Freshfilter

Product brochure

For a healthy work climate

FFMULTIBOX

FFTUBE

FFBOX

FFM10

FFController
3000

FFController
5000

Freshfilter

Content

1. General information

Cab air quality systems

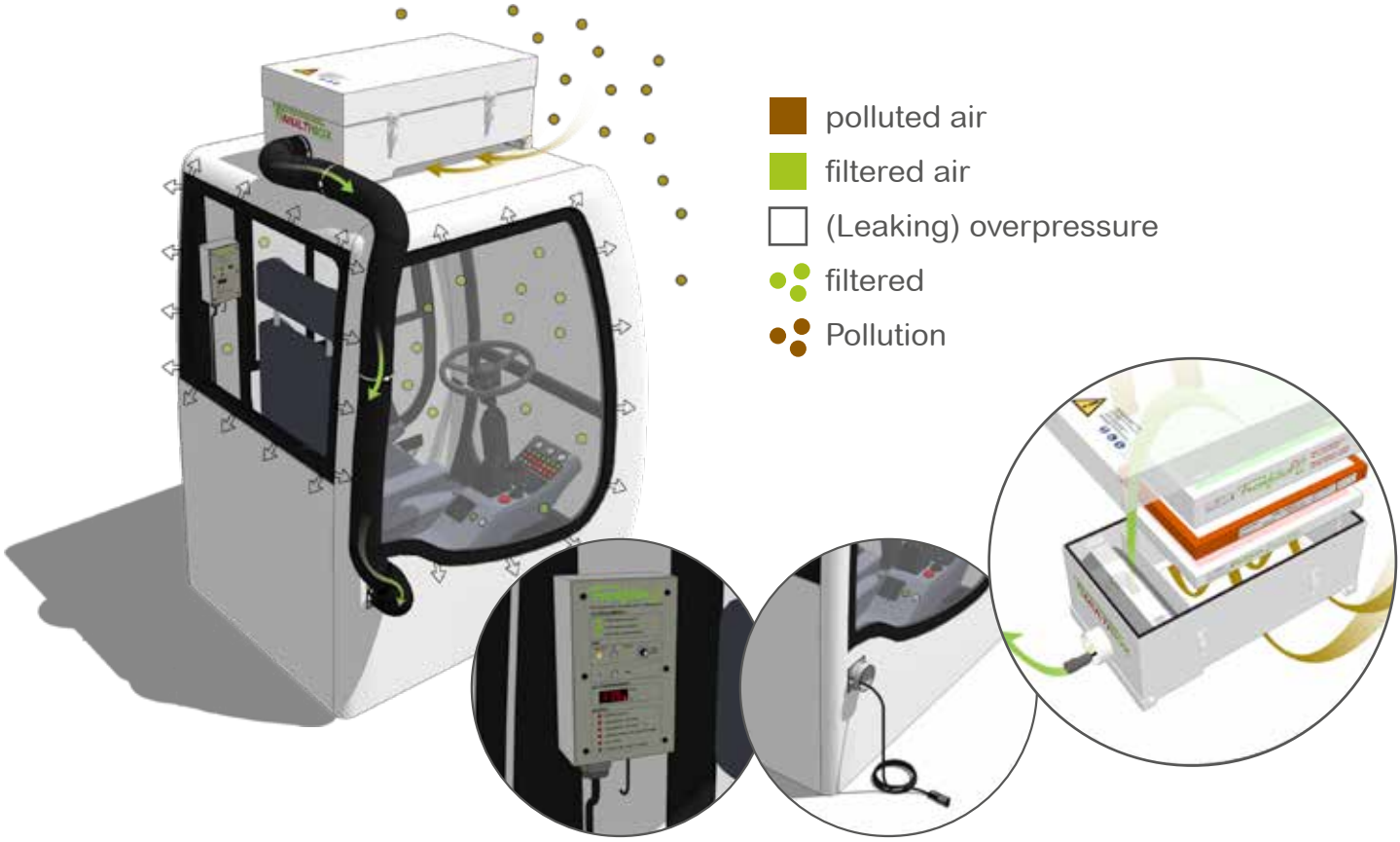
Cab air quality systems of Freshfilter are used on haul trucks and mobile machinery to protect the operator against polluted substances and gasses which are released with re-mediation, sorting halls or compost processing.

To prevent the outside air from entering the cabin, an artificial (but relatively small) pressure difference is created in the cabin so all air flows can go outside through the remaining gaps.

