

Convention Center Uses DuctSox To Allow "Flexibility" In Design

PROJECT:
David L. Lawrence
Convention Center

**MECHANICAL
ENGINEER:**
Burt Hill Kosar
and Rittelmann

**HVAC
CONTRACTOR:**
Limbach Company

**PRODUCT
SELECTIONS:**
DuctSox Fabric
Air Distribution
System

Project Description:

While the soaring stainless steel and glass crown made it possible for Rafael Vinoly Architects PC, New York, and architectural project partner, HNTB, Kansas City, MO., to design the nation's largest column-less exhibit hall, the roof's perpetual flexing presented HVAC designers with a nearly impossible challenge of effectively distributing heating and cooling throughout the 250,000-square foot space.

Because snow, rain and wind loads can flex the roof, as much as three feet, ceiling-hung metal HVAC air ducts would have been impossible because of its rigidity. Instead, the project specified polyester-based fabric air dispersion, manufactured by DuctSox, Dubuque, IA, which not only floats with the roof's random flexing, but also saves the project an estimated \$250,000 versus other duct materials, according to John L. Patten II, C.I.P.E., principal at the project's mechanical/electrical/plumbing consulting engineering firm, Burt Hill Kosar Rittelmann Associates, Butler, PA. "We could have used double-walled spiral metal duct," recalls Patten.

"However that would have necessitated hundreds of expansion joints (to accommodate the flexing) which would have been costly and much less attractive than the sloped, continuous runs of DuctSox we have now."

The fact that the David L. Lawrence Convention Center is the first major convention facility to ever use fabric duct is a milestone for the category. Fabric duct has been popular in Europe for over 30 years and is now gaining momentum in the U.S. due to its superior air dispersion qualities, light weight, easy cleaning characteristics, ease of installation, and other advantages. When Phase III is completed, the total exhibit space will have two-dozen 115-foot lengths of 32-inch diameter, air permeable DuraTex High-Throw DuctSox. Each duct run begins and ends at approximately 24 feet high and then bows to a 46-foot elevation in the middle while emulating the sloped contour of the roof.

Mechanical contractor, Limbach Company, Pittsburgh, Pa., installed the DuctSox in pairs that run through a series of specially

fabricated metal hoop hangers that not only hold light trusses between each duct pair to cut lighting glare, but also eliminate any fabric deflation during off-peak operation. Burt Hill specified a translucent duct fabric that would help disseminate light.

Metal duct also would have needed hundreds of registers, which have proven less effective in even air distribution. Instead of registers, the DuraTex fabric has factory-engineered permeability to distribute up to 15 percent of the airflow through the material. The remaining 85 percent of air distribution is through hundreds of CAD-engineered perforations that run the entire lengths of the convention center's ductwork. The perforations range from 1/2-inch to 1-1/4-inch in diameter with



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placements depending upon the height of the duct. At the 46-foot level, the holes are largest and are arranged mostly at the bottom of each duct run to maximize air throw in the draft-free air distribution design.

Disregarding the roof flex, metal duct also would have necessitated heavy insulation to eliminate condensation, especially since the convention center's air conditioning is delivered at an unconventionally cool 34°F.

Using fabric versus metal also saved natural resources and provided a more maintenance efficient material, which supplements the convention center's LEED Certified "green" ecology mandate.