

Fabric Duct Helps Score LEED Points & IAQ for Engineering Firm's Own Office Retrofit

International consulting engineer / architect company, William Tao & Associates designs and retrofits own offices for LEED[®] platinum certification.

Maplewood, Mo.— Engineers at multi-discipline engineering firm William Tao & Associates (WTA) liked the performance and aesthetics of fabric HVAC air distribution ductwork enough to replace an adequate spiral metal duct system with it while renovating its own new office headquarters.

WTA recently moved into the 17,000-square-foot top floor space of a two-story, free-standing office building in the St. Louis suburb of Maplewood, Mo. Bruce Levitt, P.E., LEED AP, WTA's executive vice president, was the lead engineer on the former call center's remodeling and Leadership in Energy and Environmental Design (LEED[®]) effort. Levitt

didn't like the aesthetics of the existing metal duct or its low-hanging, 10-foot high diffuser drops. Instead,

he preferred a more streamlined alternative of fabric duct air dispersion that would add aesthetics as well as contribute to LEED credits. WTA President, Richard Janis, P.E., AIA, LEED AP, however, didn't like the reputed deflated appearance of fabric duct during air handler inactivity.

The two engineers found a conciliatory resolution in SkeleCore™, an in-duct cylindrical tensioning device (CTD) newly-developed by fabric duct manufacturer, DuctSox, Peosta, Iowa. CTDs promote a perpetually inflated appearance and it also eliminates roll-out "popping sounds" during air handling equipment start-up. The SkeleCore CTD system consists of a 3/4-inch-diameter, lightweight aluminum tube that runs down the middle on the duct to support a series of 3/16-inch-diameter, powder-coated steel connecting rings. The 360-degree rings are precisely sized to administer tension on the fabric duct walls for a permanently inflated, streamlined appearance.

After the dismantling of the metal duct, installation contractor Rock Hill Mechanical, St. Louis, took less than a week to install 475 linear feet of DuctSox's Sedona-Xm™ fabric duct with SkeleCore, according to Mike Sullivan, the mechanical contractor's service manager. Seven existing rooftop HVAC units were retained and updated with higher MERV rated filters for increased indoor air



case study

quality, but without sacrificing static pressure. The rooftop units and their retained sheet metal drops supply 15 runs of 10-inch-diameter fabric duct hung from an architectural track suspension system. To complete the airflow system's aesthetics, Levitt chose a tan color to complement the other earth tones built into the new interior design's floor coverings, furniture and surface painting.

"...the fabric duct is quiet and the in-duct tensioning system gives it a great appearance..."

The Sedona-Xm is 55-percent recyclable, which helped accumulate the project LEED credits for a target LEED certification of Platinum by the US Green Building Council (USGBC), Washington, D.C. Fabric duct also contributed to LEED credits in other ways:

- Improved indoor air quality;
- Reduced material waste from less packaging;
- Lessened jobsite waste because DuctSox is a custom product not requiring the on-site trimming or cutting that's associated with metal ductwork;
- Reduced energy consumption during shipping, because fabric is lighter in weight and was shipped from within 500 miles of the destination.
- Eliminated off-gassing that's associated with metal duct paint and coatings;
- 24.5-percent more efficient than conventional metal duct systems, according to a recent third-party computational fluid dynamics (CFD), energy study performed by the Iowa State University Mechanical Engineering Dept., Ames, Iowa, (www3.me.iastate.edu/bglab).



projects, such as auditoriums and schools. "Now the air distribution is higher for better sight lines, but without sacrificing occupant air comfort."

LIGHTING EFFICIENCY REDUCES HEAT FOR HVAC

Levitt also added many energy efficient lighting innovations such as motion sensors and lighting control fixtures.

Another lighting innovation is Philips Ledalite which uses PureFX fixtures with MesoOptics® lenses and reduced wattage lamps in enclosed multipurpose spaces. Open office spaces use Ledalite's Float fixtures and elliptical MesoOptics technology to deliver visually comfortable direct/indirect lighting without the use of louvers. The fixtures create a balance of brightness and glare control for ambient and task-focused lighting.

Instead of traditional halogen sources, the space uses a variety of direct LED and remote phosphor LED in down-light products. Retrofit integral driver LED par lamps were also used.

The original metal ductwork drops from the rooftop system were retained and painted the same tan fabric duct color, which matches the interior design retrofit also.

Cozad Property Management Co., St. Louis, the property's management firm that oversees more than 2 million square feet of local industrial, commercial and residential space, was pleased with the outcome of WTA's professional architectural and engineering work for the building. "The space is noticeably quieter and I think it's due to the interiors and the fabric ductwork updates," said Don Kelly, construction manager, Cozad.

Echoing Kelly's comments, Levitt said, "the fabric duct is quiet and the in-duct tensioning system gives it a great appearance that everyone is very satisfied with here."

SPECIFYING FABRIC DUCT

Air is dispersed partially through the fabric duct's factory-engineered Comfort-Flow porosity, while the remainder is distributed evenly through a linear orifice system (seven cfm/orifice) that appears at 3 and 9-o'clock the entire length of each run. Assisting Levitt in the fabric duct specification was Pat Olwig, product sales manager, at Langendorf Supply, Bridgeton, Mo., a manufacturer's representative firm specializing in ventilation. "Although both the metal and fabric were hung at the same 12-foot-high height, the metal had two-foot long diffuser drops down to 10-foot-high that were unappealing," said Levitt, who has specified fabric duct for more than 20

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