

Frequently Asked Questions (FAQs): Vayu Swachh

Q. Why Air Sanitization (Vayu Swachh) technology is useful for Indian Armed Forces?

A. Vayu Swachh technology is described as an integration of multiple disinfection technologies in single system to ensure that indoor air quality is clean and pure as per laid down standards. The technology comprised of ionization filtration, carbon filtration, ozone and UV-C sterilization in addition to air purifiers (filters- pre and HEPA as per requirement). The technology is designed for bases for Armed Forces as well as their associated residential units, schools, restaurants and other community units. These are developed as part of mitigation strategy to protect communities as well as responsive units. The protection of families of responsive unit ensures that their morale and performance is not compromised in next generation hybrid warfare. It is universal in nature with their multiple variants: (a) Mobile (slim) unit for in-space; (b) Fixed units for offices ('Air Flow separation technology) and; (c) HVAC based customized units for centralized air flow management. The similar technologies are being used in USA for their Air Force bases.

Q. Which counterpart global technology and where it is being used?

A. The counterpart imported global technology is ISO-Aire which is a combination of three layers of air purification; 12-inch HEPA Filter; ozone free bipolar ionization and UV-C sterilization. This technology is in-space solution for US Air Force bases (<https://www.iso-aire.com/blog/protecting-the-indoor-air-for-our-us-military>). On the other hand, Vayu Swachh is "Ultraswachh integrator device" comprises of (a) Air Purifier; (b) Ionization led dust suppressor; (c) Advance Filtration (HEPA/ other as per requirement); (d) Ozone-UVC cyclic air sterilization system and; (e) advance Carbon Filtration/ residual ozone capture technology. The latter is DRDO's Ultraswachh technological marvel developed in 2020 during first phase of COVID-19 pandemic. It is applicable for maintenance of "Indoor Air Quality" Standards for effective operational skills both during peace time and war.

Q. What type of Threats can be mitigated?

A. With respect to three wings of Armed Forces, the common threats is (a) continuous operability under extreme conditions (terrain/ contamination); (b) safety of their bases / critical mass of decision makers; (c) safety of civil units which are resource-centric for supporting logistics supply chain and; (d) safe units for residential communities for mitigation of psychological warfare. Hence forth, next generation warfare of following aspects can be mitigated effectively using such technology. The scenarios include: (a) Hybrid attacks using biological (panic & morbidity inducer) agents while CR&N as tactical agents at border levels; (b) Slow - death warfare uses "less lethal though high spread/morbidity agents" with impact on economic dividend; (c) Silent Assassination Attacks during critical meets or targeted attack on "persons of interest". All such scenarios require preventive / preparatory measures in place as part of infrastructure as being aided by Ultraswachh- Air Sanitization Unit (Vayu Swachh).

Q. Why Air Purifiers is not suitable technology to mitigate such threats?

Air Purifiers are generally 3 layered technologies that support filtration only and not neutralization of microbes while Vayu Swachh technology is superior technology integrating air purification with other technologies.

