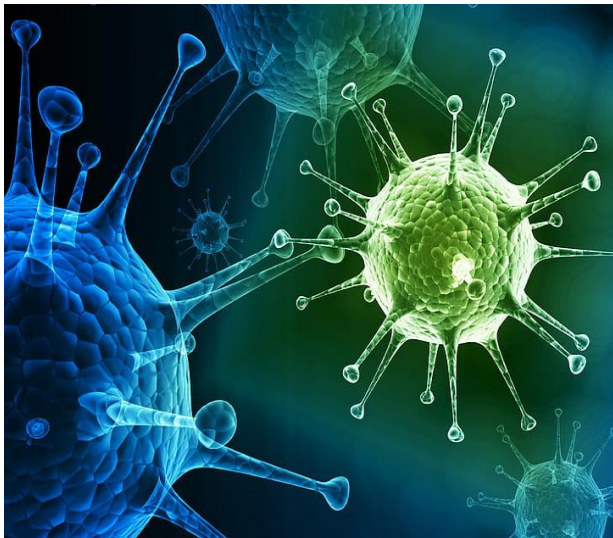




COVID-19 TECHNOLOGICAL UPDATES

MICROBIAL AIR PURIFICATION SYSTEM

MAPs is a combination of science and multiple technology that create a better and safer Indoor Environment to live, work and breathe. This technology is fast, efficient, safe, reliable & user friendly which eliminates not only germs, viruses & bacteria but also harmful gases, VOCs, odours, tobacco smoke, suspended airborne particulate & this is the need of the hour.



India with uncomfortable weather conditions we spend our 80% time under centralised Ac in closed spaces like Multiplexes, Malls, commercial office high rise buildings/ apartments, Airports, Hospitals etc. During the time of COVID-19 did it ever come to your mind if we are breathing an infected air?

The coronavirus disease 19 (COVID-19) is a highly transmittable and pathogenic viral infection which is **very contagious** and is been **quickly spreading** across the globe. The transmission is believed to occur through

respiratory droplets from coughing and sneezing. Given the right temperature and humidity levels, Virus can survive in air for long duration in the form of a droplet nuclei. Chances of transmission of this virus in form of droplets or droplet nuclei increases in closed spaces like Metro trains, Airports, Hospitals, Multiplexes, Malls, commercial office and high rise apartment buildings because of the **Centralised HVAC** (Heating Ventilation Air Condition) Systems installed at these places. Because the mechanism of HVAC is based on **recirculating the internal Air**. A small proportion of external or fresh air is been used in this mechanism. Consequently, for example, if in a Hospital ward an infected person sneezes

or releases these tiny droplets in his room is being transmitted to other person present in the corridor or may be in the other room. That is possibly one of the reasons that despite wearing PPE kits or maintain required distance various medical staff and healthcare workers got infected by this virus. Similarly, if a positive person is observing self-Quarantine in his apartments may infect the other residents of his Building through this recirculation infected air droplets. Same theory is applicable for all public spaces like mall, multiplexes and govt offices where **Centralized Air Conditioning HVAC systems** are installed. Existing HVAC System is based on the concept of recirculating of cool/hot air to maintain the controlled

environment and making the system energy efficient. But it poses a great threat to human life especially at the time when world has been exposed to risk of attack from deadly microbes naturally.

For ages HVACs works on the concept of recirculation of internal air again and again which may be polluted or may be carrying Viruses and bacteria. But this recirculation mechanism without any treatment of pollutants and virus are no longer reliable for the safekeeping of our lives.

