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**PROTECTIVE VENTILATION SYSTEMS**



Fine inhalable dusts and possibly hazardous fumes are present during work in, for example, demolition, remediation, mining, waste metal processing. Workers can become ill by inhaling these substances and/or vapors. With Freshfilter's protective ventilation systems, only filtered, thus clean air is blown into the cabin. For a healthy working environment, choose Freshfilter.



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Installing the right filters is very important. In fact, a protective ventilation system has different possible filter combinations.



# SAFETY FIRST

## WORKING IN CONTAMINATED AIR

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Inhaling (fine) dust and/or toxic fumes while working in a cabin can make an employee sick. This affects employees' health not only in the short term (such as allergies), but can also manifest itself after working life. Examples include dust lungs, chronic bronchitis, COPD or even lung cancer.

## A HEALTHY WORKPLACE IS ESSENTIAL

Through inhalation, fine dust enters the nose, upper and lower airways and lungs. The smaller the diameter of the dust, the deeper it enters the lungs. Ultrafine dust can penetrate as far as the alveoli and be absorbed into the blood. In the lungs, fine dust can cause inflammatory reactions and make oxygen uptake more difficult. Accumulation of this dust can lead to damage to lung cells which can result in lung cancer.



Toxic fumes also pose a danger to a machinist. This danger not only lurks in soil that is contaminated, but can also develop in the waste industry, for example. Depending on the type of waste, the presence of water, temperature and nutrients can create various chemical compounds and microorganisms (such as viruses, fungi).



## SAFETY FIRST

The nature and degree of exposure to particulate matter and vapors determines whether actions should be taken. Although each employee has his or her own responsibility, employers have a duty to provide a safe workplace by identifying, evaluating, and taking appropriate protective measures of occupational hazards. The risk of health effects is lower when working outdoors than in a room because of mixing with clean air. In a cab of a shovel, for example, the concentration of substances and vapors can be much higher than the concentration outside a cab. The workplace inside a machine therefore presents an increased risk of long-term health problems.

Refreshing clean air in an enclosed space (such as a cabin) is necessary to reduce the increased risk of health problems. A suitable means on machines or other enclosed spaces is a protective ventilation systems. To prevent contaminated outside air from entering the cab or other enclosed space, an artificial (but relatively small) pressure is created in the cab so that all air flows out through the remaining gaps. The air required for this overpressure is always passed through the filter package so that it is safeguarded from contaminants and hazardous substances.



# THE FRESHFILTER QUALITY

## LEADING IN PROTECTIVE VENTILATION SYSTEMS

A protective ventilation system from Freshfilter consists of the filter system, an in-cab controller and optional an in-cab recirculation unit. The controller will automatically start up and immediately control the protective ventilation system in the most optimal settings. In case of possible danger, the controller will directly warn the operator optically and acoustically.

Freshfilter and dealers all over the world have qualified personnel to advice and optimally install a protective ventilation system.



◀ **We introduce Freshfilter in 1 minute with this video!**

Freshfilter specialists invest time in you, asking and answering questions, learning your business, understanding what harmful substances are present so a recommendation can be made. Providing the correct option guarantees a safe and healthy work environment for your team.

After selecting the most optimal system and filter combination, the system is installed on the machine. An installation is not limited to placing the system, but a correct sealing on a machine is of great importance. A cabin should be optimally sealed to create positive pressure and to minimize airflow. Low airflow benefits the lifetime of the protective ventilation system as well as the installed filters. In fact, dust will not be attracted into the system due to this low air velocity.



A protective ventilation system is connected to the original HVAC, if possible. This ensures that air is blown conditioned into the cabin, it also prevents annoying air flows in the cabin. To connect a system to the HVAC, custom stainless steel connection parts are commonly used.

## OPTIMAL PROTECTION WORLDWIDE

Freshfilter's experience with ISO regulations, international law, and regional legislation dramatically enhances efficiency with partners and dealers. By collaborating with local Freshfilter entities abroad we're able to quickly map out compliant products that deliver local solutions from local suppliers.

A standard Freshfilter installation meets the most stringent requirements available, so it can be deployed around the world. The installations also comply with the updated ISO 23875 for instance. Some standard features include:

- ✓ Overpressure in the cabin is above 100 Pa (standard 115 Pa) and below 300 Pa (with a flow between 40-120m<sup>3</sup>/h). But is also adjustable in the applicable standard of your country.
- ✓ Automatic control controller, incl. filter detection, current pressure display and alarm in case of possible danger.
- ✓ Expandable with sensors (such as HC, NH<sub>3</sub> and CO) with alarms for potential danger.
- ✓ Expandable with in-cab recirculation unit with HEPA 13 filtration level (EN1822).
- ✓ Filters supplied according to EN1822 (dust filters) and EN12931/EN14387 (carbon filters).



