

# Molecular Filtration In Healthcare



Leadership in Filtration

**MANN+**  
**HUMMEL**

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## BACKGROUND

Proper indoor air quality is essential in healthcare applications. While pathogen control often gets the spotlight in discussions on healthcare filtration, molecular contaminant control is important and often overlooked. Studies show that median contaminant concentrations can be two to five times larger indoors with maximum concentrations over an order of magnitude higher. Given that most patients in a healthcare facility are there for some health reason, these elevated levels of contaminants are even more concerning. A hospital is a facility dedicated to health and odors inside of it will be seen as contradictory to good health. Due to the nature of most hospital designs, it is nearly impossible to prevent helicopter and ambulance exhaust from entering the facility.

## CONTAMINANTS IN HEALTHCARE

Like many applications, molecular contaminants in healthcare are both externally and internally generated. The contaminants range from those causing nuisance odors to those with health altering consequences.

### EXTERNAL SOURCE ONE

The most common source of healthcare contaminants are various types of transportation that bring patients to the healthcare facility. These include helicopters, ambulances, passenger cars, and public transportation. These vehicles produce contaminants from tire wear, brake dust, and engine emissions.



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### EXTERNAL SOURCE TWO

There are many contaminants that are generated by non-healthcare sources. These include the contaminants in the ambient air, adjacent industrial process emissions, and other transportation on nearby roads, waterways, and rail lines.



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### INTERNAL SOURCE ONE

Many molecular contaminants are generated from within the healthcare facility. The internal sources include patients, aromatic patient medications, cleaning products, food service, service animals, building materials, and construction.



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### INTERNAL SOURCE TWO

There are many specialty applications within healthcare that generate contaminants. These applications release molecular contaminants through equipment sterilization, patient procedures, lab analyses, pharmacies, and morgue activities.



# Molecular Contaminants in Healthcare

The external contaminants are brought into the healthcare facility through infiltration, pressure differential, doors and windows, HVAC system intakes, and human foot traffic. The internal sources are typically generated in a single space, but they are often transported to other spaces within the facility via the HVAC system.

## CONTAMINANTS OF CONCERN

Based on the external and internal sources of contaminants discussed previously, here is a list of typical contaminants found in the air inside of a hospital:

SOURCE	MOLECULAR CONTAMINANTS OF CONCERN
EXTERNAL	Hydrocarbons, VOCs, Ozone, CO, CO2, NOx, SOx
INTERNAL	VOCs, CO, Formaldehyde, NOx, H2O2, and Nuisance Odors

## HOW CONTAMINANTS AFFECT YOUR HEALTH

Short term exposure to harmful molecular contaminants can aggravate asthma and emphysema symptoms. Long term exposure can decrease the oxygen supply in the blood, aggravate bronchitis, increase blood pressure, and decrease fertility. Numerous studies have shown that the success rate in IVF labs is greatly increased through molecular filtration. There is also the psychological issue of patient perception that odors are affecting their health.

## CONTAMINANT CONTROL STRATEGY

**STRATEGY ONE:** Manage the sources of the contaminants by either removing them from the building or isolating them from the healthcare occupants. This isn't an easy endeavor because most of the contaminants are generated by the required activities at a healthcare facility. **STRATEGY TWO:** Dilute the contaminants through ventilation, this strategy often requires additional heating or cooling of outdoor air that was otherwise unneeded. **STRATEGY THREE:** Utilize molecular filtration to clean the air of all the contaminants of concern. This is the most cost effective and reliable method for maintaining good indoor air quality.

# Recommended Products

## Two Pass Solutions

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Based on the long list of potential contaminants found in the indoor air at an airport, two passes of chemical media are recommended. The first pass of media should be virgin activated carbon and the second pass should be potassium permanganate impregnated alumina. Since the contaminants and their corresponding concentrations will vary, a two-pass solution will allow each media type to be replaced independently, providing the best utilization of both media types.

