



CENTRAL CHILLED WATER ACs ARE SAFE.

Here's why.

The COVID-19 virus can cause respiratory tract infections that range from mild to lethal in intensity. The size of the virus is extremely small in the range of 80–160nm. In comparison a PM 2.5 particle is 2500 nm in size. From the scientific research available as of today, the virus is transmitted through both aerosols and droplets. However, while studies are still underway, the majority of the transmission is through the cough and sneeze of an infected person in the form of droplets. Because these relatively heavy droplets land on surfaces, contact transmission is high in COVID-19. The droplets travel a distance of 1–2 meters, depending on their size, and fall on surfaces and objects, where they remain active for hours and up to 2–3 days, depending on the material. People can get infected by touching these contaminated surfaces or objects; and then touching their eyes, nose or mouth. If people are standing within 1–2 meters of an infected person, they can be infected by breathing-in droplets sneezed or coughed out or exhaled by them. In low humidity conditions ($RH < 40\%$), small virus droplet nuclei are formed from the droplets in the air, which shrink in size due to the process of evaporation and desiccation. These smaller particles can remain airborne for hours. Other than cough and sneeze generated aerosols, dust particles in the air can also carry the virus.

Why are central air conditioning systems safe?

Central air conditioning systems are safe and in fact beneficial to use in commercial applications and public spaces. Air conditioning systems control both temperature and humidity in the conditioned space. This increases human resistance to infections which is highly beneficial in the current pandemic scenario. Contrary to the general perception that it is a closed-air system, these systems are in fact well-ventilated. A standard central air conditioning system design includes a mechanical ventilation cum filtration system that draws in adequate fresh air. The system also maintains Relative Humidity between 40% – 70%, which is ideal for avoiding the propagation of the Covid-19 virus.



A little more about Central Chilled Water AC Systems.

A standard Chilled Water AC system has Air Handling Units (AHUs) for catering to larger spaces and Fan Coil Units (FCUs) for smaller spaces like individual rooms & cabins. These “air-side equipment” maintain human comfort conditions by regulating temperature, relative humidity and maintaining adequate filtration levels.

In addition, there are a range of mechanical ventilation equipment responsible for drawing in adequate fresh air. As per ASHRAE standards, the system needs to deliver minimum fresh air of 5 CFM per person plus 0.06 CFM per sq ft. This translates to roughly one air-change per hour (the entire volume of air in the conditioned space is replaced with fresh air every hour). The ventilation equipment used include:

- Outdoor Air Units (OAU) with –
 - Filters, but without any thermal treatment.
 - Treated Fresh Air AHUs (TFA) with filters, Chilled Water coils or Heat Recovery Wheels.
- Toilet Exhaust Air Units to remove exhaust air.
- Kitchen and Pantry Exhaust Air Units.



Operation during non-working hours

It is advisable to operate the Air Handling Units in fan mode even during non-working hours along with fresh-air ventilation. This will facilitate effective filtration of air. During these hours the chilled water plant will not run and hence the power consumption in fan mode will be much lower.

All ventilation units, viz., Fresh Air Units and Exhaust Air Units must be kept running.



Regular Maintenance

Duct cleaning should be done on a regular basis. Removing the accumulated dirt and dust inside the ducts periodically will help to eliminate contamination. It is also advisable to clean grilles and diffusers.

It is recommended to clean filters in all AHUs, FCUs, TFAs, OAU and Toilet and Kitchen Exhaust Units on a regular basis using 5% Cresol solution (containing 50% Cresol and 50% Liquid soap solution)

- Condensate drain pans, cooling and heating coils must be cleaned regularly.
- Louvers on toilet doors which are designed as part of exhaust systems need to be cleaned regularly.
- It is also advisable to frequently sanitise various items like switches, panel handles etc. as the same may be touched and operated with human hands.



UVGI (Ultraviolet germicidal irradiation)

Customers can additionally opt for special treatment of air:

- UVGI treatment can kill or de-activate microorganisms by damaging the structure of nucleic acids and proteins. Proper selection of an UVGI system with adequate intensity is required.

In conclusion, air conditioning systems control temperature, relative humidity and ventilation which can reduce the air borne concentration of COVID 19 and reduce the risk of transmission through air as compared to other conventional methods.

By following the operating guidelines and maintenance protocols explained in this bulletin, building owners and occupants can be assured of a safe and comfortable environment.

Please reach out to our team at TOOT MNE for any support during these challenging times: tootmnetech.com



What steps can be taken to ensure the highest standards of safety when using a Central Chilled Water AC System?

TOOT MNE recommends the following operating guidelines for central chilled water AC systems:



Temperature

Temperature may be set at around 26°C.



Fresh Air Ventilation

Increase the quantity of fresh air to two air changes per hour (the entire volume of air in the conditioned space to be replaced with fresh air two times every hour) in the current pandemic scenario. This can be achieved through a number of ways:

- Increase the supply air fan speed in the TFAs and OAUs by:
 - Change the drive ratio where the fan speed is not regulated through a VFD or the VFD is already operating at the maximum setting
 - Increase the frequency of the VFD to achieve the desired air quantity
- In some systems, fresh air is drawn by the AHU through louvered wall openings and not by centralized fresh air AHUs. For such systems, it is recommended to increase the size of the wall openings or introduce an inline fresh air fan to augment the fresh air intake.
- The Toilet Exhaust Units should be run at maximum capacity throughout the operation of the HVAC system.



Heat Load & Cooling Capacity

Two air changes will increase the heat load considerably. By raising the set temperature and with social distancing compliant occupancy of up to 50%, the heat load is expected to remain roughly the same. Most systems will therefore not require cooling capacity augmentation or redesign. It is however recommended to re-evaluate the existing system design and you may contact TOOT MNE for any support in this regard.