PERFORMANCE SPECTRUM
- Indoor Air Treatment

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"Do not under estimate infectious diseases"

"We spend most of our time Indoors"

"Indoor air is vulnerable to airborne cross contaminations"

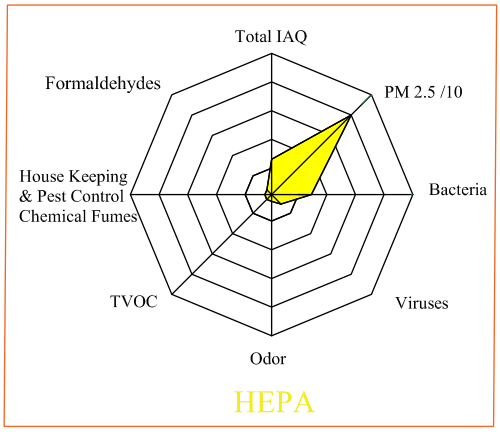
"Most of the indoor areas are untreated"

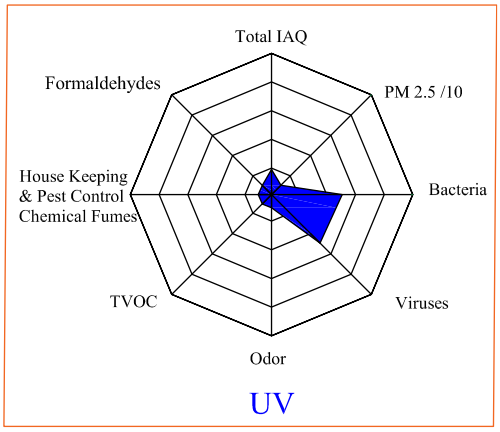
"Ask IAQ expert, Chemtronics for best solution"

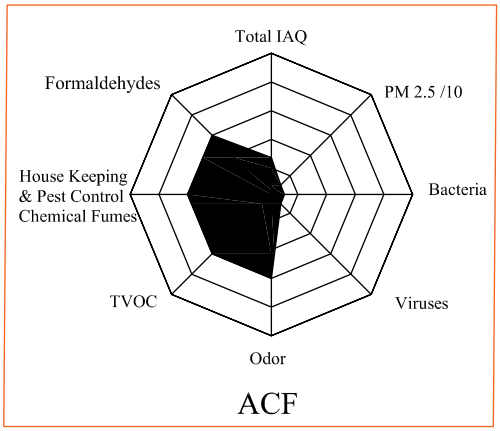
Indoor Air Quality (IAQ) significantly depends on the selection, reach & depth of the treatment technology & methodology.

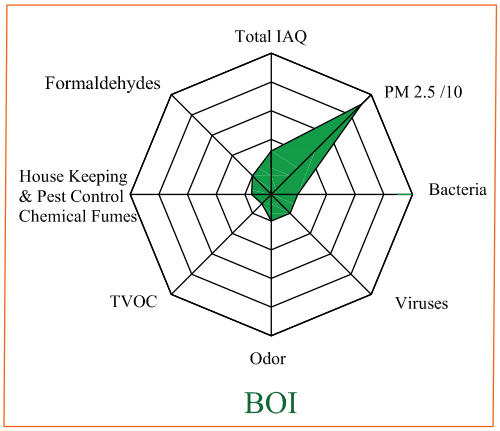
Spectrum Coverage – Technology Selection:

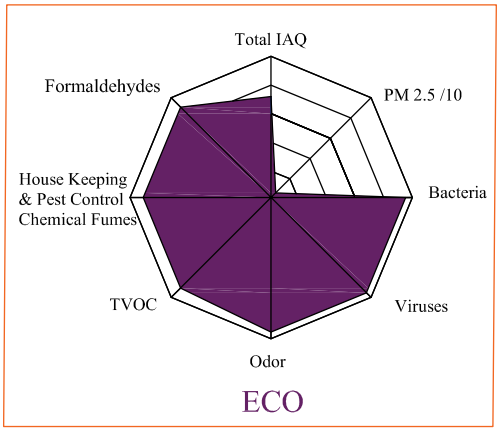
First and most crucial is the selection of the right treatment technology for Indoor air pollutants & contaminants. In the below spectrum coverge web, it is clear that different treatment technology has different effectiveness on possible pollutants & contaminants.

