



## Frequently Asked questions for Fume Extraction

### 1. What type of filter comes with the fume extraction unit?

PACE fume extraction systems are sold with a standard combination filter already installed. The standard filter is a combination pre filter, a high efficiency HEPA filter and a gas filter.

### 2. Can PACE fume extraction systems remove fumes generated by chemicals or adhesives?

The standard combination filter comes with a gas filter layer to remove trace chemical generated in various electronic soldering applications. An optional adhesive filter is available for the Arm-Evac 50, 105, 200, and the 250. The optional adhesive filter is designed to absorb larger volumes of chemical and adhesive fumes. The adhesive filters are made with a combination of activated carbon and activated alumina impregnated with potassium permanganate. They are designed to remove fumes that are generated by glues, chemical solvents and adhesives.

### 3. Is there any way to estimate the life of the adhesive filter in my application?

Estimating the life of an adhesive filter is very difficult. Quantifying the amount of chemical or adhesive fumes being absorbed by a system is not an easy task. The removal capacity of the filter is one way to get a rough estimate of the filters life. The adhesive filter's removal capacity for some common chemicals is listed below.

| <u>Chemical</u>           | <u>Removal Capacity</u> |
|---------------------------|-------------------------|
| Acetone                   | 11.9%                   |
| Ammonia                   | <3%                     |
| Ethyl cyanoacrylate       | 21.0%                   |
| Formaldehyde              | 2.0%                    |
| n-Heptane                 | 10.0%                   |
| Isopropyl Alcohol         | 21.0%                   |
| Methyl-2-cyanoacrylate    | 20.0%                   |
| Methyl Ethyl Ketone (MEK) | 21.0%                   |
| Toluene                   | 10.0%                   |
| Xylene                    | 10.0%                   |

The percentages listed above indicate the weight of a contaminant that can be removed per pound of media in the filter. For example, for every 100 lbs of media, 11.9 lbs of

acetone can be absorbed. There is approximately seven pounds of media in the adhesive filter for the Arm-Evac 105, 200, and 250.

If you have a fume removal application that involves a chemical not listed above please contact a PACE technical service representative for the removal capacities for your application.

#### **4. Can PACE fume extraction systems be used in a cleanroom environment?**

A cleanroom filter is available for the Arm-Evac 105, 200, and 250 systems. This filter is ideal for fine particulate and gas removal in designated cleanroom environments.

#### **5. Are the accessories for these systems static safe?**

PACE offers a wide variety of accessory options with the Arm-Evac fume extraction systems. The majority of these accessories are ESD safe. Static safe accessory options include metal flex arms, articulated arms, plenums, scoops and suction hoods.

#### **6. How do I know when to change the standard combination filter in my Arm-Evac 200/250 system?**

The life of the combination filter can be correlated to the number of rolls of solder that are used with the fume extraction system. Typically the combination filter will last up to 12 – 15, one-pound rolls of solder that are used with the system. The variation is due to the fact that soldering occurs at varying temperatures. At higher soldering temperatures more fumes are produced, thus shortening the life of the filter. The filters typically last from three to twelve months.

#### **7. Is there any way to extend the life of my filter?**

The pre-filters should be changed out every one to three weeks. Doing this, will help extend the life of the main filter. The Arm-Evac 105, 200, and 250 has an optional extended life filter that can extend the life of your filter up to four times longer than the standard combo filter. The extended life pre-filter is made of a cotton/polyprop fiber with an extended wire mesh and has a surface area of 1.25 square feet. The extended life pre-filter must be used with the extended life filter.

#### **8. Are benchtop fume exhausters available?**

PACE offers three benchtop fume exhausters. The FX 50 is an affordable benchtop exhauster that draws harmful fumes through an activated carbon impregnated foam filter. The Turbo Exhauster is a heavy-duty benchtop exhauster with a larger fume capture area. The Turbo Exhauster also uses an activated carbon impregnated foam filter. The Arm-Evac 50 is a unique, portable, cost effective, bench-top fume extractor that provides a wide area fume extraction or highly efficient source capture at two points (using the optional arm attachment).

**9. If I have multiple stations can I turn off the airflow to a single station when fume extraction is not needed?**

The airflow to an individual station can be controlled depending on which PACE accessory arms are being used with the system. The 2-inch metal flex arms and the articulated arms come with an adjustable airflow controller that allows an operator to turn off the airflow to a single station. An airflow controller does not come standard with 1.75-inch metal flex arm, but can be added on as an option.

