



////////// IMPROVING **INDOOR AIR QUALITY** + PRESERVING ARTIFACTS //////////

For more than 30 years, Purafil has provided clean air solutions to museums and archives worldwide. Purafil specializes in the manufacture of air purification systems that remove gaseous and particulate contaminants to safeguard and preserve artifacts.

Sources of airborne pollution are everywhere — from automobile emissions to new office furnishings. Common particulate filters trap dust, pollen, and other particles, but only Purafil gas-phase air filtration systems eliminate gaseous pollutants, the true sources of poor indoor air quality and the deterioration of artifacts.



IDENTIFYING THE PROBLEM: AIRBORNE POLLUTION

Controlling airborne pollutants is essential to maintaining adequate indoor air quality (IAQ) for museums and archives. Pollutants can come from outside and inside the building. Outside sources of odors, including the incinerators, loading docks and waste disposal units, are usually located at the rear of the building within a few feet of primary HVAC air intakes. Emissions from nearby industrial facilities or residential furnaces can also result in damage to priceless pieces of artwork or archival material. Inside sources of pollution can include food service areas, cleaning aerosols and bioeffluents from guests. Office furnishings and printers can worsen indoor air quality.

For clean indoor air, Purafil offers an extensive product selection, from pleated chemical filters to modular front and side access units. Our systems are designed for easy maintenance and are incorporated into your makeup, supply, or return airstreams.

PRIMARY CAUSES AND EFFECTS OF GASEOUS CONTAMINATION IN MUSEUMS & ARCHIVES

PURAFIL APPLICATIONS WITHIN MUSEUMS & ARCHIVES

There are numerous locations within museums and archives where gas-phase air filtration can be applied. Purafil offers a wide range of dry-chemical adsorbents called media, which are engineered to mitigate pollutants.

APPLICATION AREA	GASEOUS POLLUTANTS	CAUSE	GASEOUS POLLUTANTS	MATERIALS AFFECTED
Cafeterias	Hydrogen sulfide, aldehydes, mercaptans, VOCs	Burning of fuels in power stations, factories, buildings and automobiles	<ul style="list-style-type: none"> Sulfur dioxide Nitrogen dioxide Ozone 	<ul style="list-style-type: none"> Calcium carbonate (marble, limestone, frescoes, alkaline, sandstones) Cellulose (paper, cotton, linen, wood veneers) Silk Iron Steel
Offices	Sulfur dioxide, Nitrogen dioxide, Ozone, Acetic Acid	Printers and photocopiers	<ul style="list-style-type: none"> Ozone 	<ul style="list-style-type: none"> Organically-based materials (paper, textiles, animal skins, plant materials, paints) Metals
Restoration/Conservation Laboratories	Hydrogen chloride, formic acid, formaldehyde	Food service areas, solid waste disposal, cleaning compounds, cooling towers	<ul style="list-style-type: none"> Chlorides 	<ul style="list-style-type: none"> Metals

WHICH AIR FILTRATION SYSTEM IS BEST?

Purafil's systems are built-to-order to meet the needs of your budget, space, and air handling system. We offer solutions for retrofit applications and new construction.



PURAFIL MEDIA

Purafil offers a broad selection of dry-chemical adsorbents called media, which are the core of our built-to-order air purification systems. Purafil manufactures a wide variety of media to remove specific pollutants from specific sources. Purafil media remove contaminants through a process known as chemisorption. During this instantaneous process, gases are adsorbed, or captured on the surface of the media. Unlike adsorption, during chemisorption the contaminants are chemically transformed into harmless solids that remain trapped inside the media. Once the gases are removed from your environment, they cannot re-enter the air stream.

In most cases, we recommend Purafil® SP Blend media because it removes the widest variety of odors and gases. SP Blend is a combination of Purakol® media, a premium grade activated carbon, and Purafil® SP media, an activated alumina substrate impregnated with the active ingredient sodium permanganate. While Purakol is highly effective at removing VOCs, it performs poorly against hydrogen sulfide, sulfur dioxide and oxides of nitrogen. By using these media in combination, Purafil can ensure the removal of all contaminants.



