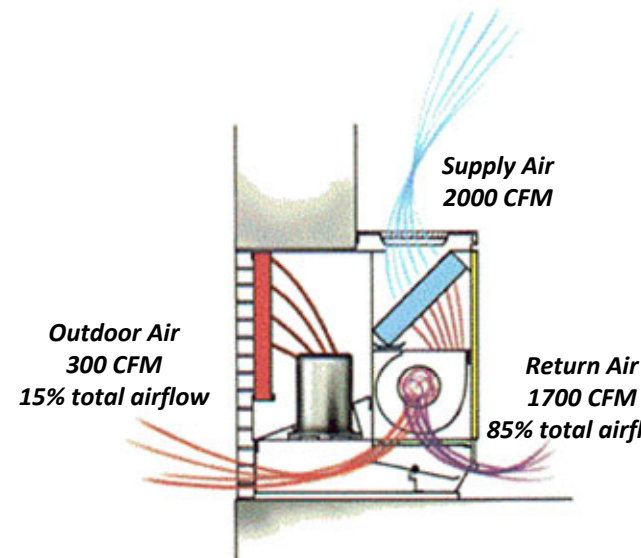
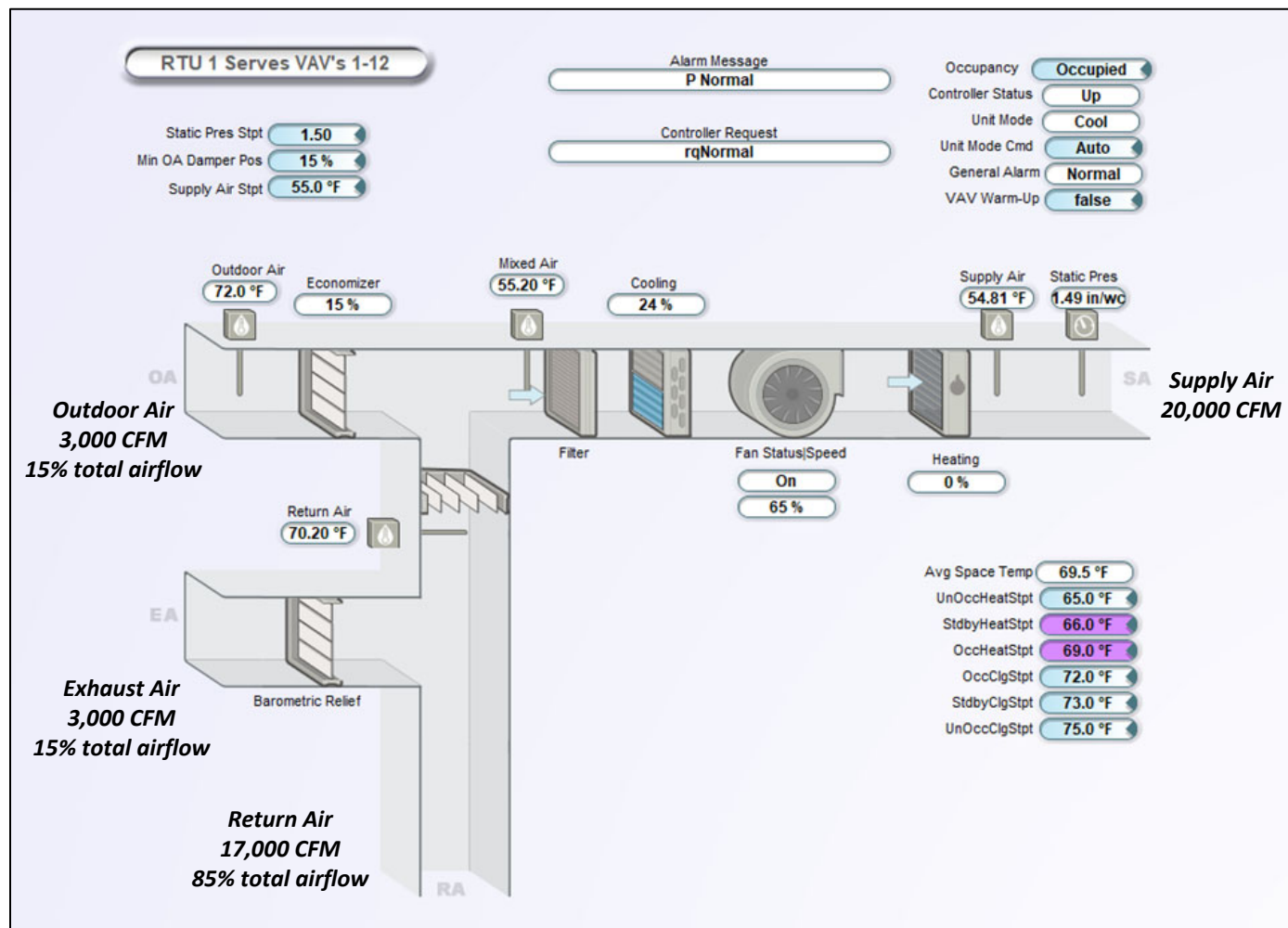