The required air for this pressure difference always goes through the filter system, so that it is untainted by polluted and harmful substances in order to protect the operator.

Freshfilter supplies in conformity with legal provisions that are included in the NEN4444, cab air quality systems and filters and the harmonised European standards EN779, EN1822 and EN12941.

Our innovative products that we exclusively produce and develop in-house, guarantee a high quality but particularly safe work climate for you and your personnel.
With our quick filter supply, patented systems and extensive dealer network Freshfilter is the best choice for all your cab air quality material.



Service from A to Z

Quick delivery
By using multiple carriers, we can always supply you quickly.

Sometimes, due to circumstances, it can occur that new filters are still required at the last moment. Then the 24 hours' deliveries or night deliveries will not reach you on time. We always have a driver on stand-by so the filters can still be on site the same days within a few hours.

Dealer sites through the whole of the Netherlands
With dealers in the whole of the Netherlands we can always support you with the greatest care and speed. Almost all our dealers have got the common filters in stock so they can support you with filter replacement or renewal.

Our dealers are informed accurately on the latest position of the technology so they can always provide you with the correct information. See our website for a dealer review.

Filter advice

It is often the task of the client to find out which filters should be placed. In many cases this causes confusion. We can give you a filter advice based on the present contamination. With over 500 types of toxic substances in our database we can perfectly inform you on the filter to be used. Of course we try to keep this as transparent as possible, you can request a free filter guide from us, containing the most common substances.

Installation support

We can also organise the installation of the cab air quality unit, including the sealing of the cabin. The benefit of a correct sealed cabin is often underestimated; with our own mechanics, servicevans but also with a network of (experienced) self-employed people we can take care of the complete process from delivery to installation and inspection.

Filter installation and disposal

Due to the various types of contaminations it is important that you know what you are doing when replacing the filters. Freshfilter can take care of the filter replacement for you, as well as the disposal of the used filters (chemical waste). With our automated system we can send you a free e-mail reminder for filter renewal each 3, 6 or 12 months.

Maintenance

Besides from installing replacement filters, we also have interesting rates for the total maintenance of the cab air quality units. Therefore, you will be always assured of a perfect operating system, including a valid inspection, digital accessible log book, correct filter disposal and installation service, exactly at the moments when required. We can also take over the total maintenance of other brands.

2. Requirement package NEN4444

Since 2010 the NEN4444 is applicable in the Netherlands, it concerns a guideline that is specifically aimed at the use of cab air quality systems in practice and has requirements on installation, signalling and filters.

Cab air quality systems

- The pressure difference in the cabin is more than 100 Pa. In case this is more than 300 Pa there must be the possibility to turn the fan down.
- To guarantee a contact time with the carbon filter, the total air return is between 40m3 and 120m3 per hour.
- The cab air quality installation is designed in such a way that the sucked air from the environment can only enter the work space through the filter package.
- The electrical installation of the cab air quality installation complies with the NEN-EN-IEC60204-1. CE marking (conform the machine guideline) is present on the unit and controller; not applicable on filters, these comply with harmonised standards.

Signalling

- A green indication is present so it can be seen from the work place if the cab air quality installation is in use and if the filters are installed.
- If hydrocarbon detection equipment is available (compulsory with the use of carbon filters) it will give an alarm signal above the 5PPM limit value.
- There is a provision available that shows the actual pressure difference and that will give an optical and acoustical signal if it exceeds the limit values.

Installation

- The position where the cab air quality installation is installed does not cause a hindrance for the normal work activities in the cabin.
- The inlet opening of the cab air quality installation is placed in such a way that suction of exhaust fumes is avoided.
- The outlet opening of the cab air quality installation in the cabin is placed in such a way that this does not provide an annoying air flow.
- The security equipment is installed in such a way that the values given by the equipment can be read on the work place.
- The climate control system can only suck air through the cab air quality unit. If installed with direct transit, the system is equipped with a recirculation position. Air conditioning is not applicable as long as the work temperature in the cabin remains under the applicable arbo standards.

Filters and use

- P1 and P2 dust filters conform EN779.
- P3 dust filters conform EN1822, individually tested on leakages.
- Carbon dust filters conform the test method EN12941 (classification ABEK), performance requirement applicable. In practice this always means at least 10 kg filters with the given air flow.
- A log book should be maintained with the operational hours of the filters and unit, filter maintenance, etc.