# ABOUT FRESHFILTER

## FROM PRODUCTION TO MAINTENANCE

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In 1991, Freshfilter was founded as a service company to service standard interior filters. Since 2004 Freshfilter started supplying its own complete product line protective ventilation systems. From then on, Freshfilter has grown into a leading party recognized worldwide for its high quality and innovative solutions.

## WITH GIRAF METAAL A FULL IN-HOUSE PRODUCTION

At Freshfilter, in-house manufacturing means; producing everything ourselves. Starting with engineering and design, making our product from raw materials in our own factory called Giraf Metaal. This means that every system as well as air connections and frames are own production. Freshfilter does not outsource this important step in the production process, this to ensure the high quality Freshfilter strives for. Units (with the exception of covers), frames and air connections are exclusively made of stainless steel, ensuring that a complete installation remains of high quality throughout the machine years.







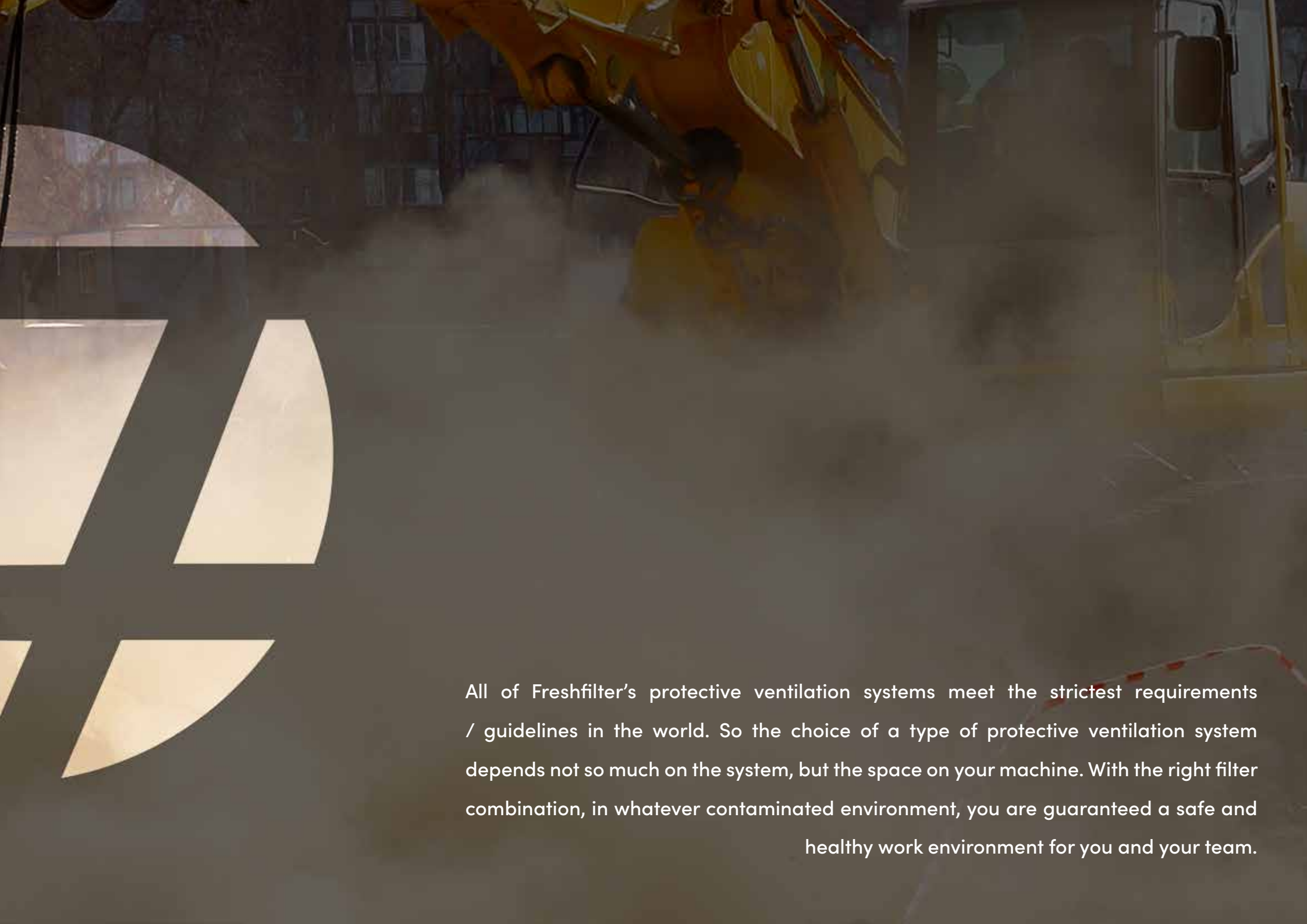
The installations of a protective ventilation system can often be provided on site (provided there is an adequate work space). On-site cabins are sealed as best as possible. The importance of a properly sealed booth is often underestimated; the better the sealing of the machine is, the better the system functions. This sometimes requires taking the cab off completely. After installation, the system will be tested for all functionalities. A certificate is issued afterwards and you are assured of clean air in your cab. This certificate is valid for one year after installation.

