

CENTRE HOSPITALIER DE L'UNIVERSITÉ DE MONTRÉAL

CASE STUDY



The Centre Hospitalier de l'Université de Montréal (CHUM, transliterated as Montreal University Health Centre, is the largest French-language teaching hospital in North America), and Collectif Santé Montréal (made up of Innisfree Canada Limited, Obrascon Huarte Lain, S.A., Laing O'Rourke and Dalkia Canada Inc.) is the largest public-private partnership, or P3 project to date in North America. Construction Sante Montréal (a joint venture partnership between Laing O'Rourke and Obrascon Huarte Lain), are responsible for the on-time success of this Mega-Project. It will be delivered in 2 phases with Phase 1 completion in 2016, delivering over 85% of the clinical space and Phase 2 in 2020.

The CHUM mission is to apply innovative approaches to healthcare, search for new knowledge and the promotion of health. This proud Quebec institution will achieve high levels of energy recovery over its lifetime, from using True 3Å® heat recovery and enthalpy wheels.

This goliath healthcare project boasts 2.5 million square feet, serving 345,000 ambulatory patients, 22,000 inpatients and 65,000 emergency patients each year. The hospital will also accommodate 772 single-patient rooms, ambulatory and diagnostic centers, surgery, intensive care, clinical laboratories and a research center that encompasses 35 medical disciplines. The project will also meet environmental LEED Silver standard.

FläktGroup® SEMCO®, a global specialist in manufacturing state-of-the-art energy recovery technology has over 900 hospital/healthcare projects currently in operation, with over 80 in Canada.

This project is unique, because it provides high indoor air quality while reducing energy consumption. The indoor air climate will be made up of 100% outside air, in lieu recirculated air from traditional air-handling equipment. SEMCO will provide a total of 47 energy recovery units which will supply 2.8 million cubic feet per minute (cfm) of outside air. At the heart of each unit is the SEMCO True 3Å heat

recovery enthalpy wheels which will provide exceptional air treatment and the highest level of energy recovery, translating to dollars of energy saved, resulting in significant savings over the life of building. This is of considerable importance given the increasing need to reduce contaminants and control the rising cost of healthcare.

The traditional design approach to hospitals would be to have preset minimum ventilation for each space, with a varied amount of filtered recirculation air, depending on the use of each occupied space. The vision of CSM/CHUM principals and engineers was not only the selection of high level of quality manufacturers with the highest level of up-time reliability, but to focus on maximizing the indoor air quality and health of their patients. This leads to eliminating all of the recirculated air, replaced with 100% outdoor air. So the genius in the CSM/CHUM design was to put health-care professionals, visitors, especially patients first, and to create an indoor climate made up of 2.8 million cfm of cleaned, conditioned, healthy air.

AIR QUALITY

Total energy Enthalpy wheels have been utilized for decades, however, until the development of the True 3 angstrom (True3Å) SEMCO technology, this practice was not feasible. Recovering the wasted energy exhausted from a building requires an understanding of the mechanical and chemical operation of an enthalpy wheel, avoiding mechanical cross contamination and adsorption of contaminants.

Desiccant cross contamination requires experience and expertise to avoid the cross contamination of exhausted molecular contaminants from being adsorbed by the wheel and brought into the outdoor air. For more than 25 years, SEMCO has been manufacturing and applying the True3Å desiccant for critical/institutional environments, specifically designed to limit the cross contamination, and third party certified.

SEMCO's True3Å molecular sieve is a ceramic based desiccant that is created specifically to have adsorption pores just larger than the critical diameter of a water molecule (2.8 Angstroms). The technology allows recovering or reducing the air humidity, while eliminating the risk of cross contamination of the larger molecules of molecular contamination. This feature complements the hospital's desire to have the best indoor air quality. Meaning that the ventilation effectiveness of the building will be maximized and the outside air will not be impacted by the recovery technology included in the system.

For the geographical location of CHUM, the recovery of humidity is one of the greatest benefits for the enthalpy wheels. Given the dry winters in Montreal one of the biggest

attributes to winter time sickness is the human olfactory drying out due to the lack of humidity. Buildings lose naturally occurring humidity given off by patients and employees through exhaust. SEMCO's True3Å enthalpy wheel technology will recover the exhausted humidity and reduce the requirement of mechanical humidification. By adsorbing only the water molecules in the air, the SEMCO system can assist in providing a more stable humidity level in the heating season, improving the environment and promoting better health for occupants.

Beyond the transfer of temperature and humidity while effectively eliminating cross contamination SEMCO, has further enhanced its enthalpy wheel technology with the addition of anti-microbial coating on the wheel. SEMCO developed AVRON 46, an EPA (US Environmental Protection Agency) accepted for HVAC application coating that works to reduce any growth or spread of bacteria and mold.

ENERGY SAVINGS

A benefit of the Total Energy Recovery True3Å wheel is the increased efficiency that the hospital administration will realize through lower energy costs. Based on utility rates, it is estimated that the SEMCO systems will provide significant dollar savings in energy over the operational life of the building. The energy savings is a combination of temperature reclaim from the exhaust air, dehumidification in the cooling season and recovery of humidity in the winter season. The purpose of SEMCO's technology is the same as CSM/CHUM, to promote a comfortable and healthy environment for all whom utilizes their facility. In addition, SEMCO is partnering with CSM in being good stewards of the environment. This is evidenced by the estimated savings of over 40 thousand tons of carbon emissions being reduced ANUALLY, from operations of the hospital through the downsizing of the mechanical cooling and heating systems by using such technology embedded within its design. Also supporting the efforts are the estimated excess of 14.5 million gallons of cooling tower water that will not be needed ANUALLY due to the cooling system reductions.