Labelling

- The cab air quality system has the W01 warning sign on the outside, as well as a visual warning for the use of the correct personal protection equipment.
- The installed filters have a label containing the filter type, filter class, manufacturer and the installation date.

3. Filters for any cab air quality system

Coarse dust filters

For the filtering of coarse dust particles Freshfilter supplies P1 and P2 filters. These filters ensure that 50% to 90% of the particles with a size of 4 microns are filtered out efficiently. These are classed as F5 to F9 conform EN779.

The coarse dust filters ensure that the P3 absolute filters do not get damaged and/or saturate too quickly. When only using carbon filters in the application it is advisable to place a P1 or P2 filter in front. This will avoid premature clogging of the carbon filter by dust particles.

Absolute filters

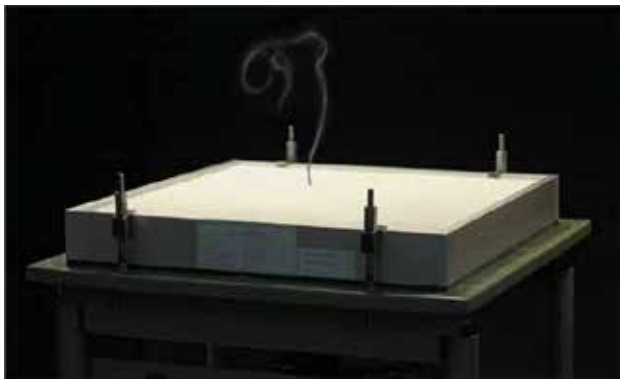
Conform EN1822 Freshfilter produces H13 absolute filters (also called P3). In contrast to the coarse dust filters these are individually tested for leakages and will be supplied with a test certificate. This will state how the filter was tested and under which circumstances.

Heavy metal and asbestos particles will be caught by a P3 filter and therefore this filter is often used for demolition projects.
As this filter is very sensitive to damages it is always recommended to apply a coarse dust filter (P1 or P2) in front of this filter. The coarser particles will be filtered out sufficiently and cannot rip through the P3 filter cloth.

Washable dust filters

On request we also produce special H10 filters for the FFMultibox series. The degree of this filter lies between P2 and P3 filters. This special filter has a washable media with Teflon coating for extreme dusty situations. The Teflon coating is also anti-static therefore even wet dust particles do not stick to the filter cloth. This combined with the self-cleaning features of the FFMultibox, it will ensure for an unprecedented long service life!

With the use of a paraffin test, EN1822 filters are individually inspected on a test bench for leakages.



Each small hole in either the adhesion of the filter or the filter cloth will leave a visible puff of smoke behind so the tester can see if the filter should be rejected (and destroyed).

Carbon filters

When cleaning up contaminated soils, toxic fumes are often released which can cause serious damage to the respiratory system in the long-term. For this application we supply carbon filters.

Active carbon dust (originating from peat, coal and coconut shall) has an enormous surface and can therefore absorb organic substances. Inorganic fumes are collected with special impregnated coals. To this activated coal a chemical substance is added, to collect these fumes by using chemisorption (instead of adsorption).

The EN12941 provides a clear classification of the various chemical substances and their adsorption and chemisorption requirement.

- A: Activated coal.
- B: Impregnated coal to collect inorganic fumes.
- E: Impregnated to collect acids
- K: Impregnated to collect ammonia compounds

Of course we can also supply carbon filters that contain several chemical substances, such as for example ABEK carbon dust filters.

Due to our many years of expertise in the field of carbon dust we can provide excellent advice on the carbon dust to be used; as each situation is different we have over 25 different types of (impregnated) coal, each with a specific application! Each type is in stock and can therefore be delivered quickly. Freshfilter is the only producer of cab air quality filters that fills the filter under high pressure, therefore these can absorb 10% more carbon dust compared to similar filters from other brands.

Quality assurance

Per serial number

With the use of our automated system we can always digitally request the correct batch number (coal) or item test (H13) based on the serial number on the filter. Therefore, the history of, for example, a carbon dust filter can be traced back to the coconut shell or the coal mine!