After installation of the protective ventilation system, it is important that the system is actually maintained properly. Placing and maintaining the filters is one of the most important activities to keep the system in top condition. In fact, filters can break over time, allowing contaminated air to still enter the cabin. Changing filters ensures that hazardous substances and vapors stay out of the cabin for the life of the machine. By including this in the maintenance program, the employer provides a safe workplace for employees.

# PROTECTIVE VENTILATION SYSTEMS

MEET FRESHFILTER'S F20, F33 AND F33R





All of Freshfilter's protective ventilation systems meet the strictest requirements / guidelines in the world. So the choice of a type of protective ventilation system depends not so much on the system, but the space on your machine. With the right filter combination, in whatever contaminated environment, you are guaranteed a safe and healthy work environment for you and your team.

# F20

## COMPACT SIZE, HIGH CAPACITY

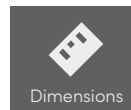
Despite its compact design (only a diameter of 350mm), the Freshfilter F20 is characterized by a high capacity. The standard version is ideally suited for the most heavy dust contamination. But the F20 also offers room for a 3.5 kg activated carbon filter so that also contaminations with (toxic) vapors are no problem. The F20 base, as well as the mounting parts, are made of stainless steel as standard. An F20 with accessories is therefore very durable and will perform for years, worry-free.

## SELF-CLEANING FUNCTION

The filters of the F20 have a significantly longer service life than traditional protective ventilation systems. This is because the ambient air is drawn in against gravity. Vibrations and movements of the machine allow coarse dust particles to escape from the filter. The round shape of the P1/P3 (H13) combination dust filter makes it impossible to misplace the filter. The radial fan ensures even 360° air distribution over the entire filter medium. This not only utilizes the entire filter surface, it will also make the system quieter.

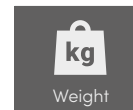






Dimensions

Ø 350mm  
height: 430mm



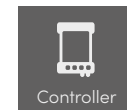
Weight

13 kg



Max. pressure

500 Pascal  
120m<sup>3</sup> p/h



Controller

F4000

## COMPACT

### AND FLEXIBLE IN USE

One of the most important feature of the F20 is its compact size. Machines are becoming more compact, which has the downside that a protective ventilation system is less easy to install. The F20 can be mounted on almost all machines without an expensive subframe. The air is brought into the cabin through an 80mm or 100mm hose, this creates a quieter and better airflow compared to smaller hoses.

It is important to use the right filter combination for each application. The F20 has a P3/HEPA13 filter level combined with a 3.5 kg activated carbon filter. The activated carbon filter consists of pallets of carbon, this is not an impregnated filter element.

# F33

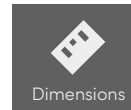
## UNIQUE DESIGN, HIGH EFFICIENCY

The Freshfilter F33 is the new high-end filter system for all types of machines. The unique design with all possible filter combinations makes the F33 the perfect system in any situation. All components as well as the mounting parts are made of stainless steel. An F33 with accessories is therefore very durable.

## DISTINCTIVE FROM THE REST

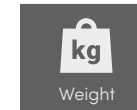
The F33 has a pre-filtration against gravity. This is because the air is drawn in through the underside of the P1 pre-filter. The major advantage is that coarse dust particles can escape from the F33 through vibration. This results in a significant increase in filter lifetime. After the pre-filter, the air is drawn through the lid into the second filter compartment. The air is then blown through the succeeding filters (P3 and optional activated carbon filter) instead of being sucked through. This unique feature creates an extremely low air velocity. In fact, air is evenly distributed over the entire filter surface before being pushed through the filter package.





