Weller®

Fume Extraction Solutions FOR A Healthy Workplace

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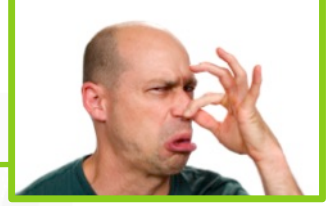
Overview

- ✓ Why Fume Extraction
- ✓ Soldering applications
- ✓ Laser applications
- ✓ Chemical applications
- ✓ MSDS / SDS warnings
- ✓ Filter types
- ✓ Selection options
- ✓ Supplier advantages

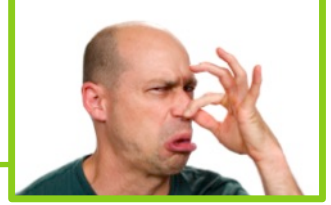
Why do you need fume extraction?

Why fume extraction?

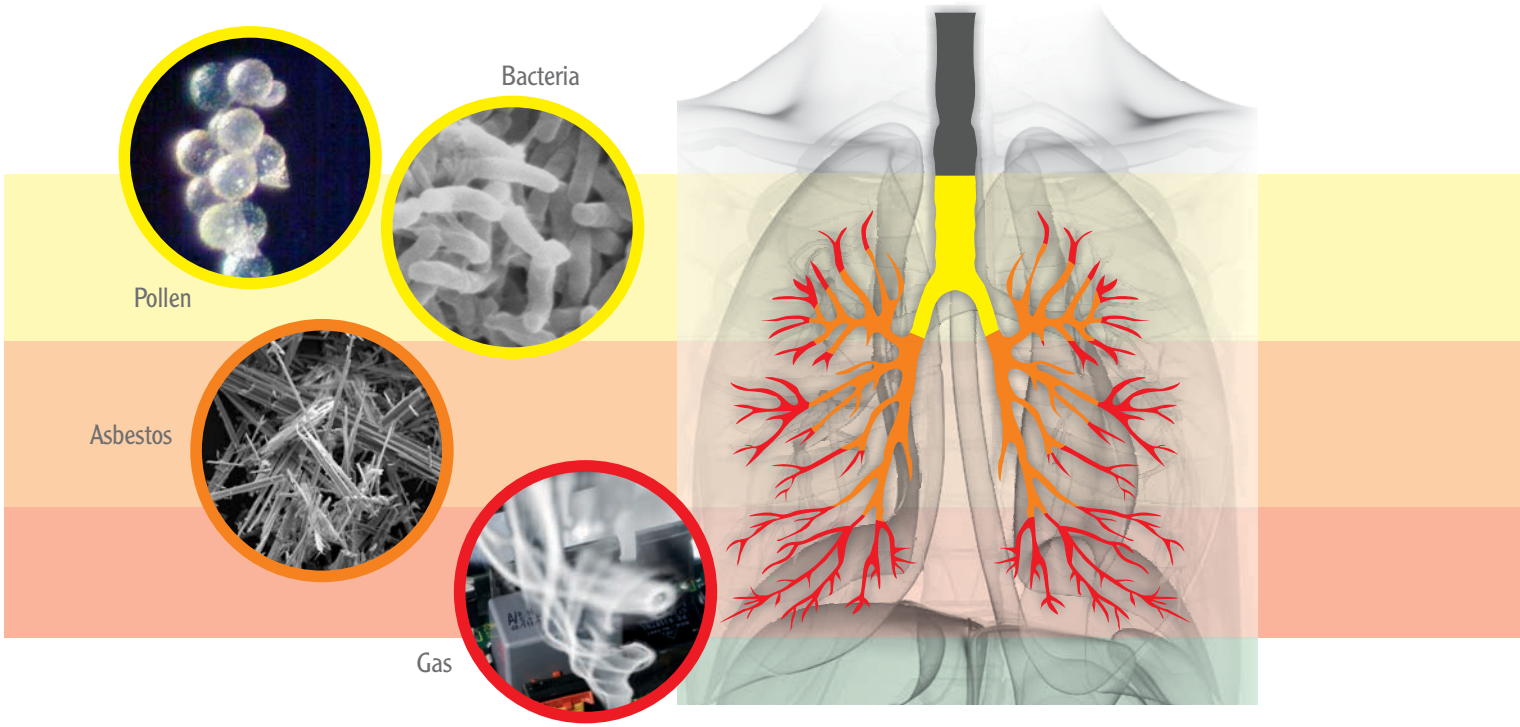


- **Soldering / Rework -** applications can produce harmful particulates and gases
- **Lead-free Alloys -** flux fumes require proper ventilation
- **Laser -** etching and engraving can produce harmful VOC compounds
- **MEK / Acetone / Formaldehyde –** chemical compositions should not be inhaled

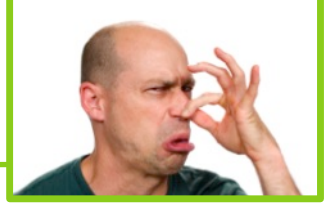
Why fume extraction?