Werkszeugnis nach **EN 10204-2.2**
Relevé de contrôle selon **EN 10204-2.2**
Test report according to **EN 10204-2.2**

Schwebstofffilter / Filtre absolu / HEPA/ULPA filter

Artikelnummer Numéro d'article Article no.	Artikelbezeichnung Désignation d'article Type designation	Filterklasse (EN 1822) Classe de filtre (EN 1822) Filter class (EN 1822)
204306	**MF526362EU13**	**H13**
Seriennummer Numéro de production Production lot no.	Filternummer Numéro du filtre Filter no.	Prüfdatum Date du test Date of test
100017 47040-9	**2**	**23.06.2010**

The test certificate of the filter indicates the conditions under which the filter is tested and by whom.

4. Filters and order numbers

FFMultibox filters
595x395mm

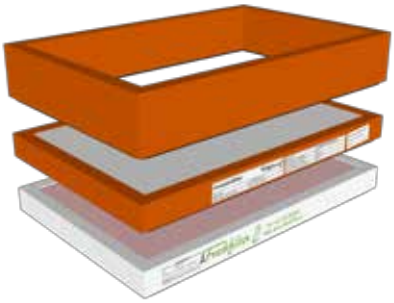
Stack system
The FFMultibox is a stack system with a filling height of 200mm. These 200mm should always be filled up, either with just filters or a combination of filters and fillers.

Reverse installation
As the unit is sucking the dust particles against the gravity, the filters should be installed in a different order! Coarse dust filters should be in the bottom of the unit, then the absolute filter and on top the possible carbon filters.

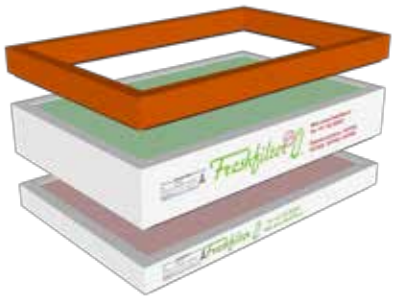
Extreme situations
In extreme situations one can select to place 17kg coal in the FFMultibox.
There will only be 50mm space left for the (combination) dust filter.

Common combinations
Below you will find a number of common combinations including the type numbers.

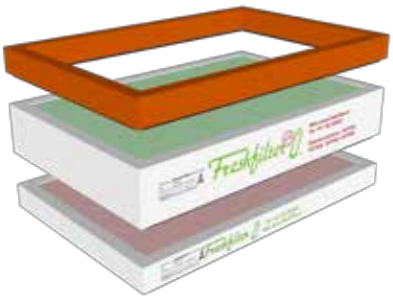
Order number	Application	Description	Size (mm)
VM604050EU5	FFMultibox	P1 Dust filter	595*395*50
VM593950EU513	FFMultibox	P1 / P3 Asbestos filter (combination filter)	595*395*50
VM593950EU7	FFMultibox	P2 Particulate Filter	595*395*50
VM593950EU13	FFMultibox	P3 Asbestos Filter	595*395*50
KM593910A	FFMultibox	11Kg. Carbon filter A	595*395*100
KM593910AB	FFMultibox	11Kg. Carbon filter AB	595*395*100
KM593910ABEK	FFMultibox	11Kg. Carbon filter ABEK	595*395*100
KM593910AK	FFMultibox	11Kg. Carbon filter AK	595*395*100
KM593910AX	FFMultibox	11Kg. Carbon filter AX	595*395*100
KM593915A	FFMultibox	11Kg. Carbon filter A	595*395*150
KM593915AB	FFMultibox	11Kg. Carbon filter AB	595*395*150
KM593915ABEK	FFMultibox	11Kg. Carbon filter ABEK	595*395*150
KM593915AK	FFMultibox	11Kg. Carbon filter AK	595*395*150
KM593915AX	FFMultibox	17Kg. Carbon filter AX	595*395*150
VR604050	FFMultibox	Empty filler height 50mm	595*395*50
VR604010	FFMultibox	Empty filler height 100mm	595*395*100



Particulate matter
- VR604010
- VM593950EU13
- VM604050EU5



Gases
- VR604050
- KM593910A
- VM604050EU5



Gases + Particulate matter
- KM593910A
- VM593950EU13
- VM604050EU5

FFM10/Brofil B10 filters
600x336mm

Stack system

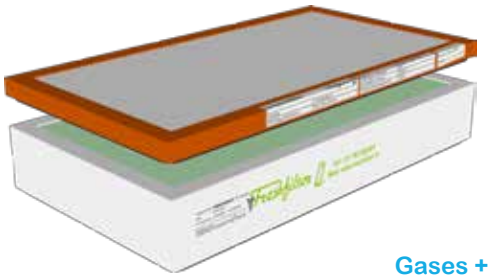
The M10/B10 is a stack system with a filling height of 120mm. These 120mm should always be filled up, either with just filters or a combination of filters and fillers. The B10 is a similar system but with a filling height of 222mm.

