

# SkeleCore™

INTERNAL FRAMEWORK SYSTEM



## Fabric Duct and Heat Recovery Reap Unprecedented IAQ & Savings for Ice Arena

Canada's first SkeleCore eliminates sagging associated with idle air handler periods and "popping" sounds during equipment start-up.

**Stanstead, Quebec**—The new \$8.9 million Pat Burns Arena is a role model of energy efficiency with the specification of state-of-the-art heat recovery and textile HVAC air distribution, but it also doesn't sacrifice aesthetics in the process.

Named for the late coach of the Montreal Canadiens and several other National Hockey League (NHL) teams, the Pat Burns Arena is unique among North American community recreational facilities because of its 500-plus combined spectator seating and standing-room-only capacity.

Energy efficiency doesn't always translate into occupant comfort, however both skaters and spectators have built-in temperature and relative humidity (RH) comfort thanks to the facility's engineering commissioned by the City of Stanstead to design the 48,000-square-foot facility. The design team included consulting engineer, Patrick Bourget, ing., Dupras Ledoux ingenieurs, Montreal;

mechanical contractor, Sylvain Duquesne, Ventilation G.R. Inc., Laval, Quebec; DuctSox® textile air dispersion manufacturer's representative, Enerconcept Technologies, Magog, Quebec., and the Montreal offices of energy recovery HVAC/R manufacturer, Cimco Refrigeration—div. of Toromont Industries, Toronto.

"Stanstead now has indoor air comfort equal to any renowned arena and our ice, refrigeration and HVAC equipment is a smaller scale version of the same system that helped make the Richmond Oval facility at the XXI Winter Olympics, Vancouver, one of the best and fastest tracks in the world," said Marc Parent, facility manager, Pat Burns Arena, which also includes a mezzanine restaurant, locker rooms, offices, physical therapy rooms, small gym and multi-function rooms serves as a role model for future college and community ice arenas.



## Textile Air Dispersion: Energy-Savings and Aesthetics

One reason both spectators and skaters have cutting-edge indoor air comfort is due to textile air dispersion ductwork suspended above the buffer zone separating the spectators from the skating area. The 167-foot run of silver non-porous Tuffex™ textile duct was factory-engineered to disperse conditioned air evenly and without drafts from four rows of small 5/8 to 1-inch-diameter linear vents that span the entire duct length at 6:30, 7:15, 8:15 and 9 o'clock positions. The 32-inch-diameter textile duct transitions to a reduced 24-inch-diameter half way from its mechanical room wall origins to the opposite side of the arena.

Another unique feature is DuctSox's SkeleCore™ in-duct cylindrical tensioning system—the first application of the patent-pending system in Canada. Unlike other fabric air duct which hangs limp and wrinkled during idle air handling periods and distractingly rolls out during equipment start-ups, the SkeleCore system keeps the textile duct aesthetically taut 24/7. Therefore, air dispersion doesn't distract from the ice action and subliminally keeps the spectators in a 40-percent relative humidity (RH) and comfortable 58°F temperature set point.

The textile duct will save the arena maintenance costs versus metal because it can't be dented from wayward hockey pucks, doesn't need expensive and toxic anti-corrosive coatings reapplications, and can be commercially laundered to eliminate contaminants and maintain optimum indoor air quality.

Because of the even air dispersion which results in uniform temperatures throughout the spectator and skating areas, mechanical HVAC equipment running times are reduced. Fabric duct has been proven as an energy-saving alternative to metal duct, according to the 10-month-long study, "Thermal Comparison Between Ceiling Diffusers and Fabric Ductwork Diffusers for Green Buildings" conducted by the Iowa State University's Mechanical Engineering Department, Ames, Iowa. The study proved an overwhelming 24.5-percent efficiency differential when fabric duct was used to heat rooms.

### Saving Energy with Heat Recovery

It's not just the textile duct that saves energy, the arena's Eco Chill® refrigeration system by Cimco Refrigeration uses heat recovery to supply the duct. Waste heat from the flooded ammonia system's compressors is recovered to heat a glycol loop for liquid-to-air heat exchange that terminates at building's air handlers. The 8,500-cfm arena air handler also has a cooling coil that dehumidifies to eliminate fogging and promote optimum ice skating surfaces. A back-up, stand-alone dehumidifier system is also on hand for high RH periods, according to Simon Madore, ing., project engineer, Cimco Refrigeration.

The 87-ton Eco Chill system also comes with ice bank storage that helps reduce electric use while economically maintaining nighttime ice surfaces. The ice banks also supplement the high refrigeration loads during the day.

The arena, which was built on the Stanstead College campus and is currently leased to the grade 7 to 12 boarding school, was partially financed with federal and provincial funds. The \$5.3 million grant came from the Communities of the Building Canada Fund, which aims to finance the completion of infrastructure projects in communities with fewer than 100,000 inhabitants. Other funding came from the Red and White Educational Foundation, Stanstead, a support group for schools and education.

The new facility, which is a recipient of 50 years of ice rink and HVAC/R technology gains is a huge improvement over the circa 1954 Stanstead College Arena it replaced. The current facility's hockey regulation-size, 200 x 85-foot rink is 20 feet longer than the former rink. Originally, the former rink relied only on cold weather to generate and maintain ice since it had no refrigeration. However, it was eventually outfitted with conventional refrigeration equipment in the 1960's for year-round use. While functional for skating, the older facility HVAC was primitive by the new arena's technology standards. Two dehumidifiers hung from opposite ends helped reduce summertime fogging, while wall-hung supply and exhaust fans provided ventilation. Indoor air comfort was still lacking for skaters as well as spectators in terms of air changes, RH and temperature, which typically was very chilling, according to Parent.

Today the college and the city enjoy a first-class ice arena that provides indoor air comfort and economical operation.



**DUCTSOX**®  
Textile Air Dispersion Products

9866 Kapp Court • Peosta, IA 52068  
Ph: 866-382-8769 • Fax: 563-588-5330

[www.ductsox.com](http://www.ductsox.com)