The smallest particles penetrate most deeply into the respiratory system



Effects of fine dust and gas fumes on the lungs



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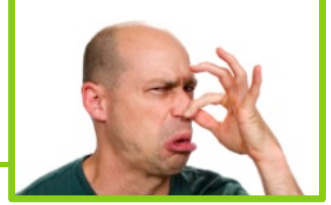
Soldering / rework can also be offensive!

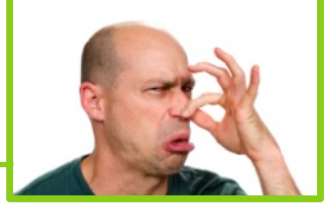
Amines are used in certain flux types and can smell like rotting fish.



LEAD-FREE SOLDER

Going up in smoke…

The temperature needed to create a good solder joint using lead-free solder is measurably higher, causing a stronger reaction within the flux and creating more solder smoke with a greater number of particles.



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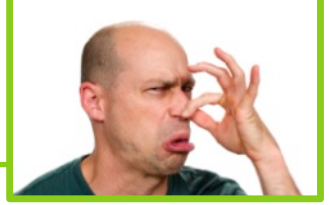
It’s a common misconception that lead-free soldering is a healthier solution

BEFORE

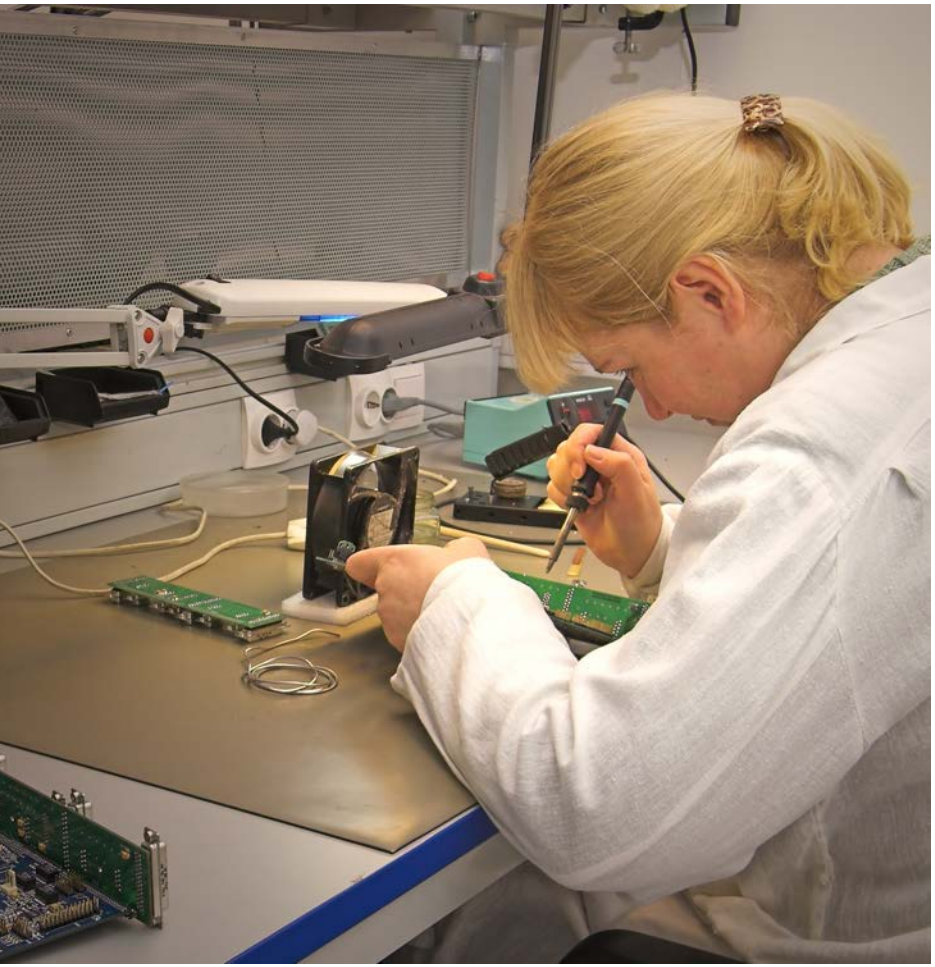
Test filter before use

AFTER

After 1.5 hours of soldering with lead-free solder wire, 3% flux content



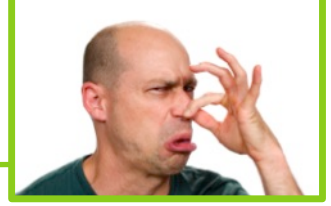
LEAD - FREE SOLDER



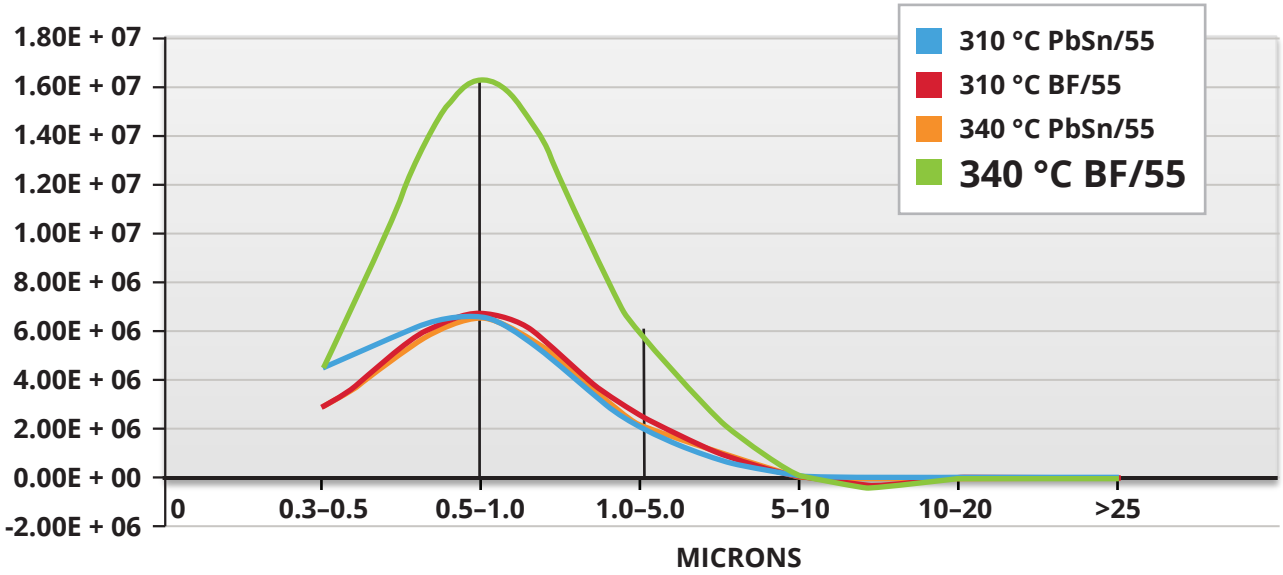
Better for the environment; worse for the operator

The transition to lead-free soldering has reduced strain on the environment, but for the operator, the hand soldering process has become more dangerous.

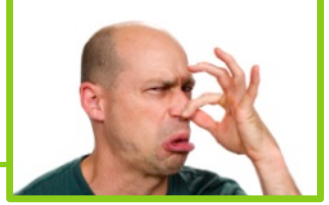
The lead in the solder is gone, but to get the solder wire to flow properly, changes have been made to the flux compositions to accommodate the higher melting point alloys.



LEAD-FREE SOLDER



Lead-free soldering produces up to 250% more particles between 0.5 and 1.0 microns in diameter, the size that is the most dangerous to inhale. In addition to particles, solder smoke can contain isocyanates, aldehydes, and other unhealthy substances.



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Typical soldering application

20 million particles
0.3 – 1.0 microns / cubic foot
or about 700 million
particles / cubic meter

You don’t want to breathe this!

Poll question # 1:

What type of application(s) does your company have a need for?

