IMPORTANCE OF INDOOR AIR QUALITY IN DIFFERENT MARKET SEGMENTS

* Commercial & Public Buildings

Problems: Commercial and public buildings often face issues with poor indoor air quality due to the accumulation of dust, allergens, VOCs (volatile organic compounds), mold spores, and bacteria from building materials, office equipment, and occupant activities.

Health Risks: Respiratory issues, allergies, headaches, fatigue, and irritation of the eyes, nose, and throat.

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| **Application Area** | **Ultrapure Solution** |
| Whole building with Centralized Air Conditioning | Pentagon AOP duct air purifiers |
| Where centralized air conditioning absent: |  |
| * Conference room/cabins/ seminar rooms, etc. | Virushield/ GermiNOX/ Falcon S/ Falcon C |
| * Washrooms/ restrooms | Virushield/ GermiNOX |
| * Pantry/ kitchen areas/ Cafeteria | Virushield/ GermiNOX |
| * Waiting rooms | Virushield/ GermiNOX/ Falcon S/ Falcon C |

* Airports

Problems: Airports experience high foot traffic, leading to elevated levels of airborne pathogens, dust, VOCs, and pollutants from aircraft and ground vehicles. The constant movement of people and luggage stirs up dust and other particulates, while the presence of travellers from various locations increases the risk of spreading infectious diseases.

Health Risks: Respiratory infections, asthma exacerbations, allergic reactions, and transmission of infectious diseases.

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| **Application Area** | **Ultrapure Solution** |
| Whole building with Centralized Air Conditioning | Pentagon AOP duct air purifiers |
| Where centralized air conditioning absent: |  |
| * Spa areas | Virushield/ GermiNOX/ Falcon S/ Falcon C |
| * Washrooms/ restrooms | Virushield/ GermiNOX |
| * Pantry/ kitchen areas/ Cafeteria/ Lounges | Virushield/ GermiNOX |
| * Waiting areas | Virushield/ GermiNOX/ Falcon S/ Falcon C |
| * Smoking Zones | Customized air purification (SmokoNOX) |
| * Bags Check-in area | Virushield/ GermiNOX/ Customized purifier |

* Halls & Malls

Problems: Halls and malls are large, enclosed spaces that can accumulate dust, odors, VOCs, and airborne bacteria due to high visitor turnover and diverse activities such as food preparation and retail operations. Poor ventilation can exacerbate these issues, leading to an unpleasant environment for shoppers and staff.

Health Risks: Allergies, respiratory problems, headaches, and increased susceptibility to infections.

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| **Application Area** | **Ultrapure Solution** |
| Whole building with Centralized Air Conditioning | Pentagon AOP duct air purifiers |
| Where centralized air conditioning absent: |  |
| * Grocery storage room | Virushield/ GermiNOX |
| * Washrooms/ restrooms | Virushield/ GermiNOX |
| * Food court/ kitchen areas/ Cafeteria/ | Virushield/ GermiNOX |
| * Play/ Fun Zones | Virushield/ GermiNOX/ Falcon S/ Falcon C |
| * Smoking Zones | Customized air purification (SmokoNOX) |
| * Changing room | Virushield/ GermiNOX/ AOP Sanitization cabinet |

* Hotels

Problems: Hotels must manage odors, allergens, VOCs, and airborne bacteria to ensure guest comfort. Cleaning activities, use of personal care products, and high turnover of guests contribute to poor indoor air quality. Issues such as mold and mildew in humid climates can further degrade air quality, impacting guest satisfaction and health.

Health Risks: Respiratory issues, allergies, asthma, and exposure to mold-related illnesses.

* Restaurants

Problems: Restaurants generate odors, smoke, VOCs, and airborne grease particles from cooking activities. These pollutants can spread throughout the dining area, creating an unpleasant experience for customers and posing health risks for staff. Proper ventilation and air purification are essential to manage these contaminants.

Health Risks: Respiratory issues, allergies, headaches, and irritation from smoke and VOCs.

