

## **Q&A WITH DR. WALID CHAKROUN, ASHRAE**

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### **1. What are the implications of COVID-19 on the AC servicing sector?**

The COVID-19 crisis has strongly implicated the AC sector by:

- a. setting up temporary hospitals and quarantines in arenas, stadia, etc., while setting up the most suitable AC systems taking into account the IAQ measures that can reduce cross-infections
- b. requests from clients in commercial, residential, and healthcare buildings from AC contracting and consulting firms in their assistance to set up their buildings with the recommended IAQ measures

To slow down the transmission of the virus we are now in need for more qualified engineers and technicians to check the ventilation and the filtration process to ensure the recommended measures.

### **2. What are the best practices when servicing AC equipment amidst COVID-19 pandemic.**

It is recommended that workers performing maintenance and replacing filters on any ventilation system with the potential for viral contamination wear a properly fitted respirator (N95 or higher), eye protection, and gloves. The HVAC systems should be turned off prior to entry for any maintenance activity. When feasible, filters can be disinfected by spraying them with a 10% bleach solution or another appropriate disinfectant, approved for use against human coronaviruses, before removal and disposal.

Disinfectants should not be used on ventilation filters prior to continued use of the filters inside ventilation systems. The effects of the disinfectants on filter performance are unknown. Filters should only be sprayed with disinfectants if they are to be removed from service and discarded. Whether disinfected or not, filters removed from HVAC systems with suspected coronavirus contamination can be placed into a regular trash bag (do not bend, tear or crush the filters) and disposed of as normal trash. There are no special bagging/tagging requirements or waste processing steps necessary, outside of the normal waste processing procedures. When maintenance tasks are completed, maintenance personnel should immediately wash their hands with soap and water or use an alcohol-based hand sanitizer.

### **3. Are there any guidelines and measures for mitigating the transmission of Virus in the Refrigeration sector?**

Not to my knowledge, since refrigerated spaces are not normally occupied. Distancing and masking would apply, but I am not aware of any measures related to refrigeration equipment.

### **4. Is there any need to review our MEPS due to COVID-19 pandemic?**

There is always a need to review our MEPS, and not just due to the corona era. MEPS help us reduce the energy consumption and the indirect emissions.

**5. Do the COVID-19 can spread from one room to the other room when we stay at the same hotel, through air conditioner system?**

I am not aware of room to room transmission through an HVAC system. However, something as small as a typical hotel room is really a single zone. I think it would be unusual for air to pass from one space to another through HVAC in a hotel because of the way they are normally ventilated (no recirculation).

If multiple rooms are cooled by a single air handling unit or package unit, then yes. This is mainly due to the fact that the return air does not go through ducts, and the attics are usually open as the return air is naturally circulated back to the AC unit. This can cause droplets containing the SARS-CoV-2 virus go from one room to the next.

If there are return air ducts, and no proper filtration systems, then small droplets can spread to other rooms through the AC unit blowers.

**6. In which type of buildings/areas in buildings would you recommend HEPA (High Efficiency Particulate Air) filters?**

HEPA filters in fixed air conditioning systems are usually placed for Operating Theatres, and Delivery Rooms, due to their high efficiency and pressure drops. They require blowers with high static pressures and therefore have their own AC units. This makes their application expensive and limited to certain areas within a health-care facility.

However, portable HEPA filter units can be a good way to provide additional air cleaning in spaces in which filtration cannot be upgraded.

**7. All your information is very useful, but how it will reach the down-trodden people of our Society?**

By the following: providing this information to health-care officials in local municipalities and governments, dissemination of the ASHRAE website that has all the required resources for free: <https://www.ashrae.org/technical-resources/resources> Creating workshops, webinars, etc that are open to the public.

**8. What of the ventilation in malls, airports, as well as churches where there is no style of occupation of the population. which method would be the best for decontamination?**

I am not sure what you mean by the style of occupation of the population means

From what I have seen so far, many local officials are trying to control the number of people entering local malls, churches, mosques, and airports. For example, many countries have not yet operated their airports at their full capacities, therefore reducing the number of people going through these ports of entry. Furthermore, governments have been imposing social distancing measures in mall, mosques and churches, reducing the number of people entering at the same time and regulating the flow of people in and out.

Naturally ventilated buildings of large volume (some mosques, for example) may be relatively safe with distancing and use of masks.

These are all promising measures, that can help building owners reduce the number of people at a given time, therefore making ventilation applicable and reducing the ventilation loads.

**9. ASHRAE'S position in COVID transmission is very important specially in the Dental sector wherein a clinic is required to have a negative pressure room. Two dental clinics I had visited had their negative room un air conditioned. Does this mean the virus could be more possibly occur/spread than an air-conditioned room?**

I do not know how these clinics were designed, but usually in health-care facilities when there is a negatively pressured room, there is an isolation room between this room and the rest of the building, to ensure no cross-contamination between this negatively pressured room and the other rooms.

Now negatively pressured rooms are there to ensure that the bacteria and viruses generated in this room does not escape to the rest of the building, hence creating an isolated space.

Air circulation caused by an air conditioner should not be a problem if the space is well ventilated, although there is reason for concern about creating strong drafts that can blow around larger droplets.

The presence of an AC unit in this case would increase the thermal comfort of the indoor occupant, and consequently making the recovery of this patient more humane, but that also depends on the weather conditions within the region these clinics are in. Furthermore, an AC unit with proper filtration, UV-C..., will reduce the number of airborne particles, limiting the probability of health-care workers exposure to the viruses.

**10. It is recommendable to combine passive and active ventilation in buildings, could that improve air quality?**

In recent publications, passive cooling techniques have shown positive results in reducing ventilation loads by reducing outdoor air temperatures. Passive cooling techniques include direct and indirect evaporative cooling, Maisotesenko Cycle, cool roofs and radiative cooling materials. Lowering the outdoor air temperatures will help in providing more ventilation air at lower without significant increases in the coil loads.

This could certainly save energy. Whether it would improve IAQ would depend somewhat on how much ventilation is provided during free running operation.

**11. When fresh air circulation is maximized, will it result in energy consumption will increase (as the fresh air temperature has to be brought down and may be humidity has to be decreased)**

Significant increases in fresh air will increase the energy consumption. For example, if you place a 90% fresh air to recirculated air ratio, then you will have more increases to the coil load, and the fan static pressure as the coil pressure drop will significantly increase. This is why ASHRAE is recommending the implementing of the ASHRAE standard ventilation rates, along with a MERV 13 filter, and carefully studying the air distribution systems within buildings to ensure no horizontal flow. Building owners need to study their buildings carefully to obtain the optimal IAQ with the least energy consumption increase. Furthermore, adding portable filters, or using air disinfection technology can improve protection with little energy use impact.