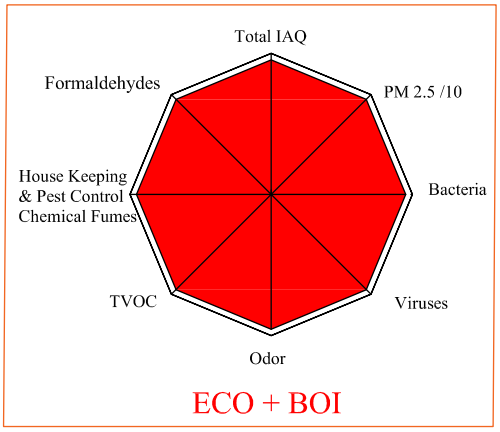












Chemtronics®
www.chemtronicsindia.com

"It is not only important to treat indoor air but to enhance it and reduce Sick Building Syndromes [SBS]"

Penetrate & Treat

"Electrochemical Oxidation [ECO] & Bipolar Oxygen Ionisation [BOI] are the killers of Any Virus"

Options :

1. Social Distancing

2. Self-Quarantine

3. Air Disinfection

Smart Answer :

Air Disinfection

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Indoor air pollutants are broadly classified as physical, biological & chemical. To neutralize them, each needs a different treatment or combination of treatments. Select one the most suitable & effective for the pollution you wish to address. Select one has the maximum spectrum coverage over diversified pollutants, maximum penetration reach and highest depth of strength & power.

High Efficiency Particulate Air (HEPA) Filter:

Colloidal particles like fine dust, pollen etc. are extremely small classified as PM 1, PM 2.5 & PM 10 as per their size in microns (1 micron = 1/1,000 mm). These particles possess positive charge on them, which keep them suspended in the air by continuously repelling each other. The High Efficiency Particulate Air (HEPA) filter can trap particles as small as 0.3 micron. These filters have high replacement frequency & are only applicable in central HVAC system or stand alone filters. For them to be effective air with colloidal particles should flow through them. HEPA filters are mechanical physical filters having minimal to nil effectiveness on biological pollutants, since all viruses are less than 0.3 micron and chemical pollutants can simply pass through them with air. HEPA filters are completely ineffective on dust particles which are settled on surfaces, floor, carpets, false ceilings, furniture & electronic equipment.

Ultra-Violet (UV) Radiation :

An ultraviolet germicidal UV-C light radiation of wavelength 253.7 has excellent performance on biological pollutants. But the UV radiation is extremely dangerous for human eyes & skin, if exposed. Even a short time exposure can cause severe conjunctivitis, psoriasis & skin cancer, so they have to be kept covered / enclosed. To treat biological contaminations air has to pass through these lights at very slow velocities to have a sufficient contact time for neutralization. Normally, air which is flowing in centralized air handling units (AHU) and ducts, can only offer 0.02 – 0.05 second of contact time. For effective CT value (concentration X time) more no. of lamps are needed to increase the concentration to compensate for the short contact time. Also, this germicidal light cannot reach places where the bacteria, viruses, mold, fungus, dust mites can hide & multiply. Its lethal performance is practically ineffective at the point of germ source. Again UV lamps are made up of a thin long glass tubes filled with Mercury, which is highly dangerous & needs careful handling.

Activated Carbon Filter (ACF):

Activated carbon filters of 800 – 1,000 iodine value are extremely effective in adsorbing most of the chemical pollutants in the air. But, for them to be effective air has to be continuously passed through them. So they can be either stand alone or can be integrated with the centralized AHU system. The major drawback is that over time, they become a breeding ground for bacteria & viruses. The replacement frequency is high with recurring cost. They are absolutely ineffective on particulate matter & biological pollutants. Also carbon filter can not adsorb chemical pollutants from the source like furniture, paint, pest control & housekeeping chemical pollutants.