Thin P1 and P3

Due to the low filling capacity of the B10 unit, the P1 filter will be void with a coal/P3 combination. Place a front strip to protect the P3 filter. A P1 filter can be placed in front with the FFM10 (in the front slot).

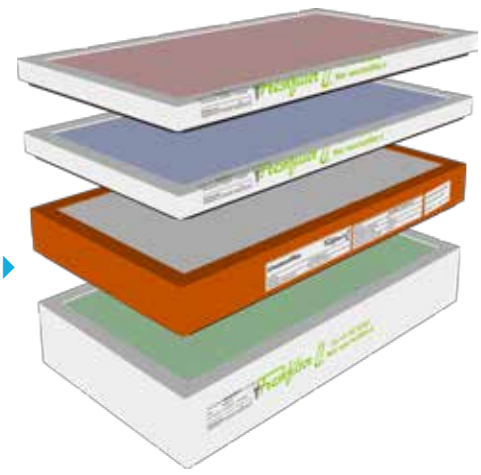
Common combinations

Below you will find a number of common combinations including the type numbers.



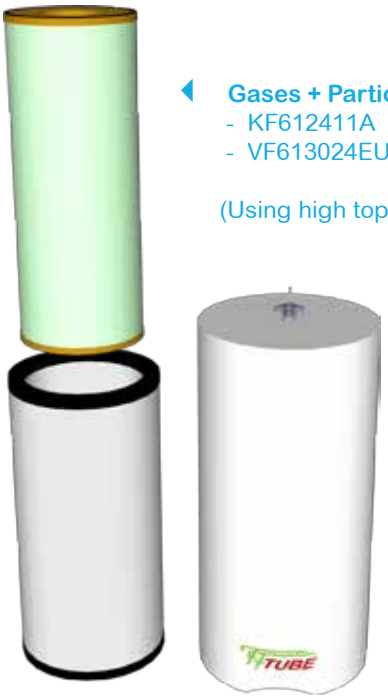
Gases + Particulate matter
- VF608720EU5
- VF603328EU13
- KF603392A
  (Freshfilter M10,
  Filling height 120mm)

Gases + Particulate matter
- VF603328EU5
- VF603328EU7
- VF603360EU13
- KF603392A
  (Brofil B10 compact,
  Vulhoogte 220mm)



Order number	Application	Description	Size (mm)
VFM606015EU3	Brofil B10	Pre-filter EU3	600*60*15
VF608720EU5	FFM10	P1 Dustfilter	600*87*20
VF603328EU5	FFM10/Brofil B10	P1 Dustfilter	600*336*28
VF603328EU7	FFM10/Brofil B10	P2 Particulate Filter	600*336*28
VF603360EU13	FFM10/Brofil B10	P3 Asbestos Filter 60 mm	600*336*60
VF603346EU13	FFM10/Brofil B10	P3 Asbestos Filter 46 mm	600*336*46
VF603328EU13	FFM10/Brofil B10	P3 Asbestos Filter 28 mm	600*336*28
KF603346A	FFM10/Brofil B10	5Kg. Carbon filter A	600*336*46
KF603346AB	FFM10/Brofil B10	5Kg. Carbon filter AB	600*336*46
KF603346ABEK	FFM10/Brofil B10	5Kg. Carbon filter ABEK	600*336*46
KF603346AK	FFM10/Brofil B10	5Kg. Carbon filter AK	600*336*46
KF603346AX	FFM10/Brofil B10	5Kg. Carbon filter AX	600*336*46
KF603392A	FFM10/Brofil B10	10Kg. Carbon filter A	600*336*92
KF603392AB	FFM10/Brofil B10	10Kg. Carbon filter AB	600*336*92
KF603392ABEK	FFM10/Brofil B10	10Kg. Carbon filter ABEK	600*336*92
KF603392AK	FFM10/Brofil B10	10Kg. Carbon filter AK	600*336*92
KF603392AX	FFM10/Brofil B10	10Kg. Carbon filter AX	600*336*92
VR603346	FFM10/Brofil B10	Empty filler height 46mm	600*336*46
VR603360	FFM10/Brofil B10	Empty filler height 60mm	600*336*60
VR603392	FFM10/Brofil B10	Empty filler height 92mm	600*336*92

FFTube filters
Ø300x200/610mm



Gases + Particulate matter
- KF612411A
- VF613024EU513

(Using high top)

High and low hood
The FFTube is exceptional regarding filters; 2 configurations are possible. With the high hood a 10kg carbon dust filter can be installed in inner circle of the FFTube, with a high P1/P3 combination filter in the outer ring. When the low hood is used, a (low) P1/P3 combination filter can be installed.