Laser Engraving / Marking

- **Industrial lasers** can also generate harmful fumes when used on different types of materials in the manufacturing process. These fumes are known collectively as Laser Generated Air Contaminants (LGACs).
- **LGACs fall into two categories: particles and gases.**
- **Laser system** – Whether the application is cutting, engraving or marking, the laser catalyzes the material and VOC gases are formed as the material melts or burns. Because these gases are toxic and have the ability to spread quickly, it is important that these fumes be removed immediately.

Laser Engraving / Marking

- **Synthetic polymers** include plastics like polyethylene, polycarbonate, polypropylene, as well as polyvinyl chloride (PVC).
- **Polyethylene** produces formaldehyde and is a noxious VOC and known carcinogen. Aside from bringing on asthmatic attacks and allergies, it can also cause cancer.

Laser Engraving / Marking

- **Respirable particles** – Many particulate LGAC's are very small (generally less than 1 micron in diameter), so they can be easily inhaled.
- **Irritants** – Materials such as ceramics, glass and wood release microscopic particulate that may cause irritation to the respiratory tract, skin, nose and eyes.
- **Toxic particles** – Some particulates may cause allergic, carcinogenic or toxic effects, commonly known as "heavy metals", are the chrome and nickel particles that are produced when engraving or etching stainless steel.

Laser Engraving / Marking

- **Volatile Organic Compounds (VOCs)** refers to thousands of organic (carbon-containing) chemicals that are present mostly as gases at room temperature. VOCs can be man-made or naturally occurring chemical compounds.
- **VOCs** are often produced when working with lasers on plastics.
- **VOCs** already have Workplace Exposure Limits in place according to the EPA and are generally enforced by NIOSH (National Institute of Occupational Health and Safety) and OSHA (Occupational Safety and Health Administration).

