Museums and Historic Storage

Advanced Solutions for the Removal of Airborne Particulate and Gaseous Contaminants

Commercial Application Solutions

AAF® INTERNATIONAL *Better Air is Our Business®*

AmericanAirFilter®

Museums and Historic Storage

Advanced Solutions for the Removal of Airborne Particulate and Gaseous Contaminants

Total Clean Air Solutions for Museums and Historic Storage

Around the globe, AAF® and AmericanAirFilter® brand filters are meeting the need for clean air in environments where preservation of our national treasures and history takes place. From inexpensive disposable panel filters to high-efficiency, extended surface filters with antimicrobial and gas-phase filtration, we market the widest range of air filtration products available.

Preserving historical objects and collectibles can generate many challenges to museums and historic storage facilities. Controlling airborne pollutants and gaseous contaminants is fundamental to protecting priceless collections of artifacts, historical assets, artwork, and literature. By maximizing the life of these objects, we essentially protect our heritage as well as our vintage treasures.

Environmental Factors

Damage to collectibles can be caused by uncontrolled temperature and relative humidity, dust and dirt, and gaseous pollutants such as ozone and sulfur dioxide. Temperature and humidity, if not controlled properly, can speed up the rate of chemical reactions which cause much of the deterioration of sensitive objects. Dust and dirt contamination can cause artifacts to discolor and can potentially scratch precious gems; whereas, gaseous pollutants may cause significant and irreversible deterioration of artifacts, metals, historic records, photographs, and marble through chemical reactions. Poor Indoor Air Quality (IAQ) can also have adverse health effects on employees and visitors.

AAF can custom design air filtration products to meet the most demanding airflow and efficiency requirements and provide critically controlled environments with regards to temperature, humidity, and air purification in any museum or historic preservation setting.

Historical assets, such as this antique photo, can be effectively preserved with the proper filtration solutions in place.

Our air filtration team understands the requirements for preservation of our national and historic treasures differ for each application. Our experience in developing air filtration products for a variety of industries gives us the know-how to tackle any project.

The AAF Advantage — Energy Savings with the Lowest Pressure Drop in the Industry

Air filtration systems must handle relatively large volumes of air. Consequently, operating costs are a prime consideration in air filtration design. One of the most important areas to be evaluated is airflow resistance, or pressure drop, across our filters.

AAF understands filtration and energy savings. We challenged our air filtration team to develop proprietary specifications for filter media with the highest efficiency and least possible airflow resistance. The challenge was met. Filtration solutions for museums and historic facilities are engineered and assembled to provide reliable products with the lowest possible pressure drop and energy savings.

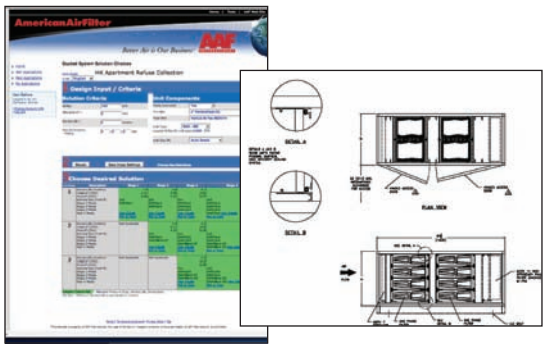
This is important because increased airflow resistance means more cost in the construction and operation of your system. You need the most accurate and complete testing to determine pressure drop across a filter. Our years of experience have proven that our volumetric testing is essential to determining true pressure drop across our filters.

Life Cycle Valuation Program

AAF Sales Representatives use an exclusive software tool, Life Cycle Valuation (LCV), to tailor AAF solutions to your unique circumstances and create an optimized filtration maintenance schedule for your system. AAF's LCV program puts your costs into perspective by considering all aspects of your facility and assessing a broad range of variables. Easily customized and adapted to create unique solutions. In addition to budgetary information, your Sales Representative uses this tool to provide solutions for multiple systems showing you the cost comparison in a clear and concise summary. Some of the variables included in the query are: current cost of electricity; inflation rates associated with power, filters, and labor; filter flow capacity, face velocity, and even MERV.

SAAF™ Tech Tools

SAAF Tech Tools is the filtration industry's most sophisticated and complete decision-sciences software for configuring clean air products to remove airborne gaseous contaminants. Using SAAF Tech Tools, AAF experts can enter application specific data or select from a list of pre-defined applications to configure the exact clean air solution required for our customers. Detailed information on contaminants, adsorbers, oxidants, and links to industry information relevant to specific applications is also readily available.