Being able to turn off the airflow to an individual station when it is not in use will improve the overall airflow performance of the remaining stations.

**10. Why do fumes generated in electronic soldering operations need to be extracted?**

One of the dangers in electronic assembly is exposure to solder flux fumes. When heated, flux produces airborne pollutants which pose a potential health hazard to workers. The hazards that are produced by heating flux include formaldehyde, hydrochloric acid, benzene, toluene, styrene, phenol, chlorophenol and isopropyl alcohol.

In addition to the gaseous components of heated flux, a significant amount of particulates are created ranging in size from 0.01 micron to 1.0 micron. Flux fumes closely parallel the particle inhalation range of tobacco smoke. These microscopic particles are readily inhalable and can easily reach the lower respiratory system. These inhaled particles tend to be retained for long periods of time in the lower respiratory tract, promoting adverse chronic pulmonary conditions.

**11. Does PACE sell tip extraction systems?**

PACE currently has two tip extraction systems for use with up to 60 soldering irons. The two systems offer an easy to install solution for harmful fumes generated by electronic soldering.

**12. What is the expected motor life for the fume extraction systems?**

All PACE fume extraction systems are equipped with heavy-duty brushless motors that are specified to last for 20,000 hours. If the systems are turned on for eight hours a day, five days a week the motor will last up to ten years.

**13. Can I add more than one fume extraction arm per inlet port?**

You can connect two arms to one port by using part number 8882-0692. The kit contains an 8' section of 3" diameter flex hose, a 3' section of 3" diameter flex hose with a 3-2" reducer, and a "Y" connector. If the arm requires a 3" diameter hose, the adapter can be

removed to facilitate the installation. Be sure to check the unit specifications so as to not exceed the total number of arms and the maximum ducting length.

**14. Can the fume extraction systems such as the Arm-Evac 200 and 250 be used if resting on its side?**

The fume extraction systems are to be operated in the upright position only. They rely on gravity for proper internal sealing of the filter.

**15. What is the shelf life of the fume extraction filters?**

Generally, if the filter remains as received from PACE (i.e. in a sealed bag), it should keep for approx 2 years. The filter does contain organic compounds that will start to degrade and lose its effectiveness.