Chemical Cleaning / Etching

- **Chemicals and Solvents** – Acetone, MEK, ether based solvents, sulfuric acid, silicone based conformal coatings and even certain types of paint can be considered to be respiratory irritants.
- **Formaldehyde** – Flooring and similar building materials used in mobile homes and RV construction have been in the news for a number of years. Formaldehyde is a known carcinogen and is one of only a few chemicals that can actually be measured.
- **OSHA / IAQ** – Indoor Air Quality is a significant concern in all workplace environments and is now being reviewed for residential environments as well.

SDS warnings

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ormation, call:
gency Number: 201-796-7100
HEMTREC assistance, call: 800-424-9300
nternational CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
78-93-3	Methyl ethyl ketone	>99%	201-159-0

azard Symbols: XI F
Risk Phrases: 11 36 66 67

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: colorless liquid. Flash Point: -7 deg C. **Danger!** May cause respiratory tract irritation. May cause severe eye and skin irritation with possible burns. May cause fetal effects. May cause central nervous system effects. Extremely flammable liquid and vapor. Vapor may cause flash fire. **Target Organs:** Central nervous system, eyes, skin, mucous membranes.

Potential Health Effects

Eye: Causes eye irritation. May result in corneal injury.
Skin: May be absorbed through the skin in harmful amounts. Prolonged and/or repeated contact may cause irritation and/or dermatitis.

nervous system depression,
ness, and nausea. Advanced
eath due to respiratory failure.
al nervous system effects
ness and coma. Causes respiratory tract
d pulmonary edema. May cause numbness in
nilar to those of acute inhalation. Prolonged or
d dermatitis. Animal studies have reported that fetal
ernal toxicity is seen.

ection 4 - First Aid Measures

th plenty of water for at least 15 minutes, occasionally lifting th
ical aid immediately. Do NOT allow victim to rub or keep eyes
ical aid. Rinse area with large amounts of water for at
ted clothing and shoes.
ion: Do NOT induce vomiting. If victim is conscious
medical aid immediately.
nhalation: Get medical aid immediately. Rem
breathing, give artificial respiration. If b
resuscitation. If breathing has ce
mechanical device such as
Notes to Physician

If inhaled…

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband.

If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation.

Get medical attention.

Acute potential health effects include:

- Skin irritation
- Skin absorption
- Eye irritation
- Inhalation of high concentrations may cause central nervous effects characterized by headache, dizziness, unconsciousness, and coma
- Can cause respiratory tract irritation and also can affect the sense organs
- May affect the liver and urinary tract
- Chronic inhalation may cause effects similar to those of acute inhalation

So what do the filters do?

What do the filters do?

The most effective systems offer a 3-stage filter process for removing airborne substances

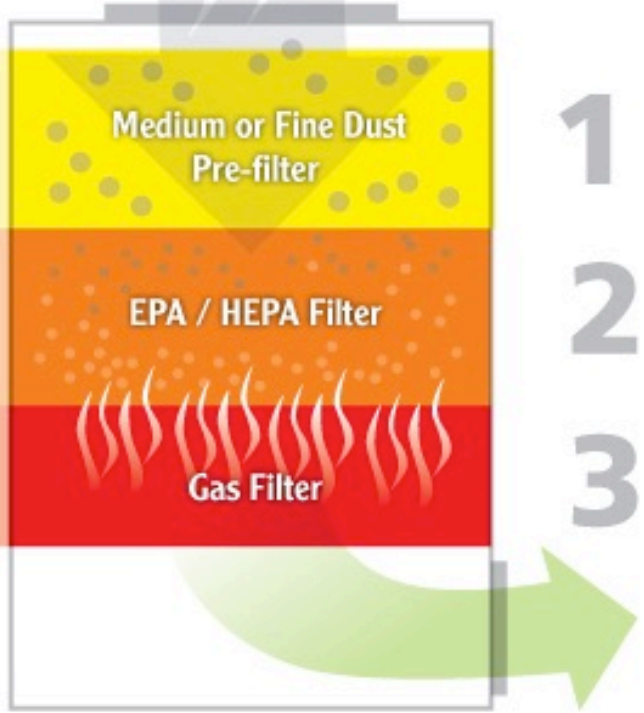
After hazardous substances are efficiently captured by the nozzle and delivered into the filter system:

Larger particles become trapped in the medium or fine dust M5 or F7 pre-filter.

Smaller particles become trapped in the EPA or HEPA particle filter.

The wide band gas filter removes gases, odors, adhesive and solvent fumes.

Clean air is recirculated back into the workplace.



What do the filters do?