### Single Zone Classroom (Typical)



- 30'X30' = 900 sq. ft.
- 10' ceilings = 9000 cu. ft.
- 300 Cubic Feet per Min. (CFM) of Outdoor Air (OA) takes 30 min. to completely change the air in this space. This is stated as 2 ACH, or Air Changes per Hour.
- 1700 CFM of return air means the air in this space is filtered about 11 times per hour.
- The same principal is applied to larger central Air Handling Systems such as the unit shown below.

### Central System AHU Image is CCDC RTU #1



In April of this 2020, the American Society of Heating, Refrigeration and Air conditioning (ASHRAE) released information about how airborne pathogens, such as COVID-19, can spread inside buildings and through HVAC systems. Their primary focus is the relationship between Indoor Air Quality, and what can be done to mitigate the risk of contamination and distribution of the pathogens.

In late July, we began implementing these strategies to prepare for our students and staff returning for the 2020-2021 school year. Our approach was to focus on increased air filtration and dilution, as recommended by ASHRAE. In addition, we would evaluate and recommend air disinfection opportunities on a case by case basis. We do not currently have air-disinfection equipment installed in our District.

Air filtration is simply passing the air in a space through a filter element. Air filters are manufactured to varying efficiency ratings. These ratings are Minimum Efficiency Reporting Value or MERV. The equipment in our District has been engineered and selected to operate at design conditions utilizing air filters rated at MERV-8. This is the typical standard utilized for commercial and public buildings. Using this filtration standard attempts to balance the air filtration efficiency with the unit operating efficiency. Higher efficiency filters increase resistance to airflow. This increases the necessary size and power of fan equipment to meet a specific airflow requirement. It is important to note that it is not practically possible to simply buy and install a higher efficiency air-filter in equipment that was designed for lower efficiency air filters. Assuming you could overcome the physical differences in size, it is much more difficult to overcome the increase in resistance to airflow. Increasing the number of times the air flows through any filter, will increase the number of particles that filter can capture. This is our focused approach regarding air filtration. We are making changes necessary in our HVAC system operations to maximize the number of times the air in any space is filtered.

Air dilution is accomplished by introducing fresh, outdoor air into a space. The greater the amount of outdoor air, the greater the dilution. Air dilution of a space is measured by Air Changes per Hour or ACH. One ACH means that the volume of a given space has an equal volume of outdoor air introduced over the time period of one hour. ASHRAE, federal, state and local codes determine the minimum standards for outdoor air flow requirements in our HVAC systems. Once again, these standards attempt to balance the indoor air quality with operational efficiencies. The conditioning of outdoor air is often the most expensive component of an HVAC systems operational costs. We are making changes necessary to increase our outdoor air settings to maximize dilution while still maintaining space comfort conditions.

Both of these strategies will increase the run-time of equipment and the operational expense of running the equipment.

One common area of concern in commercial and public buildings are windows. An open widow will obviously increase the air dilution rate in a space. All public (and private) buildings are built/modified/renovated according to the federal, state and local building codes at the time they are built or modified. Our School District has grown and changed over the years and as such, has been subject to changing building codes. In the past, it may have been mandatory to have accessible windows for emergency egress. Any of our buildings built during that time, would have been constructed with that feature, as required. Current building codes do not require accessible windows (that can open). The construction industry as a whole does not typically design public buildings with windows that can open because of security and energy considerations.

#### Rock Hill Schools adoption of ASHRAE position on COVID-19

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