Dimensions

900 \* 440 \* 295 mm



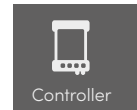
Weight

32 kg



Max. pressure

500 Pascal  
120m<sup>3</sup> p/h



Controller

F4000

## EFFECIENT IN MULTIPLE ASPECTS

The unique internal airflow of the F33 sets this protective ventilation system apart from the rest. The filtration level, despite the use of H13 filters, is at an H14 level. This means that the F33 does not filter the polluted air with 99.95% efficiency, but even with an efficiency of 99.995%.

Filters (600x336mm) can also be placed in an efficient way. The total filling height of the filter compartment is 150mm. However, any combination height of Freshfilter filters can be installed. In fact, filters are secured by the filter tensioners, in any desired combination. Filler frames or complete filter packages are a thing of the past with the F33.



# F33R

CLEAN DESIGN, LIMITED HEIGHT

The Freshfilter F33R is a protective ventilation system for trucks and roof mounts on (compact) excavators. The system is specially designed to minimize height. All components (besides the ABS lid) as well as mounting parts are made of stainless steel. An F33R with accessories is therefore very durable.

## DESIGNED FOR ROOF INSTALLATIONS

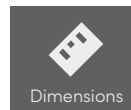


The UV-resistant ABS lid on the F33R can be easily opened thanks to the gas spring tilt system. When changing the filters, there is no need to disassemble the hood. This leaves the mechanic's hands free to safely change the filters on the roof of the vehicle/machine.

On trucks, the F33R is often installed with a brand-specific adapter in the roof hatch. On the inside, the roof hatch is neatly finished and the driver can direct the airflow through louvers. On compact machines, if possible, the system will be placed on existing mounting points to prevent leaks.

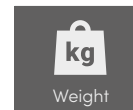






Dimensions

715 \* 665 \* 235 mm



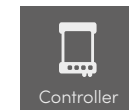
Weight

28 kg



Max. pressure

500 Pascal  
120m<sup>3</sup> p/h



Controller

F4000

## LIMITED HEIGHT

### HIGH FILTER CAPACITY

The F33R protective ventilation system accommodates dust filtration (P1 and P3) in combination with a 10 kg activated carbon filter. This makes the F33R extremely suitable for even the heaviest sanitation classes.

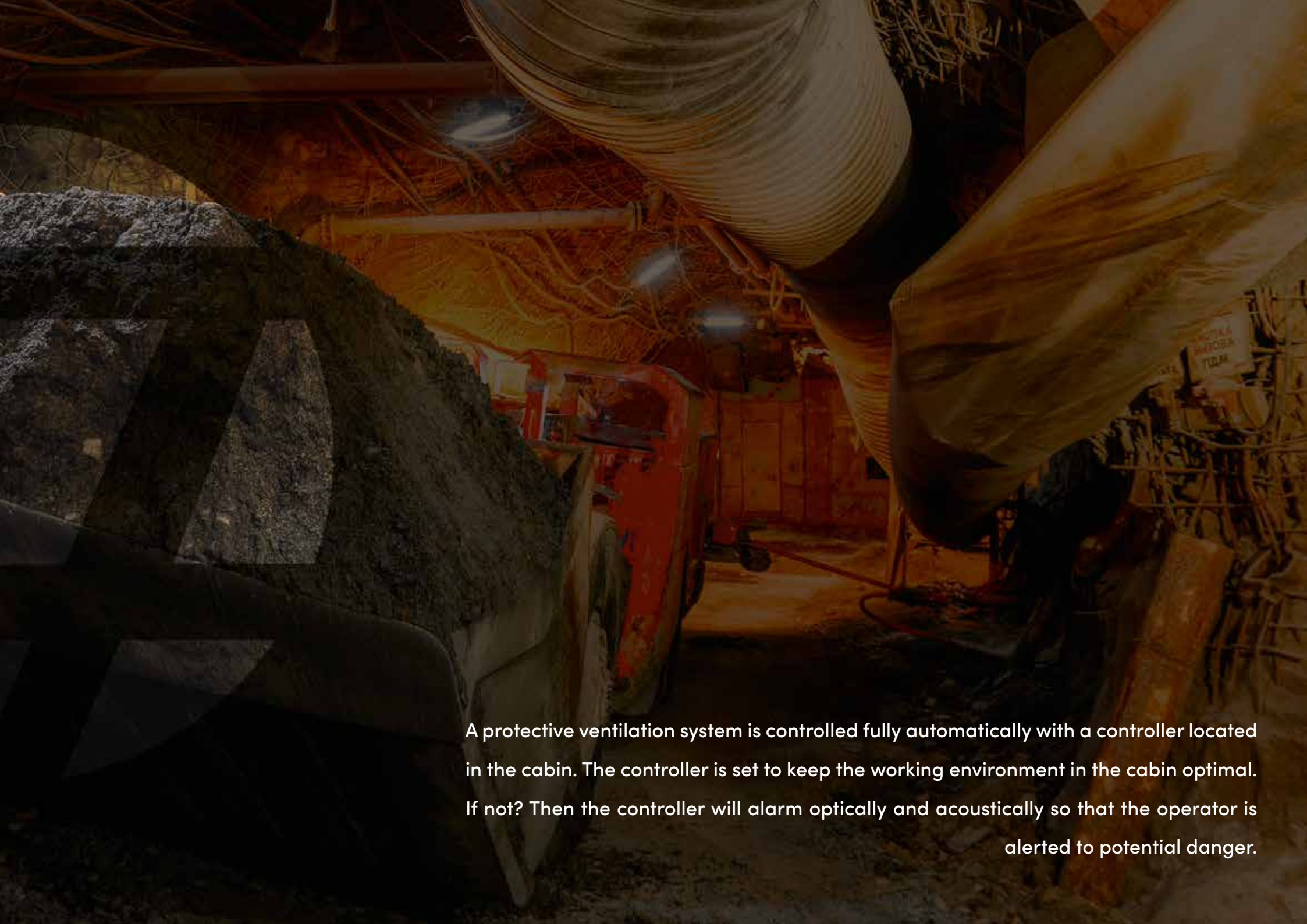
Filters (600x336mm) can also be placed in an efficient way. The total filling height of the filter compartment is 150mm. However, any combination height of Freshfilter filters can be installed. In fact, filters are secured by the filter tensioners, in any desired combination. Filler frames or complete filter packages are a thing of the past with the F33R.

