DUCTSOX®
Fabric Air Dispersion Products

HVAC contractor and G.C. "think outside the box" with design/build project and save metal manufacturer/ fabricator $500,000.

NEW $6.2 MILLION INDUSTRIAL PLANT CUTS COSTS & IMPROVES IAQ WITH FABRIC DUCT.

FREDERICK, CO When faced with a $1 million price tag just for HVAC at its new state-of-the-art, $6.2 million metal manufacturing/fabricating plant, Star Precision officials began "thinking outside the box."

The five-year-old Frederick, Colorado-based metal company dropped a consulting engineer's conventional design using metal duct with registers and set out to find a more cost effective air conditioning alternative. Taking on the HVAC design themselves, Mark Hayes, Star Precision's vice president–finance; John D'Agostino, mechanical engineer at HVAC contracting firm, AC/H Professionals, Longmont, Colorado; and Bradley Bakel, project manager of general contracting company, Construction Concepts Inc., Longmont; discovered fabric duct to be lighter, faster to install, and inexpensive compared to round spiral duct.

Instead of the original specification of 80-inch-diameter metal duct–which also would have impeded forklift mobility under the 26 to 35-foot-high sloped roof–the consortium saved Star Precision approximately $500,000 mostly in ductwork installation labor and materials and roof support alterations with fabric duct manufactured by DuctSox®, Dubuque, Iowa.

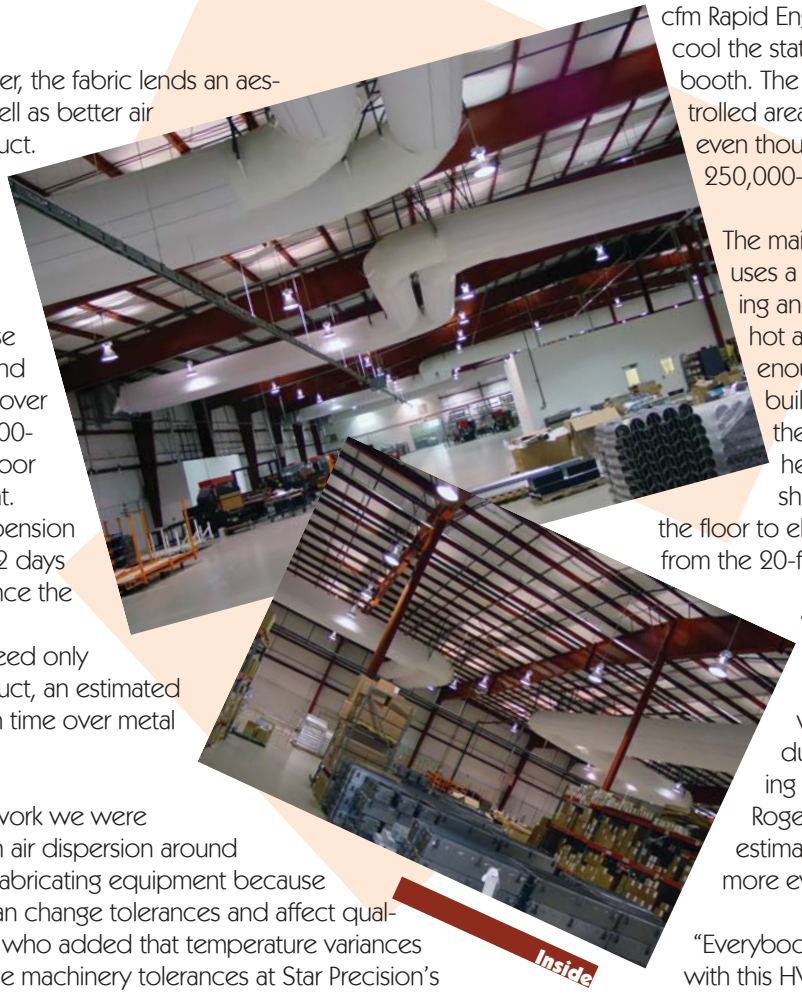
Case Study

case study

Star Precision

Besides labor and material, additional cost savings are realized because the fabric duct is 90-percent lighter than its metal counterpart. The 1,700 linear feet of 48-inch-diameter, industrial grade TufTex"! white fabric reduced the need for secondary framing to accommodate the heavier roof load anticipated with metal duct, according to Bakel, whose firm erected the 108,000-square-foot metal building manufactured by the Chief Buildings division of Chief Industries, Grand Island, Nebraska.

Aside from cost however, the fabric lends an aesthetic appearance as well as better air dispersion than metal duct. Each pair of duct runs, which span anywhere from 180 to 300 feet in length, have factory-engineered linear mesh vents installed lengthwise at 6, 7 and 8- o'clock and 4, 5, and 6 o'clock to cover every inch of the 100,000-square-feet of factory floor from their 20-foot height. Over 5,000-feet of suspension cable was installed in 12 days by a two-man crew. Once the suspension system was installed, ACH's crew need only four days to hang the duct, an estimated 50-percent reduction in time over metal duct installation.



Inside

"With any type of ductwork we were concerned with uneven air dispersion around our manufacturing and fabricating equipment because temperature changes can change tolerances and affect quality control," said Hayes, who added that temperature variances produced unpredictable machinery tolerances at Star Precision's former location. Adds Bakel: "If we put in the originally specified 32 registers with the metal duct, which would have been approximately 10,000 cfm/register which is pretty drafty–it could blow your hat off."

Machine tolerances plus worker comfort were top considerations because Star Precision's former 36,000-square-foot plant had little air flow from eight ductless evaporative coolers that simply blew conditioned air though the back wall. "Workers were either too cool or too hot because the conditioned air was either drafty or stratified from a poor exhaust design," added Hayes. AC&H's design/build concept keeps the plant at a cool 78°F even though heat generation surpasses 120°F from each of Star Precision's 30 metal machines consisting of brakes, punch presses, laser cutters, water jet cutters, and other machinery. Eight 23,000-cfm evaporative coolers by Champion Cooler Corp., Little Rock, Arkansas, supply the duct from an exterior brick mechanical space. The units are paired together with a plenum that runs through the exterior wall and splits into a "Y" shape that supplies each pair of duct runs.

The fabric duct is also combined with a 45,000-cfm Rapid Engineering evaporative cooler to cool the state-of-the-art powdercoat paint booth. The segregated and separately controlled area maintains a 78°F air temperature even though drying oven has a 250,000-BTU capacity.

The main production floor's HVAC design uses a myriad of strategically placed ceiling and wall fans to eliminate collected hot air at the roof level and exhaust enough air to produce a positive building pressure. Ceiling exhausts are thermostatically controlled to remove heat, however the wall fans have sheet metal duct drops 18-inches off the floor to eliminate air stratification and pull air from the 20-foot-high fabric duct.

"The abandoned original design called for all roof-mounted exhaust fans that when combined with the weight of the sheet metal duct might have surpassed the ceiling load bearing specification," added Roger Bakel, AC/H Professional's head estimator, who distributed the fan weight more evenly with wall installations.

"Everybody that looks at what we've done with this HVAC design just can't believe the indoor airquality we've achieved, mainly because they've never heard of fabric duct," said Roger Bakel. This is really a perfect product for gymnasiums, indoor pools, warehouses and industrial plants like this one."