Select and compare media and equipment solutions using SAAF™ Tech Tools.

SAAF™ Technical Services

The SAAF Technical Services Group has the instrumentation and training to perform comprehensive evaluations and environmental assessments.

All tests are carried out and correlated to applicable industry standards. The following evaluations are performed to target specific contaminants and provide recommendations and product solutions:

- Particulate contamination assessments
- Gaseous contaminant assessments
- Humidity assessments
- Product life-cycle assessments
- Room integrity verification
- Sealing and HVAC circuit checks

Environmental Monitoring

Environmental Monitoring is used to characterize the destructive potential of the gaseous environment. Since every application is unique, AAF offers a comprehensive range of reactivity monitoring devices to determine the concentrations of various gaseous contaminants - an essential tool in keeping your artifacts preserved. Utilizing the latest technologies, copper and silver indicators work together to detect the presence of chlorine and other gases in addition to changes in humidity. Looking at corresponding pairs of copper and silver indicators (see Table 1) can provide information as to whether the amount of corrosion formed was due more to the presence of gaseous pollutants or to humidity effects alone.

SAAFShield™ - AAF SAAFShield Reactivity Monitor Technology allows users to take immediate action to protect expensive electronics and priceless works of art by monitoring corrosion in real time or on a periodic basis to determine equipment or material vulnerability to corrosion. The SAAFShield Detecting Unit works together with the SAAFShield Reading Unit to display and trend corrosion data over time, which allows users to evaluate operational procedures, environmental factors, or other items that occur at specific times for their impact on sensitive materials.

Brochure GPF-1-135, GPF-1-136

SAAF Reactivity Monitoring Coupons - Reactivity Monitoring Coupons function by reacting with environmental conditions to form various corrosion films. Analysis of the corrosion that forms on specially prepared copper and silver strips (coupons) provide an excellent indication of the type and amount of gaseous contamination present in the environment. Typically placed in the environment for 30 days. Available in Metal and Glass options.

Brochure GPF-1-129

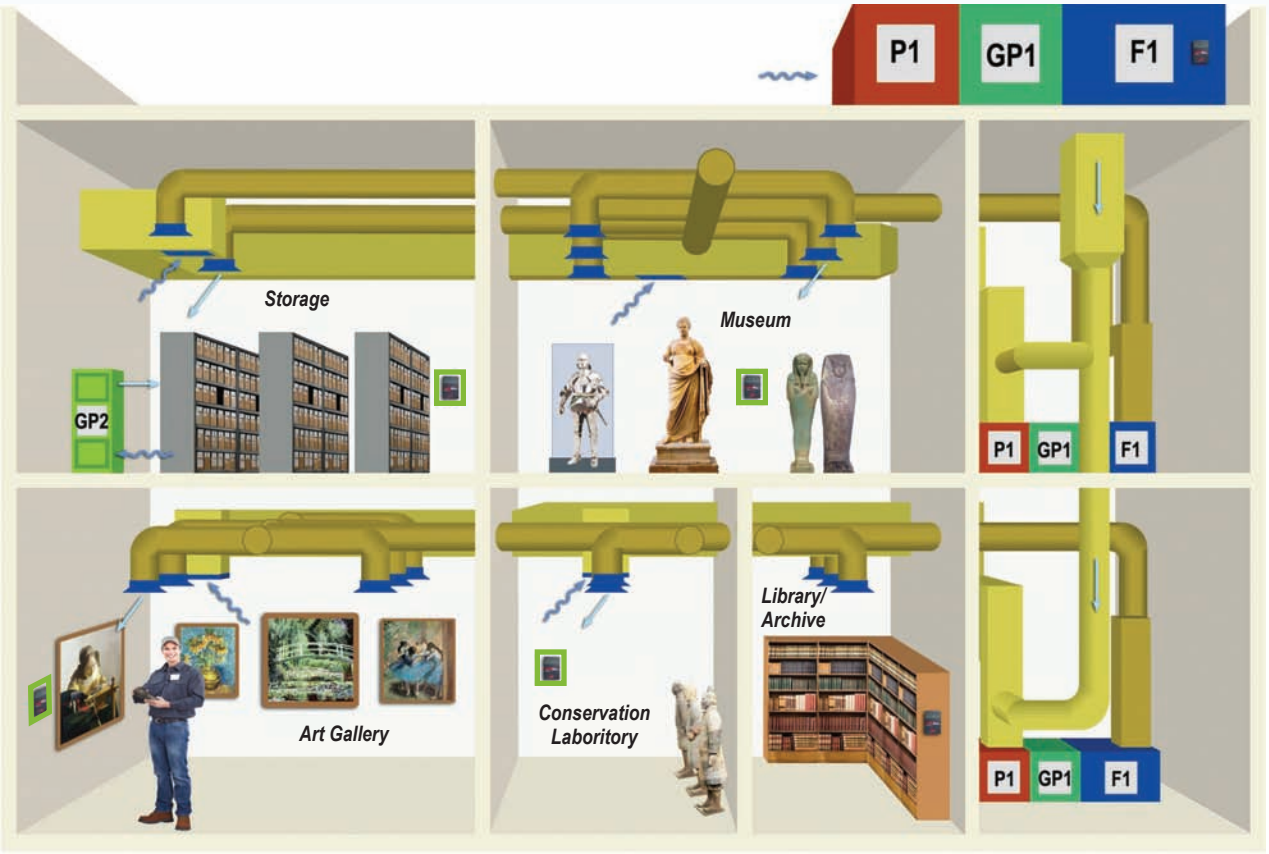
SAAFShield™ Detecting Unit with SAAFShield™ Reading Unit