# CONTROLLER

AUTOMATIC CONTROL BY THE F4000





The background image is a dark, industrial interior. On the left, there are large, dark, curved concrete structures. In the center, a red vehicle, possibly a forklift or a small truck, is visible. The ceiling is made of corrugated metal. The overall lighting is dim and yellowish, creating a gritty, industrial atmosphere.

A protective ventilation system is controlled fully automatically with a controller located in the cabin. The controller is set to keep the working environment in the cabin optimal. If not? Then the controller will alarm optically and acoustically so that the operator is alerted to potential danger.

# F4000

## MODERN, FULL-FEATURED CONTROLLER

This modern controller ensures the most optimal working environment in the cabin. The controller, which is located in the cabin, keeps the pressure in the cabin on automatic setting constant above 100 Pa. This ensures that polluted air does not enter the cabin even at wind force 7. The controller is designed so that the operator can read relevant information directly.

## COMPACT AND AN ALL-ROUNDER

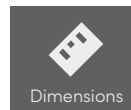


Measuring only 129 x 78 mm, the F4000 fits seamlessly into the interior of a machine or vehicle. The F4000 starts up in automatic mode and will immediately operate the protective ventilation system in the most optimal settings. In case of notifications, for example, the operator can easily operate the controller using the touch screen or the four colored buttons.

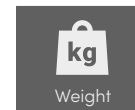
If the pressure in the cabin is not achieved, or is just too high, the operator is immediately alerted to potential danger. The F4000 gives an optical and acoustic alarm after which the alarm notification can be read directly from the screen.







