is a collaborative effort on behalf of Dallas College and CEF, a self-supporting workforce development organization that connects the Dallas/Fort Worth area's construction trades with education. The CSB is the first completed project of a 1.1-billion bond package. It resides on Dallas College's North Lake Campus, Coppell.

The building is a unique combination of taxpayer funding and private donations. Manufacturer's representative, Texas AirSystems vice president, Rusty Vaughn, a CEF board of directors advisor and the project's capital committee chairperson, invited many manufacturers to donate equipment. Nortek Air Solutions, the nation's largest custom AHU manufacturer, was a major donor of the \$2.6 million in private funding.

“We couldn't have achieved all of these goals without the amazing support of our industry donors,” said Christa Slejko, president, North Lake Campus–Dallas College.

“We are so proud to be able to showcase their names all around the facility in a prominent way.”



Nortek Air Solutions donated six Temtrol®-brand custom-manufactured air handling units totaling 70,250 CFM and two Temtrol-brand rooftop DOAS systems that met the specifications of project consulting engineer, ME Engineers. Nortek Air Solutions' financial commitment inspired other manufacturers to donate private funding.

“We (Texas AirSystems) have a department that complements contractors with on-site equipment start-up, warranty service and troubleshooting,” said Vaughn, “and it has always been a struggle to find enough trained commercial technicians to fulfill demand.”

POSITIONING HVAC SYSTEMS AS TEACHING TOOLS:

At Dallas College's request, ME Engineers specified three common methodologies for the building's HVAC: AHUs, variable refrigerant flow (VRF), and chilled beams. While multi-discipline HVAC and other working building equipment helps teach concepts, positioning for student visibility and accessibility proved challenging for Beck Architecture and ME Engineers.

"It's very rare to have three different types of HVAC systems in the same building," said Lauren Berry, P.E., LEED, BD+C, principal and ME Engineers' CSB project manager. "It was challenging to ensure all three systems worked synergistically."

One example of visibility is a Temtrol®-brand AHU behind an interior glass storefront. Three other single zone AHUs are visible and accessible inside labs or classrooms, thanks to positioning and the strategic preplanning of ductwork, piping, electric, and communication controls. Temtrol-brand AHUs reside in a mechanical room and supply classroom terminal boxes.

Nortek Air Solutions factory-customized the accessible AHUs with easy-opening hinges and interior lighting. The architects ensured accompanying AHU components, such as fan terminal units and condensate piping, are easily viewed through open walls and ceilings. "This visual presentation offers students a much better understanding of the different processes required to maintain comfortable, healthy buildings for occupants," said Stephen Pape, Ed.D, MBA, associate dean, in Dallas College's Construction Sciences Division—School of Manufacturing and Industrial Technology.



Two 150-ton chillers supply the six AHUs, which supply their own outdoor air through rooftop, ducted low profile gravity ventilators. The two indoor Temtrol-brand DOAS units use enthalpy wheels and supply the chilled beams and VRF areas with conditioned outdoor air.

In some cases, AHU positioning inspired laboratory design. The 15,000-sq. ft. Shared Lab and its 25-foot-high ceiling allowed Beck to design an in-lab stairway/mezzanine to conveniently access the lab's AHU. Another request for visibility that dictated architectural design was the open ceiling corridors that allow observers to visually track the color-coded piping paths.

"Normally, you might suspend AHUs from the ceiling to provide more floor space, but some of the Temtrol AHUs were installed at floor level in classrooms so students can walk right up to them," said Tobias Newham, associate principal, Beck Architecture, who was the senior project designer.



The presentation of visible elements mandated more installation aesthetics than conventional commercial buildings that typically recess everything behind walls and ceilings, according to Newham. Ductwork mastic, for example, tightly seals ductwork connections, but in this case it had to look perfect.



Keeping the AHUs, DOAS and other equipment indoors also complied with the City of Coppell's building code that restricts rooftop clutter. The CSB's roof is very visible from adjacent elevated "gateway to the city" Highway 121 and nearby DFW International Airport air traffic.



LEED® v4 SILVER:

The CSB received a Leadership in Environmental and Energy Design (LEED) v4 Silver certified BD+C building designation.

As a member, Nortek Air Solutions supports the U.S. Green Building Council's mission. The HVACR design helped accumulate LEED credits due to VRF technology, chilled beams, AHU fan efficiencies and heat recovery.

ME Engineers specified a unique custom-built, single path, dual chamber heat recovery function in the Temtrol®-brand DOAS that efficiently tempers outdoor air to prevent chilled beam condensation.

The chilled beams also required a secondary loop of warmer chilled water. The loop mixes warmer return water and raises the 55°F chiller discharge temperature to prevent condensation. The secondary loop is yet another design challenge associated with using three HVACR methodologies for teaching purposes.

The six Temtrol-brand AHUs' use of FANWALL TECHNOLOGY® and variable frequency drives (VFDs) also contributed to the LEED certification, because the fan efficiencies surpass those of large single fans,

according to Beck Architecture's project energy modeling. FANWALL TECHNOLOGY also results in a smaller, space-saving AHU footprint.

The BACnet®-based building management system (BMS) also adds energy efficiency.

Other major contributors to LEED credits were water usage in both landscaping and indoor plumbing; building orientation in relation to window energy efficiency and solar exposure; and natural light usage to minimize energy use in electrical lighting.





FANWALL TECHNOLOGY® ADVANTAGES AT CSB:

FANWALL TECHNOLOGY was a perfect match for CSB. Developed and patented by Nortek Air Solutions, FANWALL TECHNOLOGY features one of the industry's lowest acoustic signatures and lowest airway-tunnel turbulence, which is critical for AHUs to operate quietly inside teaching labs. Versus single fans, FANWALL TECHNOLOGY's multiple, smaller diameter, direct-drive fans are mounted in a narrow profile array that reduces the AHU's footprint. Multiple fans and motors also offer redundancy for unprecedented reliability. Finally, Beck Architecture's project energy modeling revealed that FANWALL TECHNOLOGY was more efficient and helped accumulate LEED credits.

From an education perspective, FANWALL TECHNOLOGY remains one of the hottest trends in HVACR. Students will see the technology in new construction and especially in retrofits where FANWALL TECHNOLOGY commonly replaces outdated single fan systems.

Cutting-Edge Education Model of the Future:

Thanks to Nortek Air Solutions and other donor manufacturers that helped make the project a success, the CSB's workforce development effort has attracted the interest of education organizations nationwide. Many colleges are examining how Dallas College and CEF collaborated with local industry to teach real world skills and design a building that also serves as a teaching tool. Several Society of College and University Planning (SCUP) conferences have even featured speakers from the project.

Thus, the CSB serves as a workforce development model that helps reverse the nation's declining population of trained construction workers.

“Public/private partnerships, such as this, will lead the way in addressing our workforce pipeline shortage.”

~ RUSTY VAUGHN

VP, Business Development
Texas AirSystems