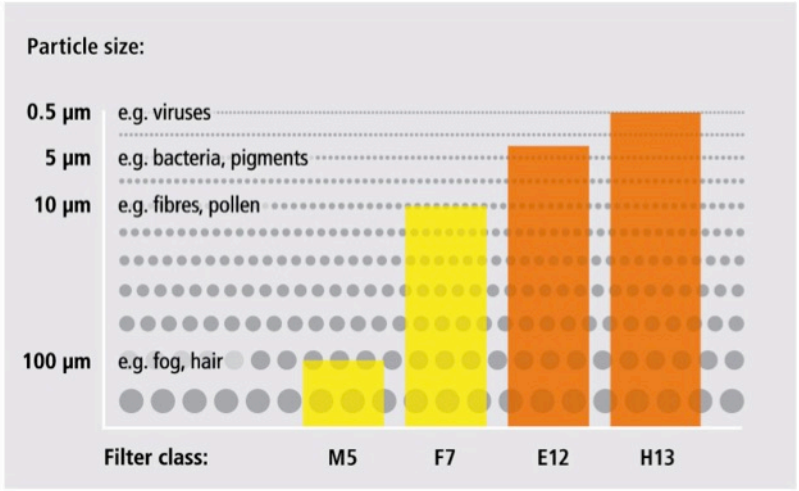
Particulate filters remove large to very small particles

Group	Filter class	Integral value	
		Degree of separation	Transmittance degree
EPA	E10	85%	15%
	E11	95%	5%
	E12	99.5%	0.5%
HEPA	H13	99.95%	0.05%
	H14	99.995%	0.005%

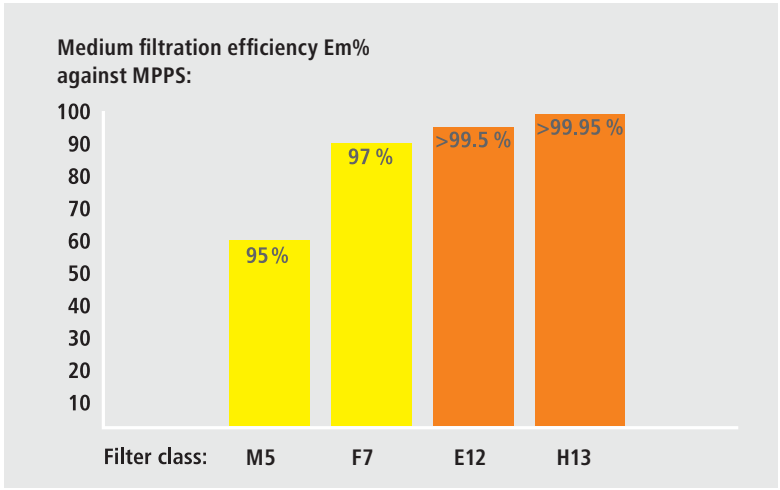
Recommended particulate filters

What do the filters do?

Filters are classified by the size of the particle that can be prevented from returning to the environment



Filter Class M5, F7: Fine dust filter as per EN 779:2012
Filter Class E12/H13: According EN 1822:2009 HEPA (**H**igh **E**fficiency **P**articulate **A**ir) Filter



Source – HEPA Corporation

What do the filters do?

Wide band gas filters remove offensive odors and fume irritants

Breathe easier with proper filters

Harmful gases with a high molecular weights are cleaned by active carbon. Additional media concentrations make up the gas filter for absorbing gases of lower molecular weight.

Because of the varying compositions of gas media, a large number of chemicals are converted into harmless, non-offensive gases.

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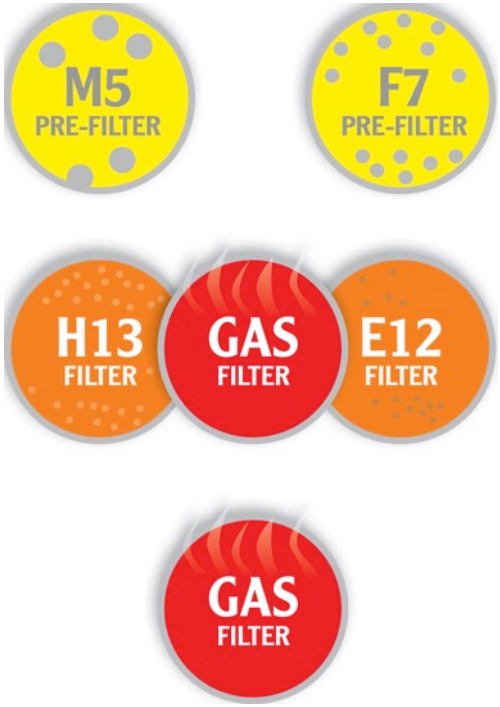
Choose a filter configuration customized to fit your application



Medium / Fine dust pre-filters

For standard applications with small amounts of fluxes and gases but with high solid content, choose filter classes M5 or F7.

EPA / HEPA Compact filters

Particle filter class H13 or E12 with deposition performance according to EN 1822:2009
> 99.95% in MPPS – Most Penetrating Particle Size Particles < 0.3 μm)
> 99.5% - Particle Size < 5.0 μm

Gas filters

For cleaning harmful fumes and vapors, wide band gas filters consist of varying levels of chemical absorption media to meet the demanding needs of the market requirements.