129 \* 78 \* 36 mm



< 1 kg



RJ50



Multi language

## GAS SENSORS

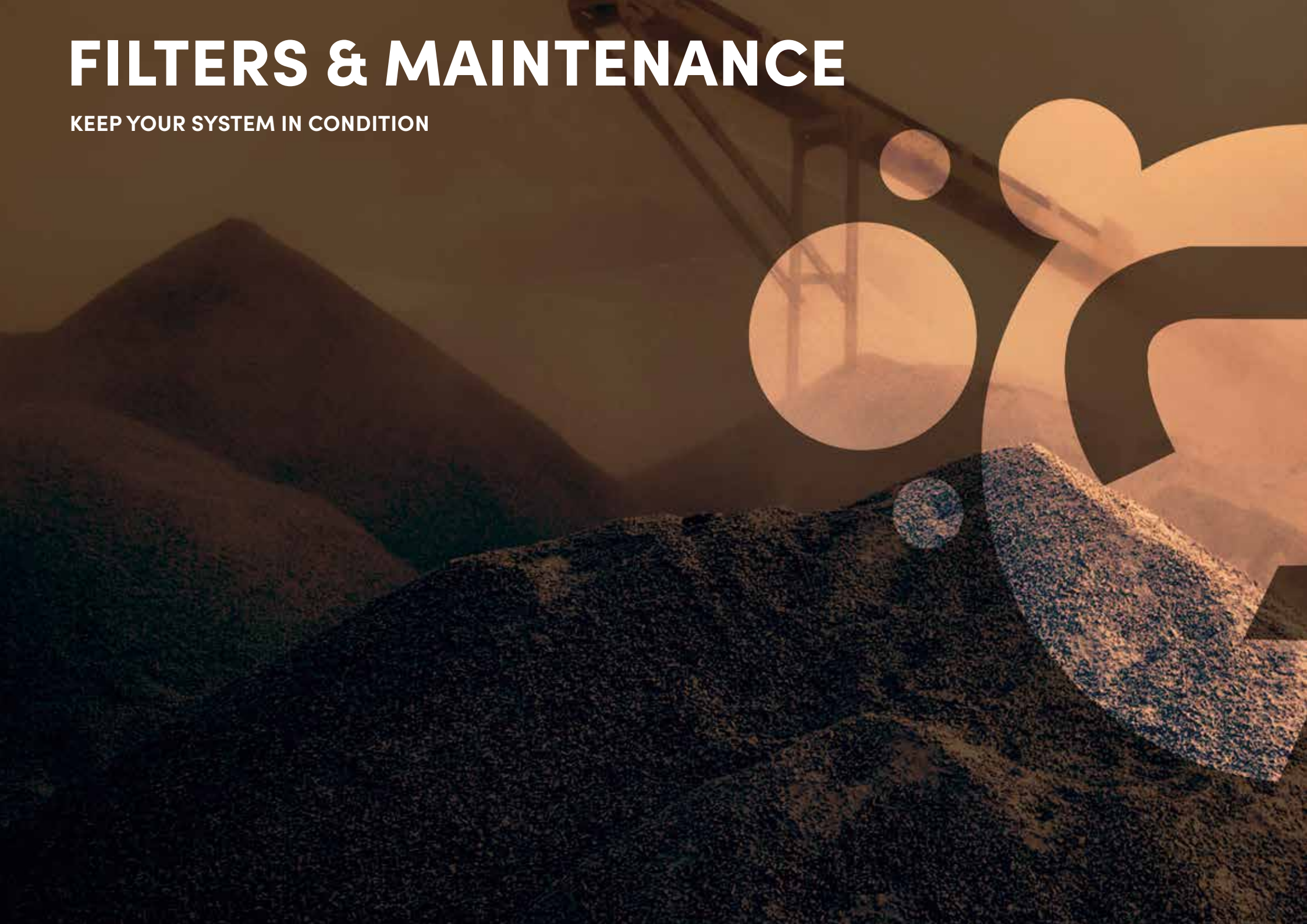
### AVAILABLE AS AN OPTION

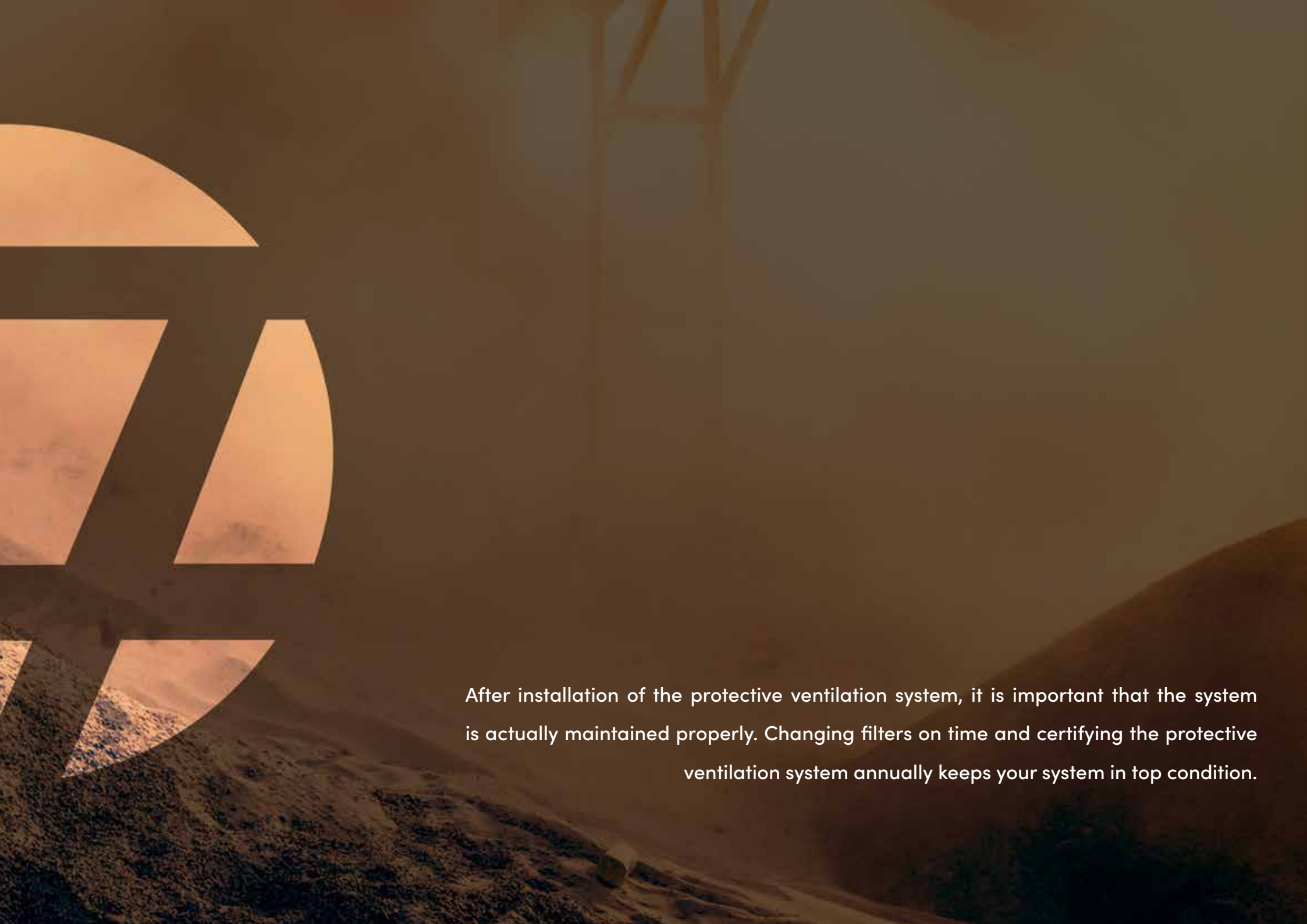
Optionally, the controller can be equipped with a sensor (for example, HC, NH<sub>3</sub>, H<sub>2</sub>S and CO<sub>2</sub>). When activated carbon filters are used, a sensor in the controller becomes mandatory in most cases. This sensor measures real-time air quality in the cabin, if the limit value is exceeded the controller will alarm. The blowout of an activated carbon filter can be detected much earlier than an operator can.

For the safety of the operator, it is important to keep the sensor working properly. Annual testing/calibration of the sensor is therefore a must. During an annual inspection of the protective ventilation system, Freshfilter can calibrate the sensor directly. This prevents Freshfilter from sending a machine into the work field temporarily without overpressure.

# **FILTERS & MAINTENANCE**

KEEP YOUR SYSTEM IN CONDITION





After installation of the protective ventilation system, it is important that the system is actually maintained properly. Changing filters on time and certifying the protective ventilation system annually keeps your system in top condition.



# FILTERS

## FOR THE RIGHT PROTECTION

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The protective ventilation system ensures that sufficient pressure is created in the cabin. However, the air drawn in must pass through a filter combination to actually keep contaminants out of the cabin. Installing the right filter combination and changing the filters in a timely manner is very important. Possible blowout of a filter would mean that an operator would still be at risk.