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| **Application Area** | **Ultrapure Solution** |
| Whole building with Centralized Air Conditioning | Pentagon AOP duct air purifiers |
| Where centralized air conditioning absent: |  |
| * Reception/Waiting rooms | Virushield/ GermiNOX |
| * Common Washrooms/ restrooms | Virushield/ GermiNOX |
| * Restaurants/Food court/ kitchen areas/ Cafeteria/ | Virushield/ GermiNOX |
| * Spa/ Play area/ Dining area | Virushield/ GermiNOX/ Falcon S/ Falcon C |
| * Smoking Zones | Customized air purification (SmokoNOX) |
| * Luggage room | AOP Sanitization cabinet |
| * Hotel rooms/ Bedrooms | Virushield/ GermiNOX/ Falcon S/ Falcon C |
| * Bar/ Banquet Hall | Virushield/ GermiNOX/ Falcon S/ Falcon C |

* Museums & Cultural Institutions

Problems: These institutions face unique challenges in preserving artifacts while maintaining good air quality. Pollutants such as dust, VOCs, mold spores, and humidity can damage valuable collections. Additionally, the high volume of visitors can introduce contaminants that degrade the indoor environment.

Health Risks: Allergies, respiratory irritation, and potential long-term effects from exposure to VOCs.

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| **Application Area** | **Ultrapure Solution** |
| Whole building with Centralized Air Conditioning | Pentagon AOP duct air purifiers |
| Where centralized air conditioning absent: |  |
| * Museum/ Cultural Hall | Virushield/ GermiNOX/Fresh air Unit |
| * Washrooms/ restrooms | Virushield/ GermiNOX |
| * Ticket counter | Virushield/ GermiNOX |
| * Waiting rooms | Virushield/ GermiNOX/ Falcon S/ Falcon C |

* Offices

Problems: Office environments often suffer from indoor air pollutants, including VOCs from office equipment, dust, mold spores, and poor ventilation. These factors can lead to "sick building syndrome," where occupants experience health issues such as headaches, dizziness, and respiratory problems, impacting productivity and well-being.

Health Risks: Headaches, fatigue, respiratory problems, and irritation of the eyes, nose, and throat.

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| **Application Area** | **Ultrapure Solution** |
| Whole building with Centralized Air Conditioning | Pentagon AOP duct air purifiers |
| Where centralized air conditioning absent: |  |
| * Conference room/cabins/ seminar rooms, etc. | Virushield/ GermiNOX/ Falcon S/ Falcon C |
| * Washrooms/ restrooms | Virushield/ GermiNOX |
| * Pantry/ kitchen areas/ Cafeteria | Virushield/ GermiNOX |
| * Waiting rooms/ reception | Virushield/ GermiNOX/ Falcon S/ Falcon C |

* Schools & Universities

Problems: Educational institutions must address allergens, bacteria, VOCs, and mold spores to protect students' health. Classrooms, laboratories, and common areas can accumulate dust, mold, and chemical fumes, which can affect students' concentration, attendance, and overall well-being.

Health Risks: Allergies, asthma, respiratory infections, and exposure to harmful chemicals.

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| **Application Area** | **Ultrapure Solution** |
| Whole building with Centralized Air Conditioning | Pentagon AOP duct air purifiers |
| Where centralized air conditioning absent: |  |
| * Teacher Cabins | Virushield/ GermiNOX |
| * Washrooms/ restrooms | Virushield/ GermiNOX |
| * Canteen/ kitchen areas/ Cafeteria/ | Virushield/ GermiNOX |
| * Classrooms | Virushield/ GermiNOX/ Falcon S/ Falcon C |
| * Library/ Computer room | Customized air purification, Virushield/ GermiNOX/ Falcon S/ Falcon C |
| * Laboratories | Fresh air unit for gases treatment |

* Industrial/Transportation

Airport

Problems: Industrial areas within airports deal with emissions from aircraft and ground support equipment, which contribute to poor air quality. Maintenance and operational activities can release harmful chemicals, VOCs, and particulates.

Health Risks: Respiratory problems, cardiovascular issues, and increased risk of cancer from long-term exposure to pollutants.

Already mentioned above.

* Power Generation

Problems: Power plants emit large amounts of pollutants, including particulate matter, sulfur dioxide, nitrogen oxides, and VOCs, which can harm human health and the environment. Managing these emissions is crucial for regulatory compliance and community health.

Health Risks: Respiratory and cardiovascular diseases, lung cancer, and premature death.

* Public Transportation

Problems: High density of passengers in public transportation systems, such as buses and trains, leads to increased airborne pathogens and poor air quality. Vehicle emissions and particulate matter from wear and tear further degrade the environment.

Health Risks: Respiratory infections, asthma exacerbations, and cardiovascular problems.

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| **Application Area** | **Ultrapure Solution** |
| Buses/ Trains with Centralized Air Conditioning | Pentagon AOP duct air purifiers or customized duct purifiers |
| Power generation plant | Fresh air standalone unit/ Corrosion Control unit |
|  | Corrosion Coupons/ monitoring system |

* Pulp and Paper

Problems: The pulp and paper industry emits dust, chemical fumes, VOCs, and odors during production processes. These pollutants can affect workers' health and the surrounding community, necessitating effective air purification solutions.