Filter options

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Filter selection should be based on the particle and gas filter capacity

Hand soldering	++	++	+++	+++	+++	+++
Heavy duty soldering (solder bath, selective wave)	+	+	+	++	++	+++
Robotic soldering	+	++	+++	+++	++	+++
Gluing, cleaning, filling	+	++	+++	+++	+++	+++
Finedust	++	++	+	+++	++	+++
MEK (Methyl Ethyl Ketone)		+	+++	+++	+	+
VOC (Volatile Organic Compounds)		+	+++	+++	+	+++
Cleanroom			+++	+++		

+ short term use ++ medium term use +++ long term use

Specialized gas filters control specific kinds of gas fumes

Cleanroom gas filter

Chemical filter to control airborne molecular contamination (AMC)

MEK gas filter

Chemical filter to control Methyl Ethyl Ketone, Acetone, etc.

Adhesive fume filter

For gluing and drying processes in dispensing applications

VOC gas filter

Chemical filter to control volatile organic compounds in laser engraving of plastics, gluing and dry processes

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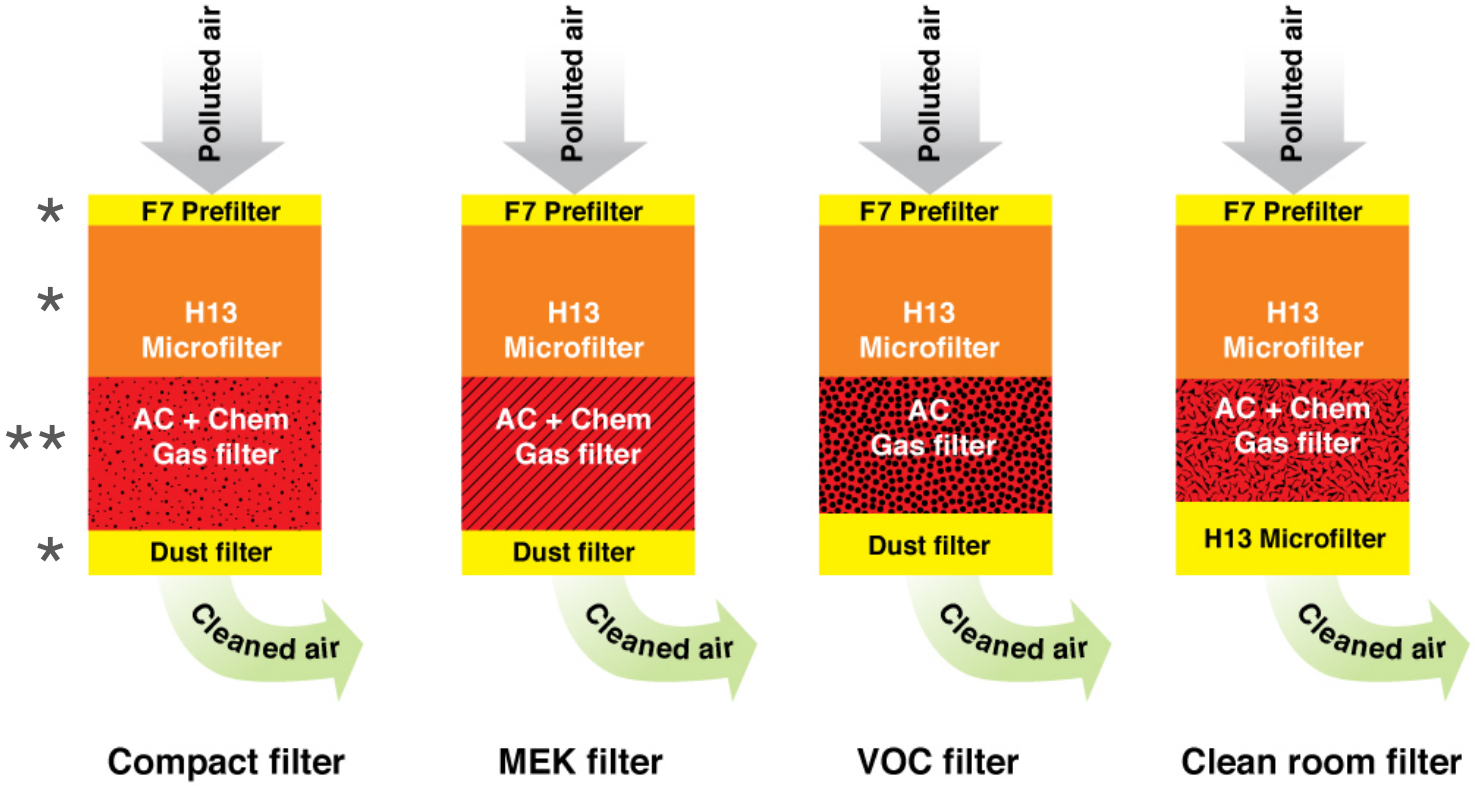
Specialty filters protect against a combination of particulates and gases



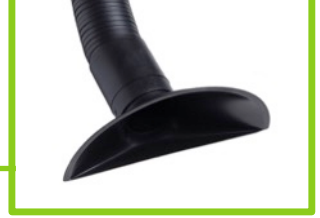
*All F7, H13, and dust filters represented are standard filters. The base dust filters vary in size and level as indicated.
**The media content and size for the gas filters vary as needed based on the designed application.