SAAF™ Reactivity Monitoring Coupons: Metal and Glass

Table 1: Museum/Archival Environmental Classifications

Silver Corrosion			Copper Corrosion			
	Class	Corrosion Amount	Class	Corrosion Amount	Air Quality Classification	Description
☐	S1	<40Å 30 days	☐ C1	<90Å 30 days	Extremely Pure	Ideal air quality for archival environments, metal collections and rare books
☐	S2	<100Å 30 days	☐ C2	<150Å 30 days	Pure	Desired air quality for museums, storage locations in museums and libraries
☐	S3	<200Å 30 days	☐ C3	<250Å 30 days	Clean	Suggested air quality for museum/archival environments
■	S4	<300Å 30 days	☐ C4	<350Å 30 days	Slightly Contaminated	Air quality suggests that corrective actions should be initiated
☐	S5	<300Å 30 days	■ C5	<350Å 30 days	Polluted	Undesirable air quality for museum/archival environments

AAF Recommended Solutions for Museums



(P1) Prefilter
PerfectPleat® Group
AmAir® C Group

(F1) Final Filter
VariCel®
DriPak®

(GP1) Gas Phase
SAAF™ Cassettes, Media, and Housings
AmerSorb®, VariSorb®, VariCel® RF/C,
VariCel® RF/C+SAAFOxi™ Filters

(GP2) Gas Phase
Pressurization and Recirculation Unit
SAAFShield™ Reading Unit
SAAFShield™ Detecting Unit

Typical Gases Found in Museums and Historic Storage Facilities

Gaseous Contaminants	Possible Effects	Susceptible Materials	Possible Causes
Hydrogen sulfide	Corrosive (tarnish, discolor)	Metals, especially silver	Construction, industrial, and biological processes, standing waters
Nitrogen dioxide	Acidic, corrosive (discolor, weaken textiles, tarnish)	Marbles, limestone, photographs, papers & organic textiles	Often from vehicle emissions, tobacco smoke, emissions from burning fossil fuels, urban areas
Sulfur dioxide	Acidic, corrosive (blackening)	Marbles, limestone, photographs, papers & organic textiles	Power plants and factories. Reacts with humidity to form stronger acids. Accelerates the decay of paints, monuments, statues, and sculptures
Formaldehyde	Premature aging	Papers & textiles	Decomposition of chemical resins used in plywood & carpeting, emissions from embalming fluids & automobile exhaust. Building materials and furniture
Ozone	Premature aging (discolor, weaken textiles)	Organic materials, paintings, textiles, papers, wood, silks, leather, tapestries, clothing, rubber, metals	Office equipment, urban smog
Formic acid	Corrosive	Glass	Humidity
Acetic acid	Corrosive, premature aging	Metals, silicone rubber, wood, tile, limestone artifacts, terra cotta & loss of fiber strength in manuscripts	
Carbonyl sulfide	Corrosive	Metals	Biological processes
Halogens (chlorides, fluorides, iodides)	Powerful oxident, bleach, drying agent	Paper, paintings, textiles, metals	City water (contains chorine), proximity to ocean (fluorides), fumigants (sulfuryl fluoride)

Our Capabilities and Products

AAF specializes in airborne particulate and gaseous contaminant removal for museums and historic storage facilities. A complete variety of filters and gas-phase media are available. All AAF products are designed to comply with applicable standards and practices.