## P1 & P3 DUST FILTERS



A P1 dust filter is a pre-filter that can capture coarse dust particles to protect the following filters. A P1 filter can prevent the P3 dust filter from leaking or clogging the activated carbonfilter. So the filter has an important function in a complete filter package. This filter has an F5 class and is manufactured and supplied according to the ISO16890 standard.

A P3 filter, is an absolute filter that can capture harmful particulate matter such as asbestos or quats dust. This filter is tested for leak tightness and comes standard with an accompanying filter certificate. All P3 dust filters have an H13 class and are produced and supplied according to the EN1822 standard.







# ACTIVATED CARBON FILTERS

During soil remediation, for example, or at a recycling site, harmful gases/ fumes may be released. Activated carbon particles in an activated carbon filter exert an attraction to gaseous or liquid particles (molecules). A carbon filter is formulated for a specific type of contamination, EN12931 provides a clear classification for different chemical substances:

- A** Activated carbon for capture of aromatic hydrocarbons > 65 C
- AX** Activated carbon for capture of aromatic hydrocarbons < 65 C
- B** Impregnated carbon for capture of inorganic vapors
- E** Impregnated for capture of acids
- K** Impregnated for capture of ammonia compounds
- HG** Impregnated for capture of organic mercury compounds

A combination of the different types of coal is possible, depending on the nature of contamination.