**Fume Extraction Filter  
Descriptions**

| <b>System</b>       | <b>Filter P/N</b> | <b>Filter</b>            | <b>Size</b>           | <b>Media/Weight</b>  | <b>Efficiency Rating</b> | <b>Arrestance Rating</b> | <b>EU Rating</b> |
|---------------------|-------------------|--------------------------|-----------------------|--|--------------------------|--------------------------|------------------|
| <b>FX 50</b>        | 8883-0200-P5      | Economy Filter           | 130mm x 130mm x 8mm   | Activated Carbon impregnated foam  |                          |                          |                  |
| <b>Arm-Evac 50</b>  | 8883-0125-P5      | Pre-Filter               | 178mm x 178mm x 4mm   | Electrostatically charged synthetic fibre. Weight 150g per sq metre. Thickness approx 5mm  |                          | 90%                      | EU4              |
|                     | 8883-0300-P5      | Economy Filter           | 178mm x 178mm x 43mm  |  |                          |                          |                  |
|                     | 8883-0280         | General Purpose Filter   | 178mm x 178mm x 43mm  | Glass paper with carbon impregnated foam (as FX50). Media per filter approx 0.5 sq metre   | 85% ASHRAE               |                          | EU8              |
|                     | 8883-0290         | Cleanroom Filter         | 178mm x 178mm x 43mm  | Glass paper with carbon impregnated foam (as FX50). Media per filter approx 0.5 sq metre   | 99.997%                  |                          | EU13             |
|                     | 8883-0295         | Adhesive Filter          | 178mm x 178mm x 43mm  | 0.4Kg of 207c Carbon, 20mm thick. Total area 178mm sq.   |                          |                          |                  |
| <b>Arm-Evac 105</b> | 8883-0111-P5      | Pre-Filter               | 255mm x 255mm x 20mm  | Polyester  | N/A                      | 80-90%                   | EU3/4            |
| <b>Arm-Evac 200</b> | 8883-0938-P10     | High Capacity Pre-Filter | 250mm x 250mm x 48mm  | Woven Polyester  | N/A                      | 90%                      | EU 4             |
| <b>Arm-Evac 250</b> | 8883-0871         | Economy Filter           | 254mm x 254mm x 187mm |  |                          |                          |                  |
|                     | 8883-0931         | General Purpose Filter   | 254mm x 254mm x 187mm | Vitreous Borosilicate & gas filter comprised of Potassium Permanganate & Activated Carbon, 0.36kg Carbon based granuals & 40 g Aluminum Oxide in pelleted from impregnated with 4% by weight potassium permanganate. | 85% ASHRAE               | N/A                      | EU8              |
|                     | 8883-0921         | Clean Room Filter        | 254mm x 254mm x 187mm | Vitreous Borosilicate & Bonded Carbon, 0.4 kg 207c coal based Carbon in granuals.  | 99.997%                  | N/A                      | EU 13            |
|                     | 8883-0936         | High Capacity Filter     | 254mm x 254mm x 187mm | Vitreous Borosilicate  | 65% ASHRAE               | N/A                      | EU 6             |
|                     | 8883-0951         | Adhesive Filter          | 254mm x 254mm x 187mm | 700g of Carbon and 400g of purafil. Total weight 1.1kg.  |                          |                          |                  |
| <b>Arm-Evac 500</b> | 8883-0145-P10     | Pre-Filter               | 305mm x 305mm x 47mm  | V Pleat Pre-Filter in cardboard panel  |                          | 90%                      | EU 4             |
|                     | 8883-0955         | General Purpose Filter   | 303mm x 303mm x 150mm | Vitreous Borosilicate, Mini Pleat in MDF case  | 90% ASHRAE               |                          | EU8              |
|                     | 8883-0965         | Clean Room Filter        | 303mm x 303mm x 150mm | Vitreous Borosilicate, Mini Pleat in MDF case  | 99.997% DOP              |                          | EU13             |
|                     | 8883-0956         | Carbon Filter            | 305mm x 305mm x 25mm  | 207c Carbon in Aluminum Frame  |                          |                          |                  |



## PACE General Purpose Filter Applications P/N 8883-0931

Due to the size of the Gas filter portion of the General Purpose Filter Cartridge PACE recommends that it be used in applications when the following substances are being used in small quantities or intermittently. Remember the largest portion of the HEPA / Gas filter cartridge is still the HEPA filter, which is intended for fine particulate filtration. Following are acceptable applications for the General Purpose Filter.

|                                 |  |
|---------------------------------|--|
| Acetaldehyde                    | Hydrogen Chloride                                    |
| Acetic Acid                     | Hydrogen Cyanide                                     |
| Acetone                         | Hydrogen Sulfide                                     |
| Acetylene                       | Indole   |
| Acrolein                        | Isoprene   |
| Acrylonitrile                   | Methanol   |
| Arsinc                          | Methyl acrylate                                      |
| Benzene                         | Methyl chloride                                      |
| 1,3-Butadiene                   | Methyl chloroform                                    |
| Butane                          | Methyl disulfide                                     |
| Butyric Acid                    | Methyl ethyl ketone (MEK)                            |
| Carbon Disulfide                | Methyl mercaptan                                     |
| Carbon tetra chloride           | Methyl sulfide                                       |
| Chloroform                      | Methyl vinyl ketone Methylamine                      |
| Chloropicrin                    | Methylene chloride                                   |
| Cresol                          | Nitric oxide (NO not Nitrous Oxide N <sub>2</sub> O) |
| Cyanoacrylate                   | Nitrobenzene   |
| Cyclohexane                     | Ozone  |
| Cyclohexanoic                   | Phenol   |
| 1,1 Dichloromethane             | Phosgene   |
| Diethylamine                    | Phosphine  |
| Dimethylamine                   | Pyridine   |
| Ethanol                         | Silane   |
| Ethyl acetate                   | Skatole  |
| Ethyl acrylate                  | Styrene  |
| Ethylamine                      | Sulphur dioxide                                      |
| Ethylene                        | Sulphuric acid                                       |
| Ethylene oxide                  | Sulphur trioxide                                     |
| Formaldehyde (small quantities) | Toluene  |
| Formic Acid                     | Trichloroethylene                                    |
| Freon 11                        | VOC's  |
| Hydrazine                       | Xylene   |
| Hydrocarbons (most)             |  |