PerfectPleat® Extended Surface Supported Pleat Filters

PerfectPleat® - PerfectPleat ULTRA, PerfectPleat HC M8, PerfectPleat SC M8, and PerfectPleat SC M7 filters are ideal prefilters used to prevent the buildup of lint and dust on the face of the SAAF cassettes and high efficiency filters. MERV 8 and 7.

Brochures AFP-1-202, AFP-1-203, AFP-1-210, AFP-1-211

PerfectPleat® ULTRA, PerfectPleat® HC M8, and PerfectPleat® SC M8 models available in 1", 2", and 4".

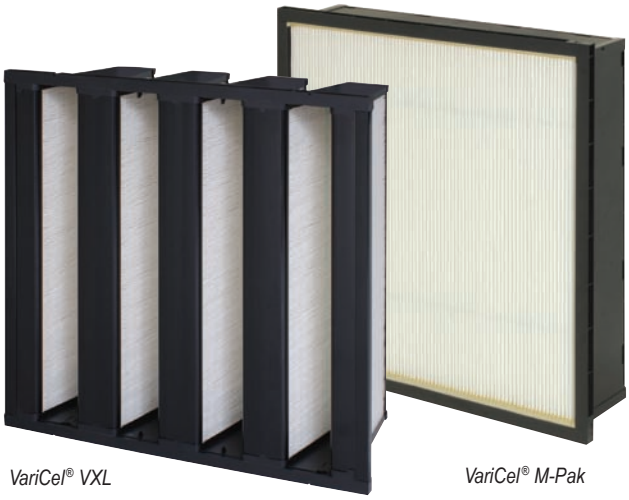
VariCel®

VariCel® VXL - 8-panel high efficiency filter. Excellent performance in difficult operating conditions. Lightweight and easy to install. Fully incinerable. Available in MERV 15, 14, 13, and 11 efficiencies. Antimicrobial on MERV 15 and 14 models.

Brochure AFP-1-162

VariCel® M-Pak - 6"-deep filter with the same media area and performance as the 12"-deep VariCel filter. Uses AAF's exclusive dual-density media. Space-saving design reduces freight, storage, and handling costs. Fully incinerable. Available in MERV 14, 13, and 11. Antimicrobial on MERV 14 and 11 models.

Brochure AFP-1-161

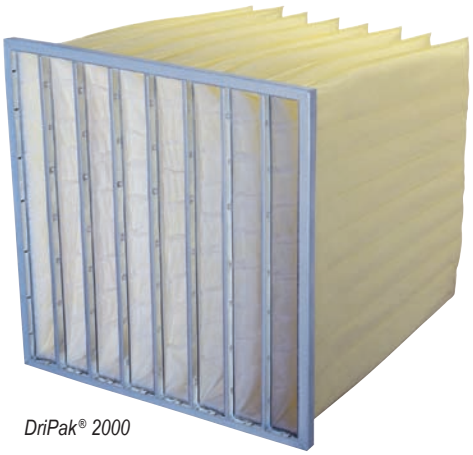


VariCel® VXL *VariCel® M-Pak*

DriPak® 2000 Extended Surface Non-Supported Pleat Filters

IAQ engineered, extended surface, non-supported pocket filter. Synthetic media is available with antimicrobial. Outstanding dust holding capacity for longer service life in each efficiency category. Choose from four efficiencies: MERV 15, 14, 11, and 8.

Brochure AFP-1-114



DriPak® 2000

High Efficiency Supported Filters for Green Buildings.
AAF MERV 13 and higher filters meet efficiency requirements established for LEED® Project Certification.

SAAF™ Pleated Panel and Extended Surface Filters

AmAir®/C, C+SAAFOxi™, SAAFOxi™, and CP - Disposable carbon filters. Available in 1", 2", and 4" depths. Pleats, panels, and pads. Commercial and light to moderate odor control applications. MERV 5 and 7.
Brochure GPF-1-118

VariCel® RF/C and RF/+SAAFOxi™ - High efficiency extended-surface, rigid air filters. Constructed with galvanized steel cell sides and plastic pleat spacers on the air-entering and air-leaving sides, these filters withstand the most demanding applications. The pleat spacers maintain the shape of the synthetic media pack and ensure that both the effectiveness and service life are maximized. Available in single-header and no-header models. MERV 8.
Brochures GPF-1-122