Health Risks: Respiratory issues, skin and eye irritation, and long-term exposure risks such as cancer.

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| **Application Area** | **Ultrapure Solution** |
| Cabins with Air Conditioning | Virushield/ GermiNOX/ Falcon S/ Falcon C |
| Pulp and Paper industries | Fresh air standalone unit/ Corrosion Control unit |
|  | Corrosion Coupons/ monitoring system |

* Refineries

Problems: Refineries release hazardous gases, VOCs, chemical fumes, and particulate matter during the processing of crude oil. These emissions pose significant health risks to workers and nearby residents, making air quality management a critical concern.

Health Risks: Respiratory problems, skin and eye irritation, cancer, and other long-term health effects.

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| **Application Area** | **Ultrapure Solution** |
| Cabins with Air Conditioning | Virushield/ GermiNOX/ Falcon S/ Falcon C |
| Pulp and Paper industries | Fresh air standalone unit/ Corrosion Control unit |
|  | Corrosion Coupons/ monitoring system |

* Water/Wastewater

Corrosion Control

Problems: Airborne chemicals in water and wastewater treatment facilities can cause corrosion of equipment and infrastructure. This can lead to increased maintenance costs and potential system failures.

Health Risks: Exposure to harmful chemicals, respiratory issues, and potential long-term health effects from inhalation of corrosive agents.

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| **Application Area** | **Ultrapure Solution** |
| Sewage treatment Plant (STP) & wastewater plant | Fresh air standalone unit/ Corrosion Control unit |
|  | Corrosion Coupons/ monitoring system |

* Emergency Gas Scrubbing

Problems: Treatment plants may face sudden releases of toxic gases, including hydrogen sulfide and chlorine, requiring immediate and effective air purification to protect workers and the surrounding community.

Health Risks: Acute respiratory distress, eye and skin irritation, and long-term health issues from exposure to toxic gases.

* Odor Control

Problems: Water and wastewater treatment processes can produce persistent odors from compounds like hydrogen sulfide and ammonia, affecting the comfort and well-being of workers and nearby residents. Managing these odors is essential to maintain a pleasant environment and comply with regulations.

Health Risks: Respiratory irritation, headaches, nausea, and long-term exposure risks.

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| **Application Area** | **Ultrapure Solution** |
| STP or wastewater treatment odor control | OdorNOX scrubber system |
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* Material Processing

Metalworking

Problems: Metalworking generates metal dust, VOCs, and fumes, which can be hazardous to workers' health. These pollutants can also affect the quality of the finished products and equipment.

Health Risks: Respiratory problems, skin and eye irritation, and long-term health effects such as lung disease and cancer.

Mining

Problems: Mining operations produce dust, silica particles, and harmful gases, posing significant health risks to miners. Proper air purification is crucial to protect workers and ensure regulatory compliance.

Health Risks: Respiratory issues, including silicosis, lung cancer, and chronic obstructive pulmonary disease (COPD).

* Oil, Gas & Chemicals

Problems: The extraction and processing of oil, gas, and chemicals release a variety of pollutants, including chemical fumes, VOCs, gases, and particulate matter. These emissions can have severe health and environmental impacts.

Health Risks: Respiratory problems, skin and eye irritation, cancer, and other long-term health effects.

* Pulp & Paper

Problems: Similar to the challenges faced in industrial pulp and paper facilities, material processing in this industry involves dust, chemical emissions, VOCs, and odors that need to be effectively managed.

Health Risks: Respiratory issues, skin and eye irritation, and long-term exposure risks such as cancer.

* Food & Beverage

Beverage Production

Problems: Beverage production facilities need to maintain high standards of cleanliness to prevent contamination. Airborne pollutants, including dust, VOCs, and microorganisms, can compromise product quality.

Health Risks: Exposure to airborne microorganisms can lead to infections and respiratory issues. VOCs and dust can cause allergies and other respiratory problems.

Dairy Processes

Problems: Dairy processing facilities face challenges with airborne bacteria, allergens, and VOCs. Maintaining a sterile environment is essential to ensure product safety and quality.

Health Risks: Respiratory issues, allergic reactions, and potential infections from airborne bacteria.

Food Processings

Problems: Food processing generates dust, allergens, VOCs, and odors that can affect product quality and worker health. Effective air purification is necessary to maintain hygiene standards and regulatory compliance.

Health Risks: Respiratory problems, allergic reactions, and exposure to harmful chemicals.