P1 filter
When the carbon filter is installed and there is no fine dust present, a P1 filter cloth can be slid over the carbon filter like some sort of sock in order to expand the life span of the carbon filter. This P1 filter cannot be used without carbon dust filter.

Common combinations
Below you will find a number of common combinations including the type numbers.

Particulate matter
- VF203011EU513

(Using low top)

Order number	Application	Description	(dia*h)
VF203011EU513	FFTube	P1 / P3 Asbestos filter (combination filter low)	300*110*200
VF618415EU5	FFTube	P1 Coarse dust filter (with carbon filter)	255*240*610
VF613024EU513	FFTube	P1 / P3 Asbestos filter (combination filter high)	300*240*610
KF612411A	FFTube	10Kg. Carbon filter A	240*110*610
KF612411AB	FFTube	10Kg. Carbon filter AB	240*110*610
KF612411ABEK	FFTube	10Kg. Carbon filter ABEK	240*110*610
KF612411AK	FFTube	10Kg. Carbon filter AK	240*110*610
KF612411AX	FFTube	10Kg. Carbon filter AX	240*110*610

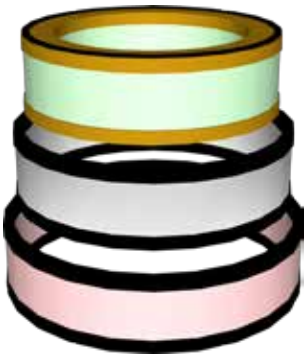
FFBox filters
180mm high, round

"Slot system"
The FFBox is characterised by the round filters. It is impossible to install these incorrectly and no fillers are required. In that respect the FFBox can be compared with a slot system.

Common combinations
Below you will find a number of common combinations including the type numbers.

Particulate matter
- VF756918EU5
- VF676218EU13

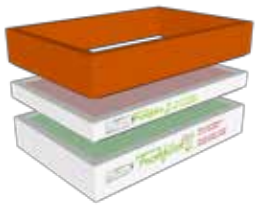
Gases
- VF756918EU5
- KF604518A



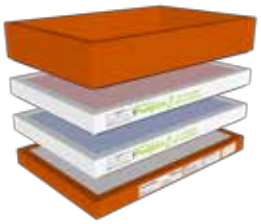
Gases + Particulate matter
- VF756918EU5
- VF676218EU13
- KF604518A

Type number	Application	Description	(dia*h)
VF756918EU5	FFBox	P1 Coarse dust filter	750*690*180
VF676218EU13	FFBox	P3 Asbestos filter	670*620*180
KF604518A	FFBox	10Kg. Carbon filter A	600*450*180
KF604518AB	FFBox	10Kg. Carbon filter AB	600*450*180
KF604518ABEK	FFBox	10Kg. Carbon filter ABEK	600*450*180
KF604518AK	FFBox	10Kg. Carbon filter AK	600*450*180
KF604518AX	FFBox	10Kg. Carbon filter AX	600*450*180

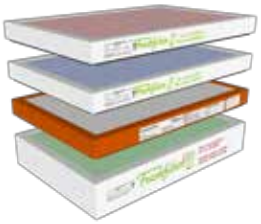

Freshfilter



Gases
- VR604010
- VF593950EU5
- KF593910A



Particulate matter
- VR604010
- VF604050EU5
- VF593950EU7
- VF593950EU13



Gases + Particulate matter
- VF604050EU5
- VF593950EU7
- VF593950EU13
- KF593910A

Applicable in the systems of BMAir MAO3/8/10/12 filters *595x395mm*

Stack system

The MAO10 is a stack system with a filling height of 250mm. These 250mm should always be filled up, either with just filters or a combination of filters and fillers. The MAO3 and 8 have a filling height of respectively 100 and 200mm, whereby the MAO3 is actually only suitable for dust cleaning.

