

UofL Physical Plant's Response to Indoor Air Quality during COVID-19

We have a variety of all kinds of buildings from a stockroom space to an advanced research facility equipped with one of the three major types of HVAC systems. The three common types are centralized, packaged and individual or decentralized. UofL buildings employed one or the other style depending upon location, size, type and potential use of a building and we have all of them in huge variety on our list.

The research buildings, labs, clinics and Vivariums are typically equipped with high efficiency air filters (MERV 14) and most are designed with 100% outside fresh air intake setup. Meaning these facilities do not recirculate the same air, instead exhaust it to the outside and they always supply with fresh clean air. So, therefore air quality isn't a concern at all for such facilities. On the other hand general purpose buildings like office spaces and classrooms are typically equipped with Merv-8 or higher rated air filters and they do recirculate the inside air to a higher percentage but required by code to bring in at least minimum 10% fresh outside air, always. To mitigate COVID-19 effectively the Physical Plant staff has made adjustment to the HVAC system for respective buildings to allow additional fresh outside air intake that is in some cases exceeding the 20% threshold anywhere allowed by the current design setup. Also, we have increased the frequency of Preventive Maintenance (PM's) on major equipment and replacement of air filters more often. We are anticipating a decent increase by 20% higher in utilities & maintenance expenses. Possibly, this can have adverse effect on our energy savings target but we are not going to compromise safety over cost.

The purpose of an HVAC system is more than just warming or cooling a space. Instead, it serves to improve indoor air quality and provide comfort for everyone inside a building. There are various types of HVAC systems depending on the location, type and size of a building at our campuses. Since HVAC systems are the largest energy consumers in a building, it is important to ensure that energy efficiency methods are in place to ensure reduction in energy consumption, costs and greenhouse gas emissions. This exchange of air is necessary to replenish oxygen, and to remove odors, carbon dioxide, unpleasant odors, and excessive moisture.

In our case the building ventilation uses a mechanical system to move air in and out. Depending on outdoor conditions, the outdoor air is drawn into the buildings and heated or cooled before it is distributed into the occupied spaces, then it is exhausted to the ambient air or reused in the system. Once the air is brought in, it is drawn into an air handling unit where the work begins. Here, air is drawn through filters to remove dirt, dust, allergens, and other particles. Next up is comfort. Air is either sent to be heated or sent to be cooled and have excess humidity removed.

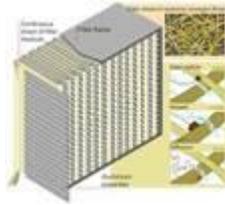
Once the air is clean, fresh, and at a comfortable temperature, it is directed into the buildings. For central systems, this means moving through a network of ducts and registers to different rooms. For other systems, this usually means being directed right into the space.

[see next page for diagram]

HEPA Filter Arrangement



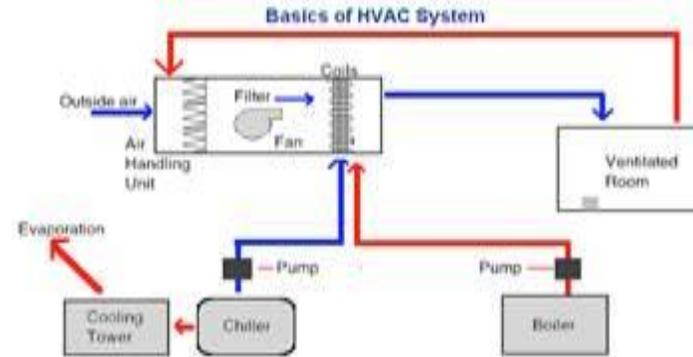
HEPA-Filter



Merv-8 Filter



Air handler Unit (AHU) Air Circulation Diagram



**HVAC system pictures*

HEPA filters are used in applications that require contamination control, such as the high-tech manufacturing like of computer disk drives, medical devices, semiconductors, nuclear, food and pharmaceutical products, as well as in clinics, research labs and hospitals. Buildings like Shoemaker Hall, Lutz Hall, Vivariums, Clinics and RBL/CPM research facility equipped with high efficiency filters. Whereas Merv-8 filters are effective at controlling mold spores, hair spray, dust. Applicable in most educational & commercial buildings, residences, industrial workplaces and paint booths. A MERV 8 air filter is efficient at trapping a majority of indoor particulates that could debilitate those with asthma and allergies, or even cause long-term respiratory problems. Another factor driving the popularity of MERV 8 filters is that they are inexpensive and easily serviced. Depending on the manufacturer they can last three to six months and even up to a year in general purpose buildings and classrooms use.