ADE ENGINEERING

UPDATE

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Combating Covid-19: Recirculation Units

As we begin to reopen our businesses and schools, we must remain vigilant in the fight against Covid-19. Studies have shown that Covid-19 has the ability to aerosolize, and be transported much farther than originally thought. Because of this, we need to begin looking at upgrading our HVAC systems. What if you cannot upgrade your HVAC system? You should consider using recirculation units.

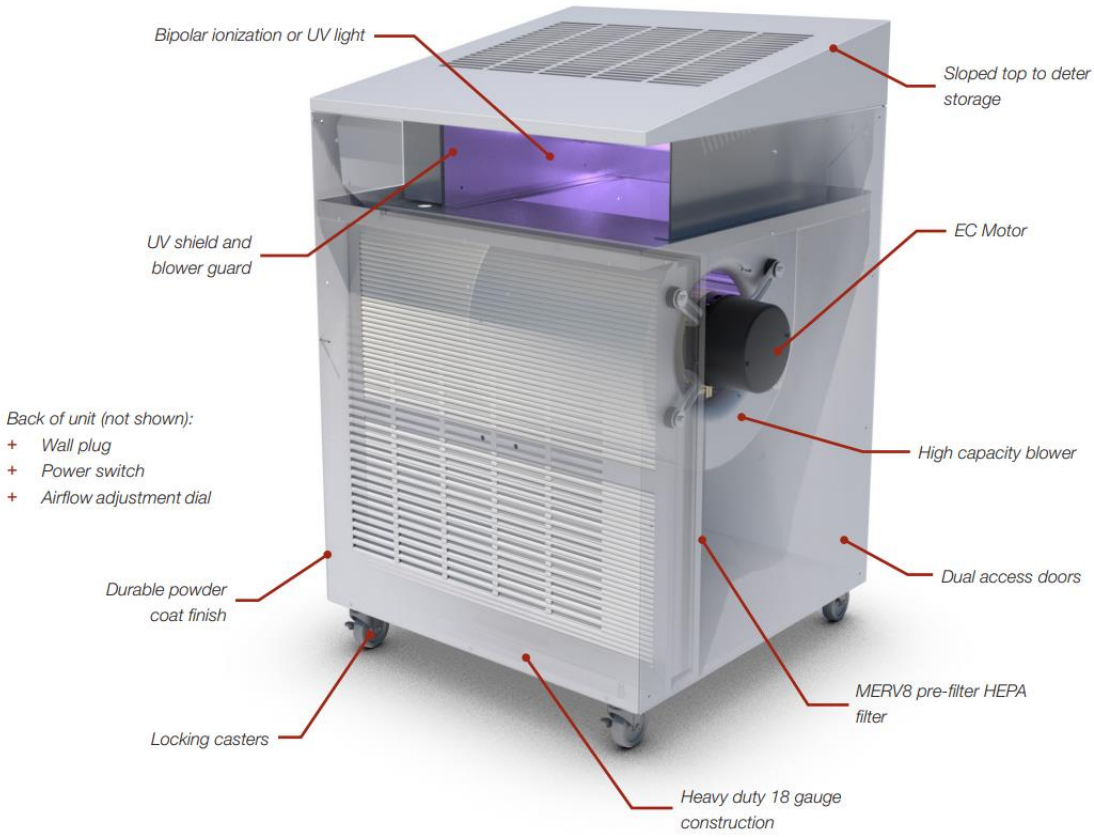

Figure 1: Price RAP Unit

Both the CDC and ASHRAE have recommended the usage of these recirculation units to safely reopen schools and businesses. These units should be fitted with a HEPA filter to catch the virus. In addition, studies have shown that Bipolar Ionization (BPI) and Ultraviolet (UV) irradiation have shown the ability to destroy diseases like Covid-19. The CDC and ASHRAE also recommend that additional consideration should be given to these technologies when deciding what method to use. All three of these technologies have been combined in one, recirculating unit, the Price Industries RAP.

The Price RAP comes standard with a MERV 8 prefilter, 99.997% effective (at 0.3microns) HEPA filter, and a blower. One also has the ability to add in BPI, UV or both into the unit. Adding in either of these options will enable the unit to not only catch the target virus in the HEPA, but also kill it.

BPI works by creating ions that react with the oxygen and water vapor in the air. This reaction creates “free radicals.” These free radicals can damage nucleic acids (think DNA) which makes them extremely

dangerous to viruses. One of the most common questions that comes up is how much ozone does this ionizer produce. The ionizers in the RAP is UL 2998 listed, which means the ozone concentration is 0.005 parts per million or less, almost negligible.

UV irradiation is commonly used for coil maintenance- the UV irradiates the coil which prevents mold and bacteria formation. What the RAP is doing is completely different, the UV lights are treating moving air. To achieve the high removal efficiency of Covid-19 desired, the lamp output is increased. The RAP can achieve a 99% removal from the UV when ran at 300 CFM, which when paired with the HEPA makes it almost impossible for Covid-19 to pass through this unit.

Now, how do we implement these units? For recirculation units, it is recommended that they outlet faces the most center position of the room to allow for the most amount of air treatment. In addition, ASHRAE has recommended that a minimum of 2 additional air changes are added to each room for safe opening.

ACH	SF	CFM
2	500	150
	667	200
	1000	300
	1333	400
	1667	500
	2000	600
3	333	150
	444	200
	667	300
	889	400
	1111	500
	1333	600
4	250	150
	333	200
	500	300
	667	400
	833	500
	1000	600

Figure 2: CFM requirement table, based on air changes required (ACH) and the square footage of the room (SF), assuming 9-foot ceilings

These units are readily available to be shipped, with a standard 3-week lead time and quick ship options available. If you would like some more information on the RAP, please visit Price Industries' Product Page for the RAP (https://www.priceindustries.com/terminalunits/products/rap-room-air-purifier). In addition to the RAP, ADE has a wide variety of products proven to help combat Covid-19, including duct-mounted HEPA filters, UV lights and Ionizers. Our engineering team has written additional articles on these solutions, and they can be found on our website, https://www.adehvac.com, in the News & Resources Section. Please contact adeengineering@adehvac.com if you would like more information, or assistance with any selections.

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