On request a 200mm high carbon filter (22kg) is also available for the MAO10.

Common combinations

Below you will find a number of common combinations including the type numbers.

Order number	Application	Description	Size (mm)
VF604050EU5	MAO 3/8/10	P1 Coarse dust filter	595*395*50
VF604030EU5	MAO 12	P1 Coarse dust filter (thin)	595*395*30
VF593950EU7	MAO 3/8/10	P2 Particulate Filter	595*395*50
VF593950EU13	MAO 3/8/10	P3 Asbestos filter	595*395*50
VF593930EU13	MAO 12	P3 Asbestos filter (thin)	595*395*30
KF593910A	MAO 3/8/10	11Kg. Carbon filter A	595*395*100
KF593910AB	MAO 3/8/10	11Kg. Carbon filter AB	595*395*100
KF593910ABEK	MAO 3/8/10	11Kg. Carbon filter ABEK	595*395*100
KF593910AK	MAO 3/8/10	11Kg. Carbon filter AK	595*395*100
KF593910AX	MAO 3/8/10	11Kg. Carbon filter AX	595*395*100
KF593915A	MAO 8/10	17Kg. Carbon filter A	595*395*150
KF593915AB	MAO 8/10	17Kg. Carbon filter AB	595*395*150
KF593915ABEK	MAO 8/10	17Kg. Carbon filter ABEK	595*395*150
KF593915AK	MAO 8/10	17Kg. Carbon filter AK filter	595*395*150
KF593915AX	MAO 8/10	17Kg. Carbon filter AX filter	595*395*150
VR604050	MAO3/8/10	Empty filler height 50mm	595*395*50
VR604010	MAO8/10	Empty filler height 100mm	595*395*100

Applicable in the systems of BMAir MAO4/5/6/7 *595x595mm*

Stack system

The MAO5 is a stack system with a filling height of 250mm. These 250mm should always be filled up, either with just filters or a combination of filters and fillers. The MAO4 and MAO6/7 are similar systems but with a filling height of respectively 100 mm and 130mm (HC version).

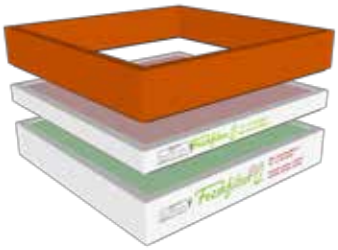
Thin P1 and P3

Due to the low filling capacity of the MAO4 unit, the P1 filter will be void with a coal/P3 combination. Place a front strip to protect the P3 filter.

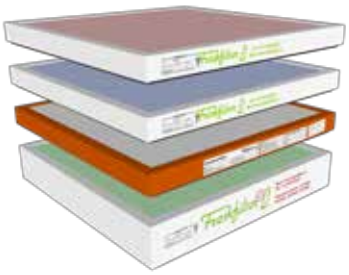
Common combinations

Below you will find a number of common combinations including the type numbers.

Order number	Application	Description	Size (mm)
VFM579015EU3	MAO 4/5	Pre-filter EU3	570*90*15
VF606050EU5	MAO 4/5	P1 Coarse dust filter	595*595*50
VF606030EU5	MAO 4/5	P1 Coarse dust filter (thin)	595*595*50
VF595950EU7	MAO 4/5	P2 Particulate Filter	595*595*50
VF595930EU7	MAO 4/5	P2 Particulate Filter (thin)	595*595*30
VF595950EU13	MAO 4/5	P3 Asbestos filter	595*595*50
VF595930EU13	MAO 4/5	P3 Asbestos filter (thin)	595*595*30
KF595970A	MAO 4/5	10Kg. Carbon filter A	595*595*70
KF595970AB	MAO 4/5	10Kg. Carbon filter AB	595*595*70
KF595970ABEK	MAO 4/5	10Kg. Carbon filter ABEK	595*595*70
KF595970AK	MAO 4/5	10Kg. Carbon filter AK	595*595*70
KF595970AX	MAO 4/5	10Kg. Carbon filter AX	595*595*70
KF595910A	MAO 5	16Kg. Carbon filter A	595*595*100
KF595910AB	MAO 5	16Kg. Carbon filter AB	595*595*100
KF595910ABEK	MAO 5	16Kg. Carbon filter ABEK	595*595*100
KF595910AK	MAO 5	16Kg. Carbon filter AK	595*595*100
KF595910AX	MAO 5	16Kg. Carbon filter AX	595*595*100
VR606010	MAO 5	Empty filler height 100mm	595*595*100
VR606030	MAO 4/5	Empty filler height 30mm	595*595*30
VR606050	MAO 4/5	Empty filler height 50mm	595*595*50
VR606070	MAO 4/5	Empty filler height 70mm	595*595*70



