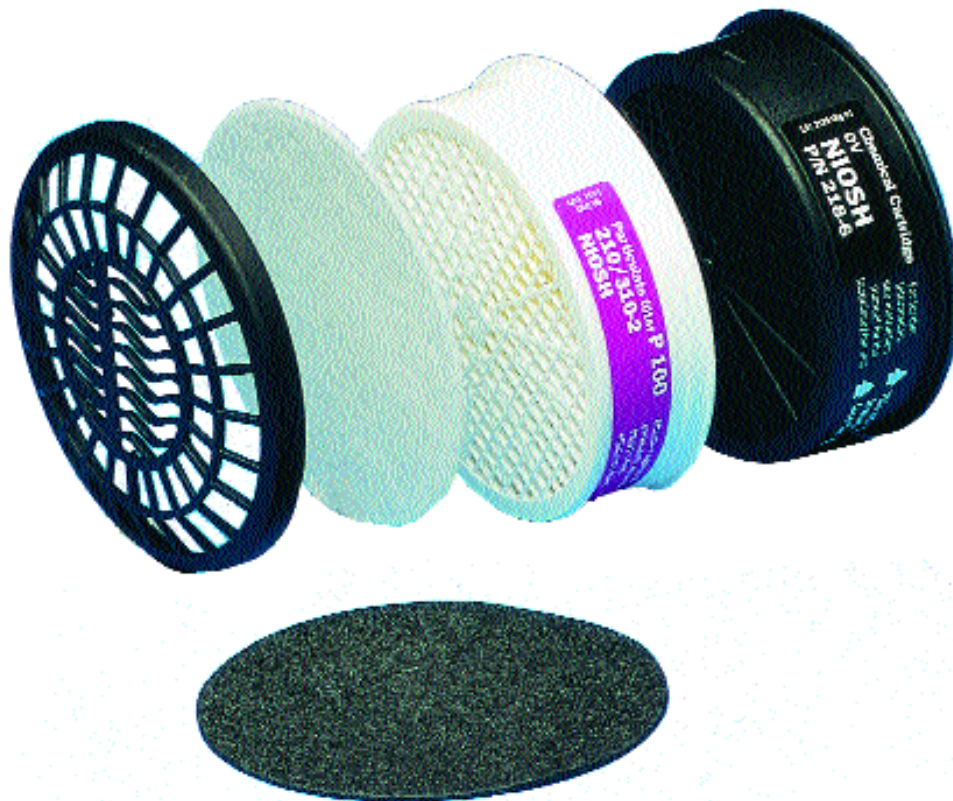


RESPIRATOR TRAINING PROGRAM

FILTERS



ALL ABOUT FILTERS AND CARTRIDGES

Gas cartridges and particle filters

There are two major types of filters: gas cartridges and particle filters.

Gas cartridges protect **ONLY** against gas or vapor.

Particle filters protect **ONLY** against particles, such as dust, smoke, aerosols, mould, bacteria and so on.

If the atmosphere contains both gas and dust, both types must be used.

WHY?

A particle filter is a very fine fibre mesh which captures dust particles while letting clean air through. But it will not stop gas or vapor from getting through.

A gas cartridge contains activated carbon, which works like blotting paper: it absorbs the gas molecules and binds them to the carbon before it can reach your lungs. However, the carbon is not an effective barrier to fine dust particles.

FILTER TYPES



Whereas high efficiency P100 particle filters provide protection against all types of particles, there are different gas cartridges for different gases.

The most common applications that require different gas cartridges are organic vapor (solvents); ammonia;

acid gas; and sulfur dioxide.

The various cartridges can be recognized by their color and their type identification. Here is a list of the most common cartridges:

Color ID	Type
Magenta	Particulates
Black	Organic vapor
White	Acid gas such as chlorine/hydrogen chlorine/sulfur dioxide/formaldehyde
Green	Ammonia/methylamine
Yellow	Organic vapor/sulfur dioxide/chlorine/hydrogen chlorine

PARTICLE FILTER CLASSES:

Particle filters come in various classes, indicating the capacity of the filter to separate very small particles. There are nine classes of filters; three levels of filter efficiency, each with three categories of filter efficiency degradation. The three levels of filter efficiency are 95%, 99% and 99.97%. The three categories of resistance to filter efficiency degradation are N, R and P:

- N for Not resistant to oil,
- R for Resistant to oil,
- P for oil-Proof.

The selection of N-, R-, or P-series filters depends on the presence or absence of oil particles in the air.

Most atmospheres probably contain oil. The reason for that is that if compressed air is used to operate tools or machinery, those tools and machines are greased with oil, which escapes into the atmosphere. If you work underground, drilling equipment is also greased with oil which is exhausted out in the working atmosphere.