Volume extraction

2 different types of fume extraction

Tip extraction

Volume extraction



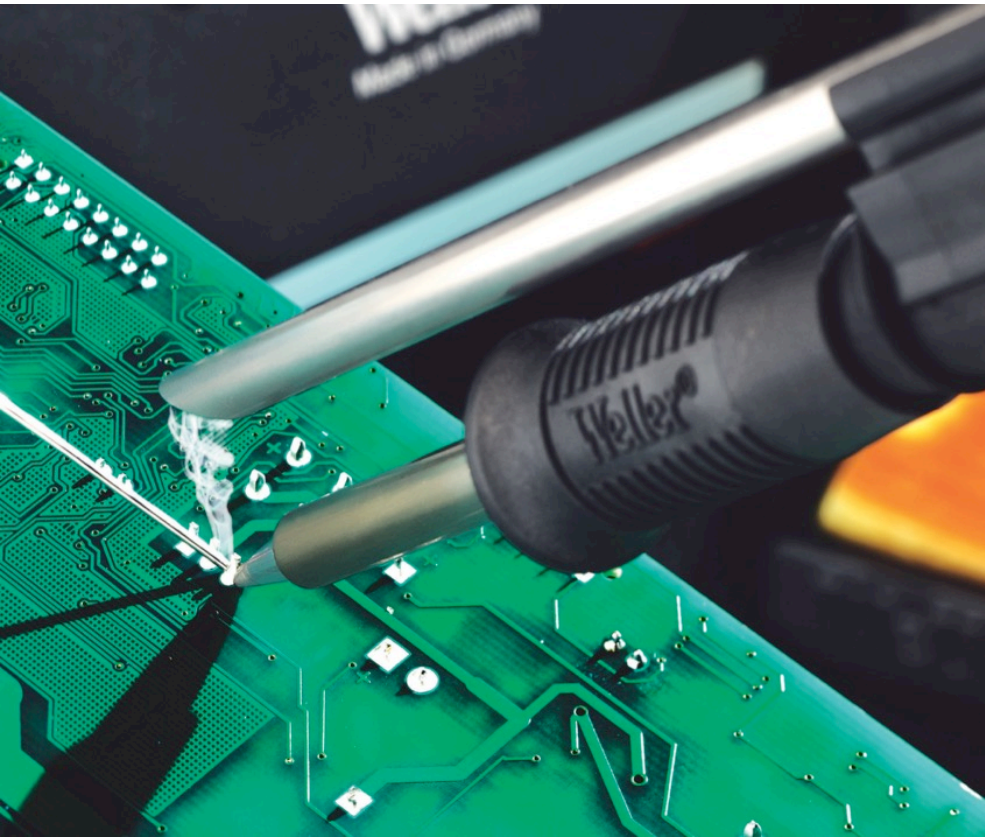
Volume extraction is best where coverage over a wide area is required.

Applications

- Hand soldering
- Selective soldering machines, robotics, solder baths
- Adhesive / chemical
- Clean room
- Microscopic soldering

Tip extraction

To extract noxious fumes right at the source choose tip extraction systems



Applications

- Hand soldering
- Rework
- Robotic
- Microscopic

Poll question # 2:

Which type of system, volume or tip extraction, would work best in your applications?