Q. How you can compare “Air Purification” vs. “Air Sanitization” technology?

	Air Sanitization Device	Air Purification Device
Definition	Device that filters (purify) air as well as neutralizes microbes (disinfection)	Device that filters (purify) air only.
Air Filters Sanitization	Self-cleaning filters that gets sanitized due to inherent ozonated radical cycle	Filters are harbor of micron sized particles/ pathogens, replaced accordingly.
Anti-Odor Ability	It act as anti-Odor device as it oxidizes VOCs (chemicals responsible for smells) and not just limits to size exclusion filtration	It reduces odor due to exchange of fresh air in the room (if fitted with HVAC) which is nearly 15-25% per cycle, though no anti-odor device unless included as separate accessory.
Protective Air Flow	Fixed systems are built up with protective air flow while mobile with transient protection at choice of deployment location.	Fixed system works with protective air flow however as no microbe neutralization hence speed of air needs to be maximized to achieve desired protection, sometimes not feasible in cold climate.
Ionization Dust Suppression	Always built up as important accessory as second line of Defense.	Some types are Air Ionizer acts as purifier while other purely works as filtration system.
Ozone Led Neutralization of Microbes (Ozonated Radical Cycle)	Present exclusively in Air Sanitization Device as Ozone neutralizes microbes while UV-C transforms ozone back to oxygen as well as sanitize air	No such system in present in Air Purification Devices
Environment Friendly	Yes	Yes
Confined Space Sanitization	Does not leave any residue trail of hazardous chemical providing “pathogens” a resistance generation opportunity	In case of chemical based air purification devices are deployed in healthcare settings, trail of chemical residues are generally present.
Time for change of filters	Under same conditions of room dust, outer air flow, influx of microbes and inherent capacity, filters play their effective role two times than air purification device	Based on capacity and status of room dust, outer air flow: average three –to– six months for effective functioning.
Recurring Input	Filters & UV-C lights only otherwise operates with Air only	Filters need to change frequently
Anti-microbial coating	Device is coated with anti-microbial coating that does not allow opportunistic pathogens to grow on its surface for a period of 90 days	Generally no such coating is there on these devices
Models	Slender sleek mobile unit in SS & Fixed Unit (s)	Plastic Unit(s) with multiple brands
Product Brands	Single (Vayu Swachh)	Multiple
Technology Brand	Ultraswachh	Many (mostly imported)
Imported/ Indigenous	Indigenous	Imported and some are Indigenous assembly units are also there
Authority	DRDO Technology	Multiple Companies however generally best one uses HEPA filters (that are mostly imported in nature)

Q. Does it operate 24 X 7 X 365 days?

As per standard mandate, it operates 24 X7. However, in practice, mobile unit generally operate during office hours when there is resident in office. On the other hand, fixed unit

operates in similar manner with additional 2 X Air Flow Separation systems (for 24 X7 operations). HVAC based Vayu Swachh units also operates continuously with 1+ 1 X system (s) having redundancy factor for such operations.

Q. What are major sites where it can be used?

The primary sites Office Room Sanitization, Seminar / Conference Hall Sanitization, Hotel Room, Cafeteria, Restaurants, Banquet Hall, Hospital Room, Industrial work space, Airport , Airline / Railway A/C coaches, Bus coaches or any confined space with probability of spread. In addition, it is applicable for all types of vehicle sanitization. It is also useful in Jewelers and any kind of shops/ showrooms. The technology is applicable for continued usage on daily basis.

Q. Is there any difference between residential, industrial and units designed for Armed Forces?

Residential unit(s) are either mobile or HVAC based in relation to nature of residential air flow whether it is independent or centralized. Industrial units have two variants: Office: fixed roof mounted units while big commercial units supporting large air flow. Units designed for Armed Forces are (a) fixed for vehicle(s), offices, control rooms (with variable personnel capacity) and; (b) Centralized Air Management Unit (based on threat level of the site). The primary difference is (a) mobility; (b) capacity and; (c) individual/ centralized. The underlying 'Vayu Swachh' technology remained same in terms of integration of technologies in all such units, the variant factor is ergonomic designs.

Q. Is it useful to install into buses or other passenger based vehicles?

Yes, it is useful to install into any vehicle which has "Air Conditioning" mode and by switching into "inner circulation mode", such systems can reduce spread of infection in public zones too.

Q. Is there any impact of frequency of change of Filters in Vayu Swachh as compared to standard Air purifiers?

An estimate revealed that due to intrinsic self-cleaning ability, the frequency of change of "filters" is doubled i.e. instead of change of filters in 6 months to 1 year in standard air purifier, it is shifted to range of 1-2 years based on similar prevailing conditions for both products.

Q. Does the product displays "Air quality index" of the confined space?

Yes, the sensor keeps on detecting the levels of pollutants in the air and exhibits the values.

Q. Whether Vayu Swachh is "odor management" device?

Yes, being ozone-UV-C cyclic sterilization technology is integrated into Vayu Swachh, it oxidizes VOCs responsible for bad odor in the confined spaces.

Q. Is the product indigenous or just integrated in India as other Air Purifiers?

Being DRDO technology, the technology is indigenous as its all critical components are manufactured within India as well as integration/ fabrication. Gel Craft Healthcare (P) Limited is technology holder of Ultraswachh technology among which it is one of the major products. The company certifies that technology is not dependent on any raw material being supplied by any rogue or unfriendly nation.