# MAINTENANCE

## YOUR SYSTEM IN TOP CONDITION

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To keep your system in top condition, changing filters is hugely important. If filters blowout, contaminated air will enter the cabin. Dust filters (P1 and P3) should be changed every 6 months or in case of visibly heavy soiling. For activated carbon filters, this interval is 13 weeks or in case of a blow-through. This can be measured by a gas sensor in the F4000 controller.

## FRESHFILTER FILTER & MAINTENANCE SERVICE

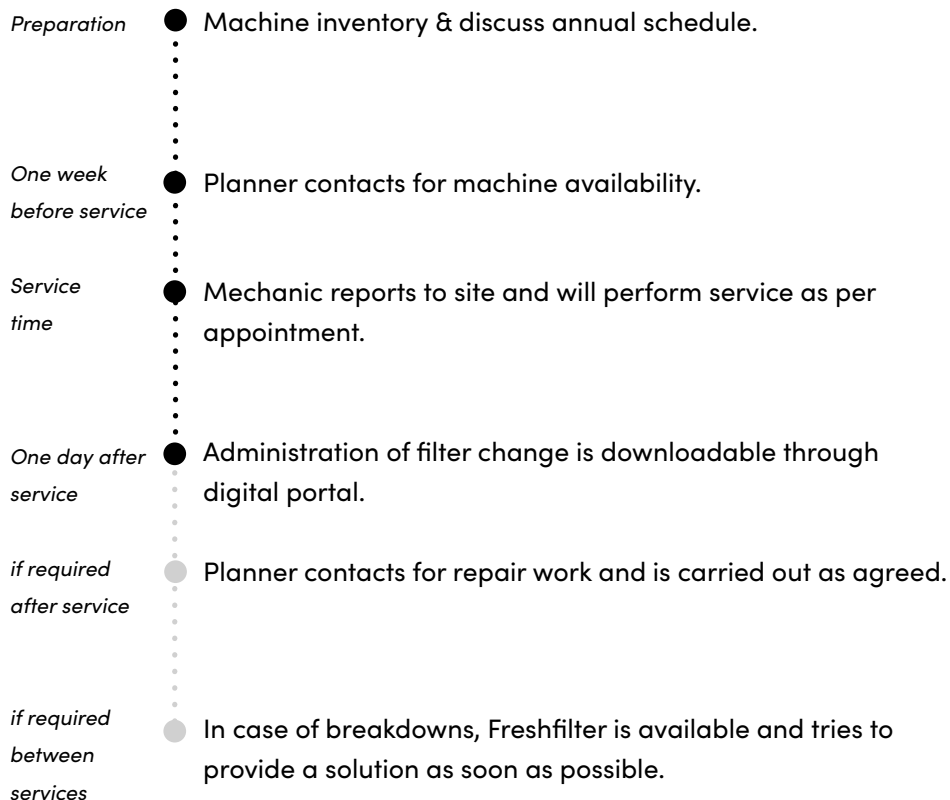
To ensure that filter installation is not in vain, the protective ventilation system should also be inspected annually for functionality. It is recommended, and often required, to have your system inspected. If necessary, a controller can be calibrated, or the sealing can be improved for the most optimal operation. After a successful inspection, an approved certificate is issued. This certificate is valid for one year after issuance.



Freshfilter can take the maintenance of all protective ventilation systems off your hands with its customized maintenance and/or filter service. As desired the system can be inspected annually or a complete maintenance plan can be composed. Unburdening is what Freshfilter does, you as a customer do not have to think about anything.

Upon purchase of a protective ventilation system or at a later time Freshfilter can take the maintenance out of your hands. A tailor-made maintenance plan is put together, in which the system is inspected at least once a year. This can be further expanded with filter service

scheduled periodically. Despite an annual schedule being made, you do not have to take any action yourself. Freshfilter's planner contacts you at least a week before the service. The Freshfilter maintenance & filter service is performed according to the schedule below:



## DOCUMENTATION

Every service is documented and can be downloaded 24/7 through its own online portal. Each machine has its own complete logbook with all filter changes and other service interventions. In case of a possible audit, the site has everything documented in one place.



## MAJOR REPAIRS

For a machine where major repairs are needed, the machine will need to be idle for an extended period of time. Freshfilter understands that this is not immediately possible; after all, downtime is never desirable. Nevertheless, to ensure that the breakdown is remedied as soon as possible, the planner will make a new appointment to repair the breakdown as soon as possible. Major maintenance is not included in the price, but is discussed with the location through an open calculation.



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