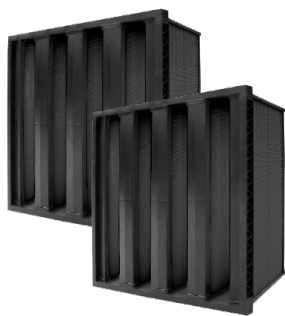


### MC PROCELL 50/50 - GOOD SOLUTION

The MC Procell 50/50 offers both molecular and particulate filtration and offers easy retrofit into existing systems. MC PROCELL 50/50 is offered in both a metal no header version and a metal single header version – this allows for easy interchange with current filters without the costly retrofit of HVAC system.

#### FEATURES

- Single header or box style
- MERV 8
- Up to 580 GSM of chemical media



### MC VB4 HC - BETTER SOLUTION

MC VB4 HC is a V-bank carbon filter that features special honeycomb panels. These panels hold 24 pounds of carbon per 24 x 24 x 12 filter—either 100% 6 x 12 mesh, industrial-grade CTC high-activity carbon, or a 50/50 blend of carbon and potassium permanganate.

#### FEATURES

- Incinerable, plastic frame
- Up to 25 lb of chemical media
- Low pressure drop



### CASSETTES - BEST SOLUTION

MANN+HUMMEL 12 inch and 18 inch cassettes are designed for medium to heavy duty contaminant concentrations. Each cassette contains two, separate media beds in a v-shape configuration to provide longer residence times with lower pressure drop.

#### FEATURES

- All plastic with recyclable frame
- 12x12x12 with a 3 inch bed depth and 1 ft<sup>3</sup> of media
- 6x12x18 with a 1 inch bed depth and 0.5 ft<sup>3</sup> of media

# Recommended Products

## Single Pass Solutions

When it is either cost prohibitive to utilize two passes of chemical media or there is a space constraint, a single pass of a blended chemical media is an acceptable solution. Recommended molecular filtration products that are available with a 50/50 blend of the recommended chemical media include:

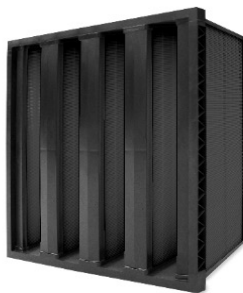


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# Recommended Products

## Retrofit Solutions

In some cases, the molecular filtration solution must be retrofit into the existing HVAC system. This usually requires replacing an existing particulate filter with a combination particulate and molecular filtration product. For these retrofit applications, the recommendations are:

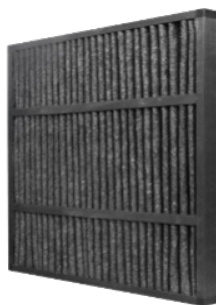


### MC PRIME SERIES - GOOD SOLUTION

MC Prime Series carbon pleat filters are specifically designed to remove unpleasant odors and gaseous pollutants entering a buildings HVAC system, neutralizing target molecular or gas phase contaminants prior to air distribution.

#### FEATURES

- Available in 1", 2" and 4" depths
- MERV 7, 8, 10, and 13 available
- 200 – 500 GSM of chemical media



### MC TL SERIES - BETTER SOLUTION

MC TL Series filters are thin line filters that provide both molecular and particulate filtration. Their thin profile, just 2 inches and 4 inches deep, allows easy use in current HVAC systems without the need for expensive modifications.

#### FEATURES

- Available in 2" and 4" depths
- MERV 9
- Plastic frame



### MC PROCELL 15 - BEST SOLUTION

The MC Procell 15 filter is a molecular filter that offers MERV 15 particulate efficiency - all with low resistance and easy retrofit into current HVAC systems. The MC Procell 15 is offered in a variety of frame styles – single header and no header box style – this broad offering of frame styles allows for easy and convenient retrofit into most all housing/holding frame configurations.

#### FEATURES

- Single header or box style
- Up to 645 GSM of chemical media
- MERV 15

MANN+HUMMEL is committed to continual product development – all descriptions, specifications and performance data are subject to change without notice. MANN+HUMMEL products are manufactured to exacting criteria – there can be a ±5% variance in filter performance.