

HVAC Design Post COVID

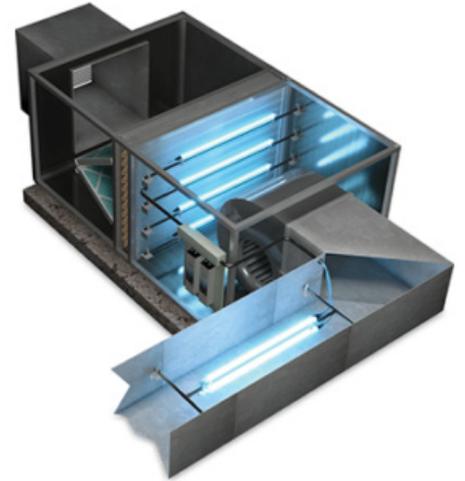
How will innovative HVAC design protect us from airborne health threats?

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In this post-pandemic culture, it seems that everything has changed in every way possible, and building design and mechanical design has not gone unscathed. There are things that design engineers will have to do differently, as well as standards that need to be changed to encourage sanitation and safety. The spread of COVID-19 has changed the way we, as designers, conduct business. There are areas we can use to push towards this movement of clarification - including ventilation, humidity, filtration, and equipment standards.

How ventilation will be changed in order to prevent the spread of COVID-19?

The addition of Ultraviolet germicidal irradiation lamps could slow the spread of dangerous particles due to the high-intensity UV-C energy that is emitted. The UV-C energy can kill 99% of diseases and viruses. By adding this energy to ventilation systems, virus particles that pass through would be less viable or killed. There are specific locations of placement that promote the most effective toll on airborne particles, which is downstream of the coil and main air handling unit.



How humidity can be used to fight the spread of COVID-19?

Relative humidity is essentially the amount of water in the air. If a relative humidity of 40-60% can be maintained, the particles in the air drop out of the air faster at this humidity. This decreases the probability of infecting people in surrounding areas, and equips the body to increase its resistance to the virus.

How to use filtration as an extra protection layer against COVID-19?

Filtration dates back to the 16th century, where people had the option to use a mask to filter out vapors, gases, and other particles. This was the only measure taken to purify the air people were breathing. In the 1900's, filtration was added to basic HVAC systems and thus was born the High Efficiency Particulate Absorption (HEPA) filter, used to protect against chemicals and radiation during the war. As filters have been researched and developed, the amount of particles they eliminate has increased drastically. By improving processes and technology like antimicrobial treatments and longer lasting and more efficient filters, filtration can be used to fight against COVID-19.

As for right now, a combination of multiple MERV (Minimum Efficiency Reporting Value) filters can be used to prevent the spread of the virus. Resources state that using MERV13 filters to catch smaller particles, and MERV8 filters to catch larger particles can help the spread of airborne particles. See the figure below for additional information on MERV filter classifications.

What changes can be made to ductwork standards?

Today, the specifications for ductwork regularly call for antimicrobial ductwork, though this is usually changed to standard ductwork due to expenses. Antimicrobial ductwork may add 5 to 10 percent on overall project costs, depending on the size of the space.



Post-COVID regulations may change this alteration to be non-existent, and antimicrobial may be the only option. The antimicrobial agent starts working after contacting moisture, which forces living particles to die. This purification of the air creates a safer environment for collaboration in the workplace and an increase in population within a space.

Closing Thoughts

The future may hold new inventions and innovations to strive towards a cleaner world. As research continues, perhaps scientists find that there are temperatures that decrease the viability of the COVID-19 virus, or maybe engineers find new ways to move air to decrease the spread of the virus. The use of other avenues like green walls - to purify the air, or sensors in HVAC systems that detect infected air, may aid in the fight towards COVID-19.

The fact of the matter is that researchers and developers will stop at nothing to create new techniques to improve the safety of a space when designing buildings. With the information we know about COVID-19, we can utilize ventilation, humidity, filtration, and even physical ductwork to enhance sanitation and clarity in these spaces. The hope is that someday, we will return to normal, but the reality is we are defining a “new normal” as we develop ways to minimize the spread of viruses and disease. It is up to us, as designers, to develop safe practices and spaces to encourage people to return to their lives, post-pandemic.