Supplier advantages

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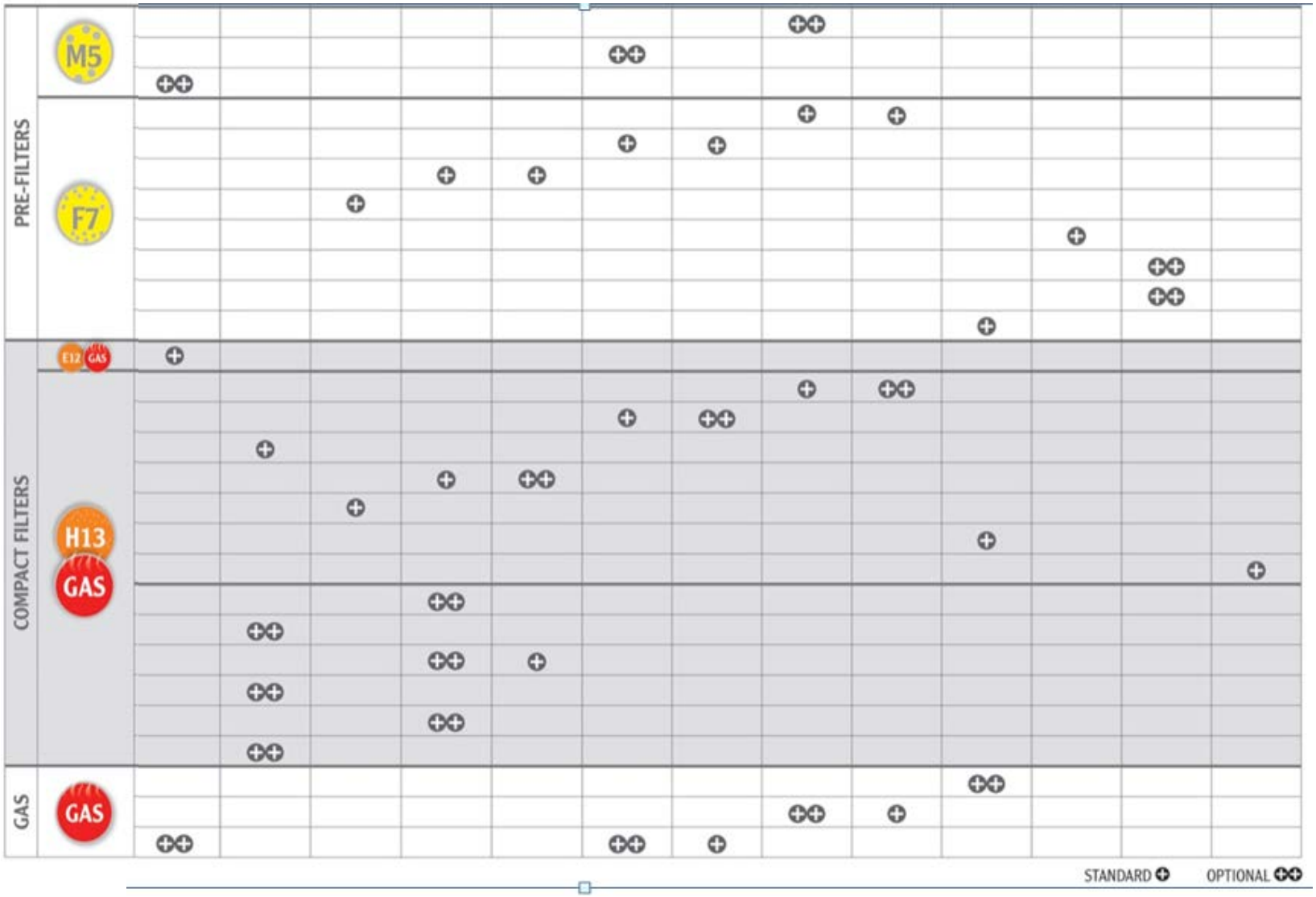
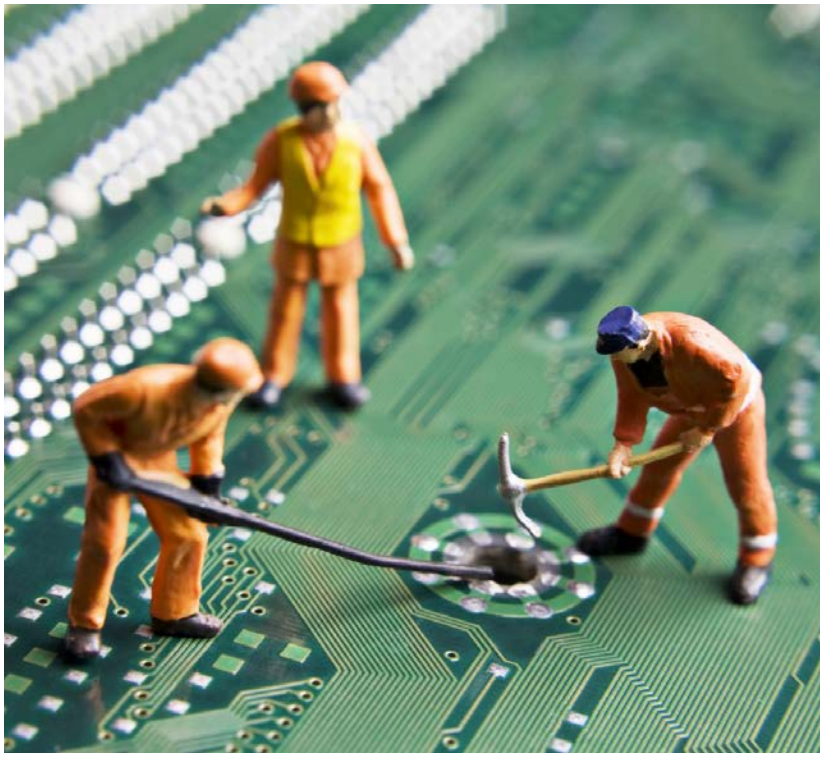


Equipment supplier

Everyone has a choice!

- Choose your equipment and your suppliers wisely.
- Equipment should offer versatility and features that suit your current and future production needs
- Choose equipment suppliers who offer upgrade capabilities



Summary

Summary

- Efficient filtration promotes a healthy workplace
- Utilize the manufacturer's MSDS / SDS sheets
- Filter selection should be based on the application
- Specialty filter types offer a wide variety of options for the market
- Choose a supplier that meets your current demands as well as those of your future needs

We're here to help!

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