



## Value-Engineered HVAC System Reaps Better Productivity at India Auto Parts Plant

### **Fabric vs. metal duct fast-tracks 1,200 linear feet of ductwork installation on production floor from 12 weeks to six days.**

BAWAL, Haryana, India—An automotive parts manufacturing plant manager devised a cost-effective HVAC system of evaporative cooling and fabric ductwork to cool workers resulting in one of the better productivity factories in India.

Alok Sharma, plant manager for Tenneco's Bawal, Haryana, India-based automotive shock absorber and emission control manufacturing location, knew that cost-effective evaporative cooling would pay productivity dividends in one of the most hot and humid regions in India. Heat exhaustion is a common malady in factories where ambient indoor temperatures can rise up to 45°C to 52°C (113°F to 125°F).

Conventional air conditioning and metal ductwork for a factory production floor is typically cost-prohibitive in India, even with rewards of higher productivity. Sharma's value engineering investigations

case study

found 150,000-cfm of evaporative cooling as 40-percent more affordable than air conditioning in both upfront equipment and operational costs.

The cooler environment has generated unprecedented productivity increases that keep the Tenneco facility weeks ahead of schedule even in the peak of summer. "The productivity at this plant is on par with any other automotive parts plant in the cooler regions of the globe," said Sharma, who has 17 years experience managing manufacturing plants in India.

**"Instead of 12 weeks, the six runs of 56-inch-diameter round Verona commercial-grade fabric duct manufactured by DuctSox Corp., Dubuque, Iowa, were installed in six days."**

Six 25,000-cfm evaporative coolers supplying their own respective 200-foot duct runs were cost effective except for the problems of installing and supporting metal ductwork. Estimates for running the necessary 1,200 linear feet of metal air distribution ductwork was extremely costly, not to mention the 12 to 14 weeks of required installation time. Additionally, hanging several tons of metal ductwork from the factory ceiling might have required a stronger roof support structure for the new 45,000-square-foot factory.

Gurmeet Singh, managing director at manufacturer's representative, VGI Power Systems, Gurgaon, India, was instrumental in helping Sharma make value engineered solutions that helped the Lake Forest, Ohio-based Tenneco reduce operational costs. Singh suggested fabric ductwork, which is 90-percent lighter than metal ductwork, thus negating structural integrity

concerns. Instead of 12 weeks, the six runs of 56-inch-diameter round Verona commercial-grade fabric duct manufactured by DuctSox Corp., Dubuque, Iowa, were installed in six days. The blue streamlined Comfort-Flow duct distributes 15-percent of its airstream through the fabric and the remaining 85-percent through a linear array of 1/2-inch-diameter precision laser-cut vents that distributes more evenly than the metal duct strategy of protruding registers. The air passing through the fabric eliminates settling dust and condensation, the latter which eliminates the need for maintenance-intensive protective exterior coatings or costly insulation concerns associated with metal duct.

Each run is outfitted with a Final Filter that captures particulates missed by the evaporative cooling system's filtration. The Final Filter is zippered into the main duct runs making replacement easy. The fabric duct carries a 5-year warranty and can be commercially laundered, if needed.

The Tenneco facility has since become a role-model for other Indian manufacturing plants that are concerned with the health/safety of their employees while simultaneously increasing productivity.

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