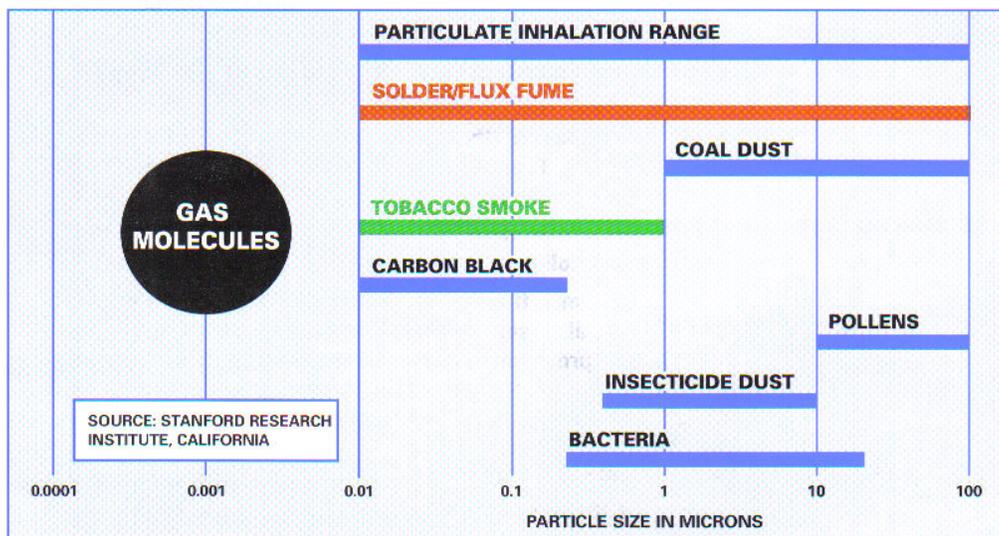
## Why is Fume Extraction Needed?

It's a fact... hazardous fumes in the working environment result in increased absenteeism, employee turnover, worker's compensation claims and lost productivity. Medical research has confirmed an increased incidence of occupational asthma, chronic bronchitis, allergic reactions, contact dermatitis and other health related effects associated with exposure to flux fumes. The substances in flux fumes are regulated by international health and safety agencies and many have been designated as "Occupational Sensitizers" which means that exposure should be eliminated or reduced to as low levels as possible. Where manual soldering is being performed or where solder-pots/fountains are utilized, hazardous fumes are produced and workers need to be protected from them.

### FACT: Exposure to Solder Fumes Lead to Respiratory Illness

When rosin-based or rosin-containing fluxes are heated, a substance called colophony is produced which is one of the major causes of occupational asthma. In order to reduce exposure to colophony, rosin-based fluxes have been exchanged for no-clean or synthetic fluxes that contain no rosin or very low percentages. While this reduces or eliminates exposure to colophony, new chemical irritants may be introduced into the work place, many of which pose a more substantial threat to workers. Over 95% of the total fume produced from rosin-based fluxes is in the form of particulates.

Chemical exposure from flux fume varies widely and is dependent on the chemical composition of the flux. Non-rosin or low-rosin fluxes use chemically aggressive substances such as acids, solvents, or alcohols in place of rosin to improve the cleaning action of the flux. Exposure to these substances is also recognized as hazardous and when flux is heated, the resultant chemical by-products can be even more hazardous. Additionally, the use of cleaners, solvents or adhesives, which are common in electronic soldering applications, expose workers to chemical hazards.



The human body has been designed with defense mechanisms such as nasal passageways lined with mucus that will collect larger particles through a process known as impaction and ciliated breathing passageways to remove foreign substances from the main airways of the lungs. Flux fumes contain high levels of respirable particles (less than 3.5 microns in diameter: similar in size to cigarette smoke) that can pass by these natural defense mechanisms, and deposit themselves in the gas-exchange region of the lungs, thereby posing the greatest exposure hazard.

### FACT: Material Safety Data Sheets for Fluxes Recommend the Use of Local Exhaust Ventilation Systems

The health effects caused by exposure to flux fumes are generally limited to forms of respiratory illness and contact dermatitis. However, since the components of flux fume are often designated as "occupational sensitizers", chronic or prolonged exposure increases the severity of health effects. PACE Fume Extraction is a key element in protecting workers from being exposed to flux fume.