VariSorb® HC - High capacity disposable filter consists of eight 1"-deep honeycomb panels assembled in a V-bank configuration. Plastic, corrosion free, non-metal, fully incinerable construction. All assembly is with non-volatile materials. Available with SAAFCarb™, SAAF Oxidant™, or SAAFBlend™ media.
Brochure GPF-1-126

VariSorb® XL - Pleated compact filter consisting of mini-pleat filter elements in High Impact Polystyrene (HIPS) cell sides for assembly in front, rear, or side-access track systems. The granular microstructure of the media packs ensures a much higher media area-to-weight ratio resulting in a high spontaneity adsorption and reaction. This makes the VariSorb XL filter very effective at removing medium and low concentrations of gas-phase contamination.
Brochure GPF-1-122

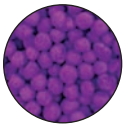
AmAir®/C, C+SAAFOxi™, SAAFOxi™, and CP

VariCel® RF/C and RF/C+SAAFOxi™

VariSorb® HC

SAAF™ Airborne Molecular Contaminant (AMC) Chemical Media and Catalysts

High-efficiency filtration for effective removal of AMCs encountered in chemical (gas), nuclear, and biohazard contaminated airstreams. Media are available as SAAF Custom Blends and SAAF Gas Specific Solutions. Remaining media life analysis calculations performed. Powerful enough for high capacity industrial applications, yet suitable in mission-critical applications. Designed for easy, cost-effective disposal solutions.
Brochure GPF-1-103

	SAAF™ Media for Museums and Historic Storage*	**Targeted Gases**
SAAFCarb™ Brochure GPF-1-110 	SAAFCarb media is pelletized activated carbon that removes toxic and impure gases from the environment. The activated carbon is composed of bituminous coal substrate.	Sulfur dioxide, Nitrogen dioxide, Formaldehyde, Hydrocarbons (VOCs), lower molecular weight Aldehydes and Organic Acids
SAAFOxidant™ Brochure GPF-1-101 	SAAFOxidant media is spherical and porous pellets, composed of a combination of activated alumina and other binders. Potassium permanganate is impregnated to this media combination, in order to provide optimum adsorption, absorption, and oxidation of various gaseous contaminants. *Also available in standard capacity GPF-1-131*	Diesel fumes, Nitrogen dioxide, Hydrocarbons, Chlorine, and VOCs
SAAFBlend™ GP Brochure GPF-1-102 	SAAFBlend GP is manufactured from equal volumetric mix of SAAFCarb and SAAFOxidant media. *Also available in standard capacity GPF-1-132*	Sulfur dioxide, Hydrogen sulfide, Nitric oxide, Formaldehyde, lower molecular weight Aldehydes and Organic Acids

**SAAFBlend™ Protect – Custom blend for heritage protection in museums, archives, and historical storage applications available.*

AmericanAirFilter

Museums and Historic Storage

SAAF™ Cassettes

V-bank Cassettes constructed from HIPS and pre-filled with SAAF Chemical Media. Available in Heavy Duty, Medium Duty, and Cleanroom Grade.

Brochures GPF-1-108, GPF-1-109, and GPF-1-111

SAAF™ Cassettes

SAAF™ Front Access Housings

Easy to retrofit and incorporate within existing AHUs. Sturdy construction. Built to high tolerances, thereby reducing bypass due to better sealing within the filtration system. House refillable panels and cassette inserts. Patented filtration technologies extend life of SAAF replacements.

Brochure GPF-1-115

SAAF™ Front Access Housings

SAAF™ Air Purification Systems

Stand-alone, multi-stage systems designed to remove particulate and gaseous contaminants from confined spaces, while reducing the amount of outside air needed to dilute contaminants. Available as Recirculation Unit and Pressurization and Recirculation Unit, these systems are suitable for in-room use or sheltered outdoor installations. No special ducting or installation required. Ultra-modern construction and options allow easy blending with room's aesthetics.

Brochure GPF-1-107

SAAF™ Air Purification Systems

SAAF™ Side Access Housings

Supports chemical media cassettes, prefilters and after-filters, and high efficiency particulate filters in one self-contained unit for effective particulate and gas-phase filtration. Housings offer the advantages of a conventional side access housing and maximum flexibility in the selection of chemical media and gas-phase filter elements.

Brochure GPF-1-106

SAAF™ Side Access Housing

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ENERGY STAR PARTNER

AAF has a policy of continuous product research and improvement and reserves the right to change design and specifications without notice.

ISO Certified Firm