



## Air Filtration - Total Cost of Ownership

### Improved Air Quality Brings an End to Workers' Comp Claim at Extended Care Hospital

#### Company Profile:

A 40-year-old acute and extended care hospital with approximately 300 beds located in Richmond, British Columbia.

#### The Situation:

The hospital's HVAC systems were upgraded several times over the years as hospital expansion projects took place. The extended care unit and several areas of the hospital were experiencing vehicle exhaust fumes and odors from the outside air supply via the HVAC systems. The unionized hospital staff had issued a workers' compensation claim against the hospital.

#### The Action:

Consultation with the Camfil local representative led to the decision to supply and install both built-up and Model 6P Glide/Pack® air filter systems in four different air handling units (AHUs) that incorporated four-stage filtration at different CFM levels.

#### Air Handling Unit

- AHU #1: (Built up) 24,000 CFM; 3 high by 4 wide
- AHU #2: (Built up) 18,000 CFM; 3 high by 3 wide
- AHU #3: (Model 6P Glidepack) 16,000 CFM; 2 high by 4 wide
- AHU #4: (Model 6P Glidepack) 30,000 CFM; 3 high by 5 wide

#### Four-Stage Filtration

Stage:

- # 1: 12-Camfil 30/30® Pleated Filters, MERV 7 efficiency
- # 2: 12-Camfil Riga-Flo® 200 Final Filters, MERV 14 efficiency
- # 3: 12-Camfil Camsorb® CH Loose-Fill V-Cell Cartridge
- # 4: 12-Camfil 30/30 Pleated Dusting Filters, MERV 7 efficiency



#### The Result:

An independent air quality test was undertaken by the hospital chief engineer. Within one week of the retrofit, the test reflected positive results. The results were proof that due to the Camfil high efficiency and carbon filters, the odors were eliminated. The workers' compensation claim was dismissed.



“By converting to Camfil filtration products, the hospital eliminated odors, emissions and pollutants from outdoors.”

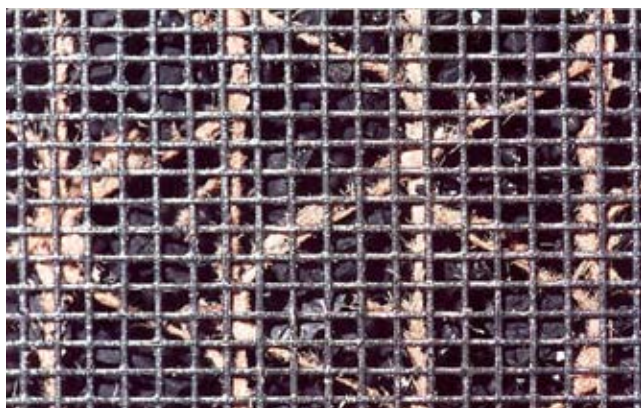
### The Proof:

All air quality parameters measured at the hospital's PACU (Palative Acute Care Unit) during the June 30 to July 7 test period were found to be at levels within established WCB workplace standards designed to protect worker health.

The findings from the CO monitoring showed low levels in the PACU throughout the week of testing, which were also less than corresponding outdoor CO levels. These results indicate that no significant infiltration of outdoor pollutants, such as automobile exhaust, was occurring during the week of testing in June and July 2003.

In addition, the results from the CO monitoring indicate the existing HVAC configuration is effective in (i) controlling vehicle exhaust emissions from outdoors through the integration of a charcoal bed filtration system into the outside air supply for the area and (ii) minimizing direct infiltration of those emissions into the PACU through the use of positive room air pressurization, relative to appropriate areas indoors. These results were confirmed during the smoke pencil testing during each day of monitoring, which showed a positive pressurization of the PACU relative to the main hospital hallway (leading to outdoors) each day.

The CO<sub>2</sub> data showed low CO<sub>2</sub> concentrations at both monitoring locations in the PACU and, based on the WCB Regulation and the Canadian Standards Association, the results indicate good ventilation with outside air by the HVAC systems serving the PACU.



*The Camfil Camsorb® loose fill cartridge incorporates granular carbon between mesh screens in a easily disposable cartridge.*



*Built-up filter banks with 30/30® pre-filter, Citysorb carbon filter & Riga-Flo® 200 MERV 14*

The results of the temperature monitoring showed consistent temperature levels at the front location and more varied levels at the rear location. While temperature levels measured at the front sampling location were within the CSA (Canadian Standards Association) recommended range of 22 to 24°C, temperature levels at the rear monitoring location varied from 20 to 25°C during the three days of measurement. Indoor relative humidity levels were also within both the ASHRAE comfort range and the CSA comfort range. These results indicate adequate thermal control in the PACU during the period of testing.

The continuous NO<sub>2</sub> data showed low concentrations during the week of testing without significant differences between the front and rear sampling locations.

The results of the continuous monitoring for the anaesthetic gases desflurane and sevoflurane showed intermittent instances of low concentrations. In addition, the gas isoflurane was not found at measurable concentrations at any time during the week of testing.

The results from the full scan organic vapor monitoring identified isolated instances of low concentrations of several compounds throughout the week of testing, including isopropyl alcohol, ethyl alcohol, toluene, styrene and formaldehyde. However, the low concentrations of these organic vapors do not suggest significant sources indoors.