



PURAFIL®

FIRST
IN CLEAN
AIR

ENGINEERED **4** IN-VITRO
FERTILIZATION

LABORATORIES



CLEAN AIR SOLUTIONS 4 IN-VITRO FERTILIZATION LABORATORIES

CONTROLLING AMC + INCREASING SUCCESS RATES

AMC & SUCCESS RATES

The term airborne molecular contamination (AMC) refers to the presence of unwanted gas-phase contaminants in the cleanroom. Effects of AMC in IVF labs have been shown to be very significant, causing a threefold decrease in success rates. AMC filtration has been proven to dramatically affect the IVF lab operation and increase pregnancy rates.

Purafil is the world leader in gas-phase air filtration and monitoring technologies. With more than 30 years of experience in the engineering and manufacture of clean air solutions, Purafil offers a comprehensive product and service offering for IVF laboratories and cleanroom customers.

UNDERSTANDING AMC

Factors that contribute to the overall AMC load to a cleanroom are outdoor air, manufacturing processes, fugitive emissions from process equipment, chemical storage areas, off-gassing from building and construction materials, accidental spills, and bioeffluents from personnel.

Outdoor air is many times considered a clean source of dilution air to reduce internal contaminant levels. However, outdoor air can be a source of multiple contaminants. These contaminants, mentioned in Table 1, have the potential to be introduced through the outside

air intakes of the HVAC system, unless the air is cleaned of those contaminants.

Internal contaminant sources that can affect IVF labs include analytical procedures, cleaning processes, compressed air, pesticide use, building material off-gassing and the personnel themselves. These sources and their contaminants are listed in Table 2.

SOURCES AND CONTAMINANTS IN OUTDOOR AIR	
SOURCE	CONTAMINANTS EMITTED
AUTOMOTIVE COMBUSTION	HBr, HCl, NO _x , SO ₂ , SO ₃ , hydrocarbons, organics
COOLING TOWERS	inorganic chlorides
DIESEL COMBUSTION	NO _x , many organics
FOREST FIRE	HCl
FOSSIL FUEL PROCESSING	H ₂ S, NH ₃ , S, SO ₂ , hydrocarbons, mercaptans, organics
GEOTHERMAL PROCESSES	H ₂ S, SO ₂
LIVESTOCK AREAS	CH ₄ , H ₂ S, NH ₃
OCEANS	NaCl, chloride ions
PLASTIC MANUFACTURE	NH ₃ , SO ₂ , alcohols, aldehydes, organics
POWER GENERATION	NO _x , SO ₂ , hydrocarbons, organics
SEWAGE	H ₂ S, NH ₃ , S, aldehydes, mercaptans, organics

CH₄ = Methane, HBr = Hydrogen bromide, HCl = Hydrogen chloride, H₂S = Hydrogen sulfide, NaCl = Sodium chloride, NH₃ = Ammonia, NO_x = Nitrogen oxides, S = Sulfur, SO₂ = Sulfur dioxide, SO₃ = Sulfur trioxide

CONTAMINANTS EMITTED FROM INTERNAL SOURCES	
SOURCE	CONTAMINANTS EMITTED
CLEANING PRODUCTS	ammonia, alkanes, alkenes, aromatics, turpenes
COMBUSTION SOURCES	NO _x , formaldehyde, PAHs, respirable particle
DAM/WET AREAS	bacteria, insects, mold
FURNISHINGS, WOOD	benzene, chlorinated hydrocarbons, formaldehyde
PERSONNEL	aromatics, alcohols, aldehydes, ketones
STERILIZATION PROCESSES	ethylene oxide, chlorine, chlorine dioxide, ozone
TOBACCO SMOKE	benzenes, formaldehyde, NO _x , PAHs, VOCs

FILTRATION OF AMC

AMC requires different filtration methods than those used on particulate contaminants. HEPA filtration will provide a medium to capture particles of very small diameters, but the airborne molecular contaminants will persist in the air.



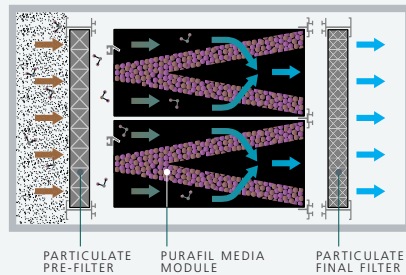
For control of AMC, Purafil offers a variety of patented, dry-scrubbing media that remove contaminants via adsorption — a physical process where contaminants adhere to the media's surface — and chemisorption — an instantaneous and irreversible chemical reaction where contaminants are transformed into harmless solids and remain trapped inside the media. Purafil media have a high surface area to mass ratio and contain chemical impregnants to target and eliminate contaminants of concern. Purafil media are engineered and manufactured at company headquarters, according to strict ISO 9001:2000 quality procedures

Purafil® SP Blend media 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. Purafil® SP Blend media demonstrates a high removal capacity for combustion gases found in outdoor air as well as emissions from furnishings, cleaning products, sterilization processes, and other internal sources.

Certain applications may require the use of another media in place of or in addition to Purafil SP Blend, such as Purakol® AM media for control of ammonia, Purafil® Triple-Blend Makeup Air media for removal of diesel exhaust contaminants, or Chlorosorb® III media for control of chlorine.

THE PURAFIL AIR PURIFICATION SYSTEM

The Purafil system (at right) features pre-filter and final filter sections for control of particulate contaminants and one or two passes of Purafil media modules for removal of gases and odors. The Purafil system can be employed in two ways: (1) As a part of the facility's HVAC system to clean the air entering the IVF lab and (2) As a standalone filtration solution to clean and recirculate air in specific process areas.



THE PURAFIL® SIDE ACCESS SYSTEM (PSA)

THE PURAFIL SIDE ACCESS SYSTEM (PSA)

The PSA is designed for both particulate and general odor 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.

THE PURAFIL RECIRCULATION AIR SYSTEM (RAS)

The RAS is designed to be wall-mounted or on casters for mobility. The system operates by drawing room air through a vent located at the top of the unit and through particulate and chemical filtration sections before being discharged through a vent located at the bottom of the unit. The RAS maintains clean air in localized areas of the facility.





16X
MAGNIFIED



32X
MAGNIFIED

THE 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 were 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.

COMPLIMENTARY LABORATORY SERVICES



Because Purafil believes in complete customer satisfaction, we offer Media Life Analysis (MLA), a value-added service that projects the remaining life of your dry-scrubbing media. Our laboratory technicians analyze media samples from your Purafil system to project when your media will need to be replaced. This service helps to maximize system efficiency and prevent breakthrough of odors and pollutants.

Purafil spends more time assessing problems and verifying system performance than any other company in the air filtration industry. We have invested in a comprehensive in-house laboratory, and we are one of few organizations to offer life testable systems.



EUROPEAN JOURNAL OF PARENTERAL & PHARMACEUTICAL SCIENCES

Purafil's article, *Application of dry-scrubbing air filtration to control airborne molecular contaminants in the pharmaceutical, biotechnology and life science industries*, published in the European Journal of Parenteral & Pharmaceutical Sciences (Volume 9 Number 1 Pages 3-9), describes in detail the use of dry-scrubbing media to control AMC in in-vitro fertilization laboratories, for emission control in sterilization and glove box applications, and for odor control in the production of insulin.

The control of AMC with dry-scrubbing filtration has been recognized as a trusted method of minimizing process defects, assuring product quality and providing for worker safety and health. For copies of the article, please contact marketing@purafil.com.

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