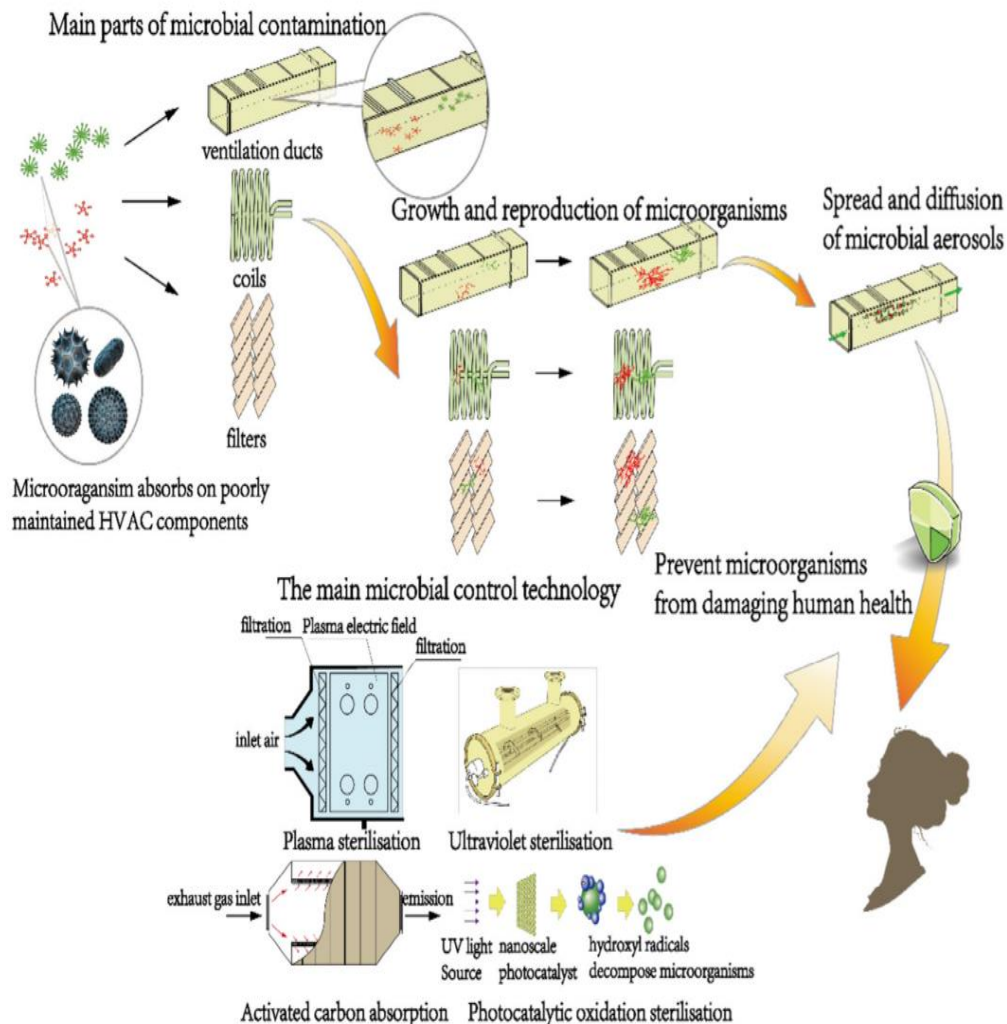


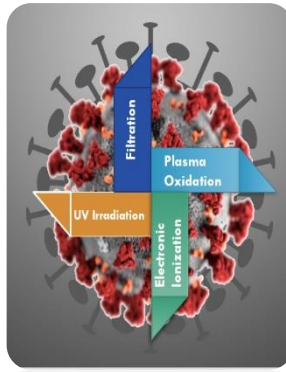
Fig. 1. Growth, reproduction, spread and control of microorganisms in HVAC systems.

HVAC AND MICROBIAL GROWTH

HVAC systems are the “respiratory system” of modern buildings, regulating indoor temperature, humidity, airflow and cleanness. However, they will be the sources of microbial contamination worsening indoor environment and threatening occupants’ health if they are improperly designed or operated.

Microbes and the subsequent biofilms grow easily within heat exchangers. According to the United States Environmental Protection Agency (EPA), contaminated HVAC systems can serve as a breeding ground for bacteria and fungi, and a substantial reservoir for viruses and fungal and bacterial spores.

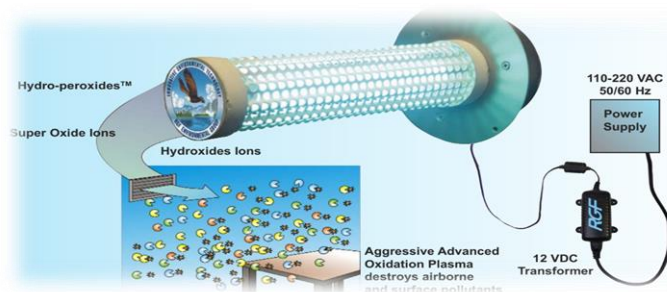
PERFECT AIR – SUGGESTED SOLUTIONS



After analysing the situation, we have come to conclusion wherein the infected aerosols are treated within the duct itself before it is transmitting or infect others. After our R&D we have shortlisted and collaborated with top technologies used around the world for killing the virus in infected aerosol droplets. The following are the different types of internationally developed technology that we are going to integrate within our current/future solutions for SITC (Supply, Installation, Testing and Commissioning) of clean rooms/ HVACs projects:

