Understanding Univents

By Keith Gourlay CEFM
Executive Director
New Jersey School Buildings and Grounds Assoc.

Univents were introduced to the classroom shortly after we stopped sending students outside to bring in wood for the stove. They have been around a long time and they go under many names, but they most commonly are known as "univents". No matter what you call them, they all do the same thing: Deliver tempered air with a percentage of fresh outside air to the classroom. They typically are mounted horizontally or vertically on an outside wall to provide access to outside air.

Lately we have been hearing a lot about filters, primarily Merv-13 and sometimes higher. Merv is an acronym for Minimum Efficiency Reporting Value. Simply put, the higher the Merv rating, the higher the ability of the filter to remove finer particulates in the supply air. There are many other factors that must be considered before increasing the Merv rating of classroom filters.

HVAC (Heating, Ventilating and Air Conditioning) systems play only one role in the prevention of infectious disease transmission. The CDC guidelines for operating schools during COVID-19 state that schools should consider several strategies to encourage behaviors to reduce the spread of COVID-19 such as hand hygiene, respiratory etiquette, masks, social distancing, signs, cleaning and disinfection as well as ventilation scenarios. Although improving central air filtration is one component, the CDC guidelines note that schools should **"increase air filtration to as high as possible without significantly diminishing design airflow.**" Recommendations include increasing outdoor air ventilation and increasing total airflow supply.

So, why Merv-4 filters and not Merv-13?

Most units are delivered to the district with Merv-4 filters installed from the manufacturer. Typically, univents can generally take up to a Merv-8 filter without requiring major upgrades. But again, always be sure to check with your manufacturer. Everything I just described also is true for rooftop units. If you have the unit model number, you can access a ton of information online.

Districts that have checked with their manufacturers already know that in most, if not all cases, Merv-13 filters are not compatible in our univents. Additionally, ASHRAE states that Merv-13 filters may not capture the virus, and existing equipment may not be able to provide the same airflow at the higher static pressure. Another consideration is that although increased filtration is a common way to increase indoor air quality and, potentially may capture airborne SARS-CoV-2 virus, the virus must remain airborne long enough to be captured by the filter.

Lastly, higher rated filters can nearly triple the static pressure drop across the coil, which can lead to frozen coils in the winter, and burned-out fan motors in addition to the reduced air flow from the unit, which is in opposition to CDC recommendations. Installing Merv-13 filters will decrease the amount of air that is being brought into the classroom. The CDC notes "the

ventilation intervention considerations listed…come with a range of initial costs and operating costs, along with risk assessment parameters such as community incidence rates, facemask compliance expectations and classroom density may affect considerations for which interventions are implemented."

Did I mention that before changing to a higher Merv rating you should check with your manufacturer?

It is important for everyone to know that these classroom units never were designed to prevent the spread of illnesses. That would require hospital grade units. We are asking our units to do something they were never designed to do.

So what do we do?

We continue to perform preventive maintenance as recommended by the manufacturer on all HVAC units and remember to maintain good records. Check outside air dampers for proper operation to allow a percentage of outside air to come in. We ensure that exhaust fans are functioning as designed, and open windows in non-air-conditioned rooms when possible. Sometimes teachers turn off the units because of the noise. ***It is imperative to keep those units running.***

We would not be working in education if we didn't care about kids. Our goal is to keep students, faculty, administration and everyone who uses our buildings safe. Let's continue to do all of the things we have been taught to do over the last 6 months – and which are all integral parts of the CDC operational guidance – including remaining diligent about hand washing, social distancing and keeping masks on when around others. If we do this, we will get through this pandemic.

These have been difficult times, but now more than ever, we need to work together to return to some normalcy and get everyone back to school.

Thank you to Premier Engineering Group Inc. and Gregory Cheney, P.E. for the technical input. I have added some of my own common-sense thoughts and opinions based on my own experiences.

KEEP TOP OF UNIT CLEAR!

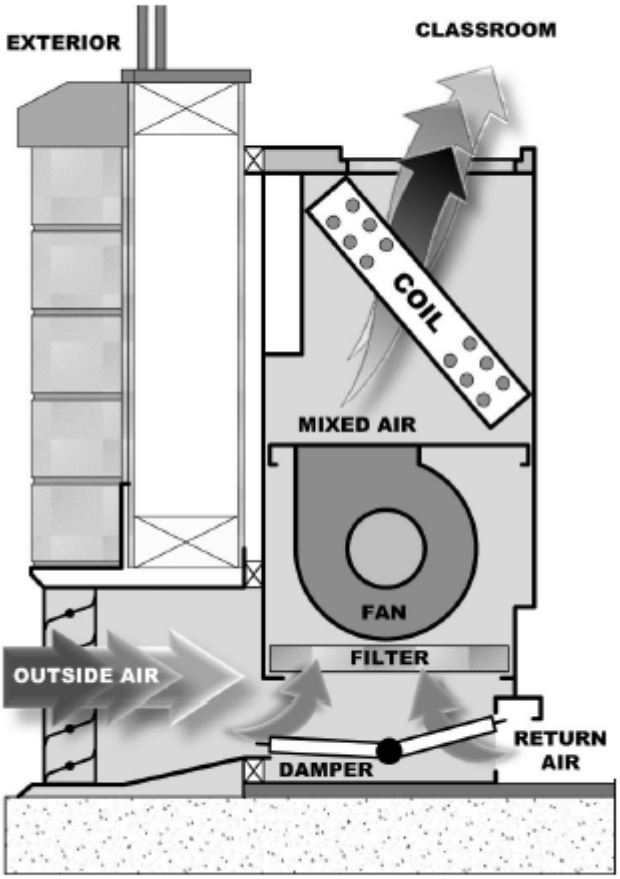
What is a Unit Ventilator?

A unit ventilator consists of a heating coil, fan assembly, dampers, filter and controls contained in a metal cabinet. Unit ventilators are usually located on the outside wall of classrooms, although they are sometimes suspended at or above the ceiling level.

Outdoor air is brought directly into the cabinet via a grille located on the outside wall of the classroom. The unit ventilator is designed to mix room air with outside air, heat the air if necessary, and deliver it to the classroom through a grille located in the top of the unit ventilators.

The proportion of outside air is controlled by the position of the fresh air damper. This damper can be adjusted to provide as much or as little fresh air as desired. A typical unit ventilator will circulate a total of 1000 or 1250 cfm (cubic feet per minute) of air, of which a minimum of 400 cfm is outdoor air. With a unit ventilator, 100% of the airflow can be outside air when it is needed for "free cooling" (also called "economizer cooling").

With any system, it is necessary to balance the air flow in the building, i.e., to exhaust an amount of air equal to the fresh air supply. In a unit ventilator system, this is often accomplished by a "gravity" relief damper in the outside wall, which automatically opens to relieve the proper amount of stale air. Sometimes, exhaust is accomplished with a ducted exhaust fan system.



Basic Classroom Unit Ventilator Operation