



Catalytic Air Purification System

Catalytic Air Purification System UVPCO + Gas Phase Technology



1. Introduction

PCO with Gas Phase Filtration is an advanced process by which volatile organic compounds (VOCs), bacteria, molds and fungus are destroyed by incorporating ultraviolet (UV) energy activating a catalyst thereby creating the photo catalytic oxidation (PCO) process.

UVPCO often utilizes a honeycomb configured, reactor coated with titanium dioxide (TiO₂ or titania) as the photo-oxidative catalyst. This design potentially can have high conversion rates with low pressure drop making it suitable for use in building HVAC systems.

The coated screen is irradiated with UV light near 254 nm UVC. Air containing organic pollutants flows through the screen, where the VOCs adsorb on the catalyst. The UV light interacting with the catalyst in the presence of oxygen and water vapor, produces hydroxyl radicals. Hydroxyl radicals are highly chemically reactive and, in-turn, breakdown the adsorbed VOCs, ideally producing only carbon dioxide and water as by products.

Gas Phase Filtration with Photo-Catalyst Oxidation systems are tailored precisely to your needs and operate with the highest efficiency. The multistage design allows for selection of the required filters in a specific sequence to meet the requirements of each application.

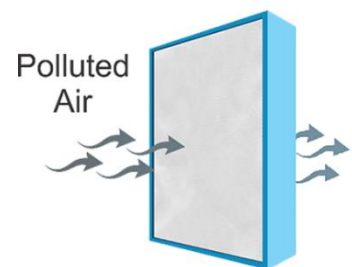
- Destroys molds, viruses, bacteria and allergens etc.
- Maintains desired levels of particulate matter
- Efficient regeneration of media
- Flexible design, Easy to retrofit
- Adequate controls for safety
- No harmful emissions
- Reduces all odorous and hazardous air pollutants
- Provides very high single-pass efficiency of gas removal
- Prevents corrosion / breakdown of electronic equipment

2. How it works?

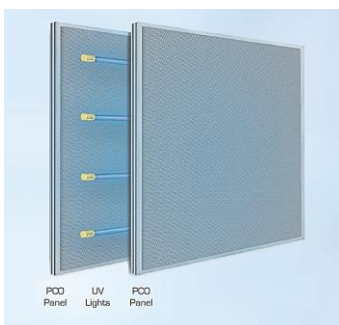
Stage 1 – Pre-Filtration

Air enters the system through MERV 8 - HEPA filter, which captures many of the larger biological contaminants and small airborne particles such as mould spores and pollen.

Bag Pre-Filters are provided with 95% efficiency (MERV 14, EU 8), bag filter made of 100% dual layer synthetic fibers to capture finer particulates.



Stage 2 – Radical Chemistry (PCO)



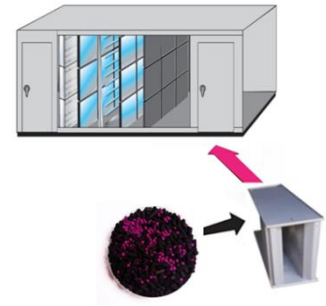
Viruses, odors, VOCs and micro-organisms are exposed to a high-intensity ultraviolet light. This UV radiation penetrates micro-organisms such as fungi, bacteria and viruses and damages their DNA bonds, sterilizing them.

This air passing through a panel coated with titanium dioxide (TiO₂), when subjected to ultraviolet photons, creates hydroxyl radicals. The radicals oxidize gaseous organic compounds, e.g., odors and VOCs

Stage 3 – Gas Phase Media

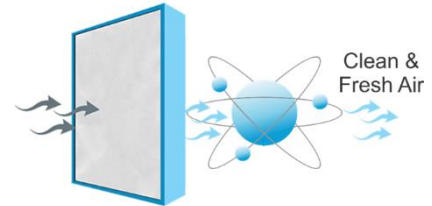
The media panel is designed to continually renew itself and has a very long life, under normal use.

Media in the form of granular pellets are made of binders and activated alumina or other elements. Potassium permanganate is used as media as it boosts the adsorption rate for a longer duration. The filtration media generally targets contaminants such as sulphur oxides, hydrocarbons, formaldehyde, organic acids, hydrogen sulphide, nitric oxide, and VOC's.



Stage 4 – Final Filters

Final set of pleated disposable fiber matrix filters are provided with 30% efficiency (MERV 8, EU 4), to capture any left over elements.



3. Adsorbent Media

Activated carbon is a form of carbon processed to be riddled with small, low-volume pores that increase the surface area available for adsorption or chemical reactions. Due to its high degree of micro porosity, just one gram of activated carbon has a surface area in excess of 500 m².

The adsorbent media, spherical or cylindrical porous pellets formed from a combination of powdered activated alumina and other binders, suitably impregnated with potassium permanganate to provide optimum adsorption, absorption, and oxidation of a wide variety of gaseous contaminants. It targets a broad range of gases which cause corrosion, odor, and other unwanted gases.



Activated Carbon



Permanganate Impregnate Alumina

4. Advantages

- ❖ Corrosion Control keeps the hardware safe from getting corroded
- ❖ Regular Corrosion Control helps in increasing the longevity of hardware equipment, metals and more.
- ❖ Protects important data saved by users from around the globe
- ❖ Prevents electronic malfunctions
- ❖ Decreases the chances of high downtime
- ❖ Reduces maintenance cost
- ❖ Increases productivity
- ❖ Enables a healthy and safer environment for employees



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