Bipolar Oxygen Ions (BOI) :

When Oxygen orbital is broken electrically, millions of positive protons & negative electrons are released in indoor air. This gives a charge to suspended colloidal particulate matter (PM) making them agglomerate & settle on the ground. In cases of AHU & ductwork, their bigger size effectively traps them in mechanical filters. Any other chemical and biological pollutant associated with particulate matter also settles down on ground, thereby offering limited efficiency. This can be strategically installed in the AHU ductwork and in local area. BOI has very negligible effect on chemical & biological pollutants.

"High level of Safety for humans, Furniture, Equipment, Environment"

ECO + BOI

Effectiveness On Reduction or Control of :

PM 1.0 | 2.5 | 10

YES

Odor Reduction

YES

Total Volatile Organic Compounds

YES

Formaldehyde

YES

Bacteria & Viruses

YES

Toxic Chemicals

YES

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Electro Chemical Oxidation (ECO):

An advanced version of air treatment uses oxidation technology to oxidize all biological & most of chemical pollutants with high efficiency. The technology uses electricity to produce oxidant on site. This oxidant works on point of source of the pollutant. It reaches every place where any virus & bacteria can hide.

Chemtronics Innovative ECO + BOI:

Chemtronics R & D team has developed unique blend of ECO + BOI to cover the most of the pollutants which can be physical, biological and chemical. In this integration, oxidation is extended to produce advance oxidation to offer high degree of spectrum coverage with better reach & depth of the treatment for optimum performance. The greatest advantage is the disinfectant does not need any consumable, as it is produced from ambient air, using electricity. The treatment is at the point of source, where air can reach. Low operation & maintenance cost without any consumables.

Below, different indoor air treatments are compared for their performance, reach & depth of treatment.

Comparisons - Indoor Air Treatment & Enhancement Chemtronics®

Points of Comparisons		HEPA	UV	Carbon	Ozone	Ions	Chemtronics ECO + BOI
Performance	PM - 2.5	Moderate	No Effect	Minimum	Minimum	High	High
	PM - 10	Moderate	No Effect	Minimum	Minimum	High	High
	Pollens	Moderate	No Effect	Minimum	Minimum	High	High
	Odor	No Effect	No Effect	High	Very High	Minimum	Very High
	VOCs	No Effect	Minimum	High	Very High	Minimum	Very High
	Formaldehydes	No Effect	No Effect	High	Minimum	Minimum	Moderate
	House Keeping Chemical	No Effect	No Effect	High	Moderate	No Effect	High
	Pest Control Chemicals	No Effect	No Effect	High	Moderate	No Effect	High
	Bacteria	Minimum	High	No Effect	High	Minimum	Very High
	Viruses	No Effect	High	No Effect	High	Minimum	Very High
	Mold	No Effect	Moderate	No Effect	High	Minimum	High
	Fungus	No Effect	Moderate	No Effect	High	Minimum	High
	Dust Mites	No Effect	Minimum	No Effect	High	Minimum	High
Point of Treatment		Origin	Origin	Origin	Source	Source	Source
Consumable		High	Low	Moderate	Low	Low	Low
Residual Effect		No Effect	No Effect	No Effect	Low	No Effect	Low
Side Effect		No Effect	No Effect	No Effect	No Effect	Air Quality Enhancement	Air Quality Enhancement
Enhance	Energy Levels	No Effect	No Effect	No Effect	No Effect	High	High
	Freshness Levels	No Effect	No Effect	No Effect	No Effect	High	High
Control Operation		NO	NO	NO	Yes	NO	Yes
Performance Spectrum		25 %	20 %	40 %	70 %	35 %	95 %
Overall Rating		Low	Low	Moderate	High	Moderate	Highest
Capital Cost		Low	Moderate	Low	High	Moderate	Highest
O & M Cost		Low	Moderate	Low	Moderate	Low	Moderate