PURAFIL SIDE ACCESS SYSTEM (PSA)

The PSA is designed for both particulate and gaseous contaminant control and works in conjunction with the facility's air handling system. The PSA is a built-to-order system available in more than 20 size options. A full range of prefilter selections and particulate final filter selections are also available.

POSITIVE PRESSURIZATION UNIT (PPU)

The PPU is an all-in-one packaged air filtration machine for indoor use. Both particulate and chemical filtration are integrated into one unit, complete with a self-contained blower. It is used to filter low to medium concentrations of gaseous pollutants while providing continuous positive pressure within the space.

RECIRCULATION AIR SYSTEM (RAS)

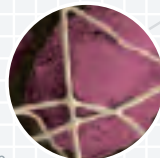
The RAS, also designed to be located within the protected space, is an air purification machine with recirculation as its primary function. The unit is used to further filter and polish the room air to maintain very low pollutant levels. It offers a number of advantages not present in filtration systems that are integral with the HVAC systems. Both particulate and chemical filtration and a self-contained blower are combined in one unit.



PURAFILTER®

Purafil also recommends the use of the Purafilter, a combination chemical and particulate filter designed to replace existing particulate filters in retrofit or rework applications. The Purafilter, which contains Purafil blended media, is useful in applications where space limitations exist.

Purafil engineers are the first to successfully suspend sodium permanganate adsorbents in a bi-component fiber matrix, which does not require the use of adhesives, so adsorbents are fully exposed for reaction with gaseous chemical contaminants and odors. Adsorbents are evenly distributed throughout the filter structure to assure the highest filtration efficiencies.



32X
MAGNIFIED



16X
MAGNIFIED





ENVIRONMENTAL ASSESSMENT

Reactivity Monitoring is a widely accepted technique used to characterize the destructive potential of an environment. Because many of the contaminants targeted for control are corrosive in nature (i.e., sulfur dioxide), reactivity monitors have long been used to gauge the quality of ambient air and to indicate the effectiveness of pollution control strategies.

Purafil's Environmental Reactivity Coupons (ERCs) may be used to indicate the presence of sulfur dioxide, nitrogen dioxide, hydrogen sulfide and chlorine compounds, which can cause deterioration of metals, cellulose or calcium carbonate within museums, libraries and similar environments.

For real-time corrosion monitoring, Purafil offers the OnGuard® Environmental Reactivity Monitor (ERM). The OnGuard ERM provides real-time information on the amount of corrosion occurring due to the presence of corrosive gases. The ERM measurements are transmitted to the building management system via a 4-20 mA output signal. The ERM features copper and silver Quartz Crystal Microbalance (QCM) sensors for the detection of contaminant concentrations as low as one part per billion.



ENVIRONMENTAL CLASSIFICATION

Both Environmental Reactivity Coupons and the OnGuard ERM measure environmental reactivity in Angstroms, a unit of length equal to one ten-billionth of a meter. Purafil's understanding of the environmental challenges facing museums and archives has led to the following environmental classification scheme whereby monitoring results correlate to varying degrees of air quality.

COPPER CORROSION			SILVER CORROSION		
Class	Air Quality Classification	Reactivity Rate*	Class	Air Quality Classification	Reactivity Rate*
C1	Extremely Pure	<90 Å/30 days	S1	Extremely Pure	<40 Å/30 days
C2	Pure	<150 Å/30 days	S2	Pure	<100 Å/30 days
C3	Clean	<250 Å/30 days	S3	Clean	<200 Å/30 days
C4	Slightly Contaminated	<350 Å/30 days	S4	Slightly Contaminated	<350 Å/30 days
C5	Polluted	>350 Å/30 days	S5	Polluted	>350 Å/30 days
* Å = angstroms			* Å = angstroms		

* BASED ON THE ABOVE-MENTIONED ENVIRONMENTAL CLASSIFICATION, PURAFIL RECOMMENDS THE FOLLOWING LEVELS OF AIR QUALITY FOR LOCATIONS WITHIN THE MUSEUM OR ARCHIVE:

- Class S1/C1: Archives, Metal Collections, Rare Books
- Class S2/C2: Museums, Museum Storage, Libraries
- Class S3/C3: Historic Houses
- Class S4/C4: Short Term Acceptable
- Class S5/C5: Not Acceptable

www.purafil.com