To achieve filter economy in those atmospheres, the P-series of filters is the best choice. However, particle filters work on either of two major principles: mechanical impact or electrostatic capture. If the filter mechanism is in any way reliant on electrostatic capture, there is a limit

to how long you can use it in atmospheres containing oil mist, as oil degrades that type of filter. Some manufacturers recommend change at least every 40 hours of use or after 30 days, whichever occurs first, in atmospheres that contain oil aerosols.

Filters of the impact type do not rely on electrostatic charge. Such filters should be replaced every 160-240 hours in atmospheres containing any type of airborne particulates, or if the filter becomes too hard to breathe through, or if it is mechanically damaged.

WHEN IS A FILTER "FINISHED"?

A particle filter should be replaced as soon as it 'clogs up' and becomes hard to breathe through.

A gas cartridge should be replaced when the carbon cannot absorb any more gas. When this happens, the cartridge simply stops working, and harmful gas is let through. There is no significant increase in breathing resistance: that is why a gas cartridge must be replaced according to a change-over schedule. This schedule must take into account the concentration of gas, the temperature and humidity of the atmosphere, as well as the workload of the respirator users. The workload expresses how hard the person has to breathe in order to perform the task he or she is doing. (For more detailed information, see the Fact Box).

FACT BOX – WORKLOAD

By workload we mean how many liters/min (minute volume or MV) of air the person has to breathe to be able to perform the task he or she is doing. Below is an example. Note that speaking or shouting will significantly increase the speed at which the air is breathed in.

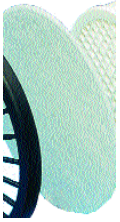
At rest: 6-13 Minute Volume (MV) with a Peak Inspiratory Air Flow (PIAF) of 25-53 liters without speech. If shouting is introduced, PIAF increases to 82-170 liters/min.

Light work (picking up an article from the floor and placing it on a bench): 10-22 MV with a PIAF of 55-95 liters without speech. If shouting is introduced, PIAF increases to 61-170 liters/min.

Medium work (walking on a treadmill at 6.5 kph at 0 degree incline): 17-48 MV with a PIAF of 124-153 liters without speech. If shouting is introduced, PIAF increases to 125-355 liters/min.

Hard work (walking on a treadmill at 6.5 kph at 5 degree slope uphill): 27-65 MV with a PIAF of 72-315 liters without speech. If shouting is introduced, PIAF increases to 147-430 liters/min.

PRE-FILTER



The pre-filter is designed to filter out all coarse particles before the air hits the main filter. It extends the life of both gas and particle filters.

The pre-filter is a disposable item, which should be exchanged at least once a day.

SPECIAL FILTERS AND COMBINATION FILTERS

If you need protection from both dust and gas, you have two solutions:

Special filters

Special filters already have two or several filter types built into a single filter. The color marking and the type ID indicate where the filter can be used.

Filter/cartridge combinations

A particle filter can be attached to a gas cartridge simply by pressing the two together with both hands, using even pressure until the filter and cartridge lock together with a sharp snap.

Attach the filter/cartridge combination as per the manufacturer's instructions.

The particle filter may be separated from the gas cartridge with a coin or similar.

HOW OFTEN SHOULD I CHANGE FILTERS/CARTRIDGES?

The pre-filter should be replaced every day the mask is used.

Particle filters should be replaced as soon as you notice increased breathing resistance, or if mechanical damage to the filter has occurred. There is no precise

gauge as to how long a particle filter will last, but a guideline is 4-6 weeks (160-240 hours), provided you use pre-filters.

Gas cartridges should be replaced according to a carefully documented change-over schedule, based on the concentration of contaminant, temperature, humidity and work load.

Remember: an exhausted gas cartridge lets hazardous vapor through without any decrease in breathing resistance. You must change filters regularly.

CARTRIDGE STORAGE

Gas cartridges continue to absorb contaminants in the air even when you are not wearing the mask.

It is important to store the cartridge in an air-tight bag or container. Don't open sealed packaging until you need the new cartridge.

SUMMARY

- Gas cartridges protect only against gas.
- Particle filters protect only against particles.
- Use a pre-filter.
- Exchange pre-filter daily.
- If you need protection from dust AND gas, you must use a special cartridge or a filter/cartridge combination.
- Store gas cartridges in a sealed bag or container.
- Always replace gas cartridges according to schedule, or if you can smell chemicals through the cartridge.

Always make sure that you know how to use your respirator and how to check that it is working. Remember why you are wearing respiratory protection: not just to comply with safety regulations... but to maintain a healthy body and a healthy life, both for you and your family and friends. After all, there IS life after work!

There is
LIFE
after
WORK!



265 Meadowlands Boulevard
Washington, PA15301, USA
Tel: [+1] (724) 746 2033
Fax: [+1] (724) 746 4421
FreeCall: (US & Can only): 1888-732-3500
email: sea.america@theseagroup.com