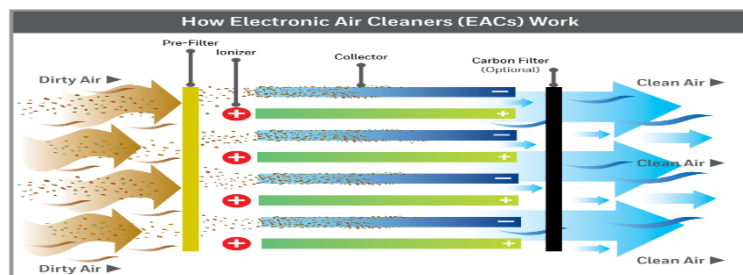
PLASMA OXIDATION

Advanced oxidation is highly effective for gases, vapours, VOCs and odour. Micro-organisms can be reduced by up to 99.99 per cent with, **Methicillin Resistant *Staphylococcus aureus***. Gasses, VOCs and odours can also be substantially reduced. Studies conducted in USA shows that this technology has proven to be effective for killing the long list of viruses like **H1N1 (Swine Flu), Avian influenza (Bird Flu), Norwalk Virus, *Streptococcus Sp.*, Tuberculosis etc.** Also, this technology has been approved by various Government of various countries.



ELECTRONIC IONIZATION

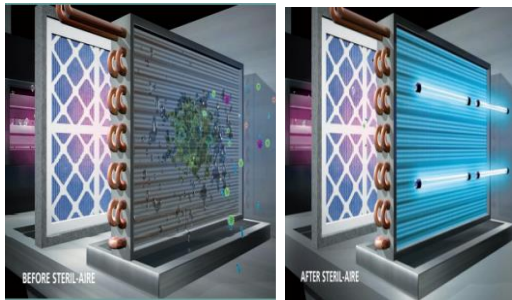
In this technology a high voltage is applied to the ionizing wires to form a strong electric field between the wires. Electrons present in contaminated air containing pollutants such as fine dust, smoke particles, pollens, mould spores and bacteria are pushed at high velocity (due to strong Coulomb Forces) from the negative charged electric field to the positive charged



electric field. Along the Australia way they collide with the contaminants, releasing more electrons. The ionized particles are

moved by the moving air into the strong electric field at the collectors and are trapped at the charged collector plates.

UV GERMICIDAL IRRADIATION



Here UV germicidal Emitters are installed on the supply side of the system. Its unique location provides more effective biofilm and microbial control than in-duct UVC installations. The recirculating air in HVAC systems creates redundancy in exposing microorganisms to UVC, ensuring multiple passes so the light energy is effective against large quantities of airborne microorganisms. Steril-Aire UVC delivers the highest UVC output, driving HVAC system efficiency while improving indoor air quality.

RECOMMENDED CONDITIONS	
TEMPERATURE	24°C to 30°C
HUMIDITY	40% ~ 70%
FILTER CLEANING	Regular
FOGGING & FUMIGATION	Before Human Entry

Confirmed & Suggested By ISRAE

CONCLUSION:

Here it is imperative to mention that these technologies can be effective if the design of HVAC system has been given due weightage. The future HVAC system can never be same again as it needs to be updated after this pandemic. The desired results from these technologies cannot be obtained if used in isolation. These technologies must be integrated with one another to give best results.

The above stated technologies are fast and efficient, safe, reliable and user friendly which reduces not only germs, viruses, and bacteria but also harmful gases, VOCs, odours, tobacco smoke, suspended airborne particulate and these are the need of hour.

FILTRATION



HEPA stands for high-efficiency particulate air. A HEPA filter is a type of mechanical air filter; it works by forcing air through a fine mesh that traps harmful particles such as pollen, pet dander, dust mites, and tobacco smoke. HEPA filters utilize a powerful blower to force the air through a very tight membrane to achieve high efficiency particulate filtration. They are very efficient in the filtering of air that passes through the filter. They filter to .03 micron.

Carbon filtering is a method of filtering that uses a bed of activated carbon to remove impurities from a fluid using adsorption. Carbon filters consist of carbon impregnated filter fabric or granulated carbon. These filters usually have a foam or fabric filter to hold the media. Carbon has the unique capability of acting as a physical filter trapping particulate, and on a chemical basis by reacting with some odours and some of the heavy gases. Absorbs odour, absorbs some gases, filters particulate, installed in central or individual rooms.

*****PERFECT AIR *****

HVAC | Puff Panel | Electrical | Automation | Validation

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