Particulate matter
- VR606010
- VF606050EU5
- KF595910A



Gases + Particulate matter
- VF606050EU5
- VF595950EU7
- VF595950EU13
- KF595910A

Applicable in the systems of BroAir 2002HD
565x165mm

Slot system

The 2002HD is a slot system with 3 slots. The first slot is 80mm wide and the last 2 are 100mm wide. No fillers are required.

Combi P1/P3

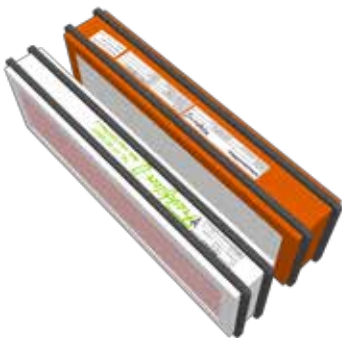
With installation of 2x 5.5kg coal only the slot with a width of 80mm remains.
Therefore, a combination filter should be used when there is fine dust present.

Common problems

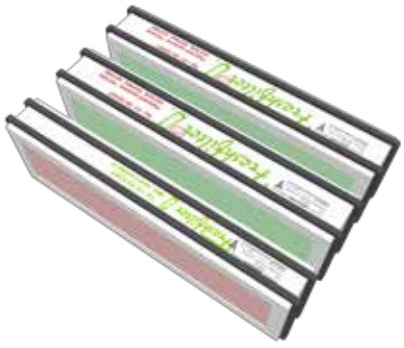
As the carbon layer with the 2002HD is 2x10cm thick with the cleaning-up of gasses, this combination gives more problems than other systems. The thick carbon layer normally ensures for more counter-pressure than other systems and it more difficult to reach the right pressure in the cabin. See also the dust test at the back of this brochure.
Ensure that the cabin is regularly inspected on tightness if the carbon filters are not used for long periods of time.

Common combinations

Below you will find a number of common combinations including the type numbers.



Particulate matter
- VF571780EU5
- VF571710EU13
(opt. P2 filter)



Gases
- VF571780EU5
- 2x KF571710A

Gases + Particulate matter
- VF571780EU5713
- 2x KF571710A

Order number	Application	Description	Size (mm)
VF571780EU5	Broair 2001/2002HD	P1 Coarse dust filter	570*165*80
VF571780EU5713	Broair 2001/2002HD	P1,2,3 Asbestos filter(combination filter)	570*165*80
VF571710EU7	Broair 2001/2002HD	P2 Particulate Filter	570*165*100
VF571780EU57	Broair 2001/2002HD	P2 Particulate Filter (combination filter)	570*165*80
VF571710EU13	Broair 2001/2002HD	P3 Asbestos filter	570*165*100
KF571710A	Broair 2001/2002HD	5Kg. Carbon filter A	570*165*100
KF571710AB	Broair 2001/2002HD	5Kg. Carbon filter B	570*165*100
KF571710ABEK	Broair 2001/2002HD	5Kg. Carbon filter ABEK	570*165*100
KF571710AK	Broair 2001/2002HD	5Kg. Carbon filter K	570*165*100
KF571710AX	Broair 2001/2002HD	5Kg. Carbon filter AX	570*165*100

Applicable in the systems of BroAir 2004 filters
600x138-155, 595x400

Slot system

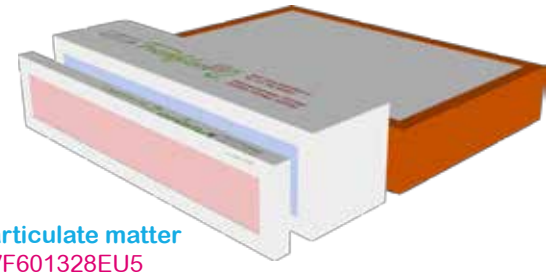
The 2004 is a slot system with 3 slots that uses different types of filter sizes. The first slot has a size of 600x138, the second of 600x150 and the last one of 595x400. No fillers are required. The air flow in the unit changes from horizontal (P1 and P3 filter) to vertical (carbon dust filter).

First slot

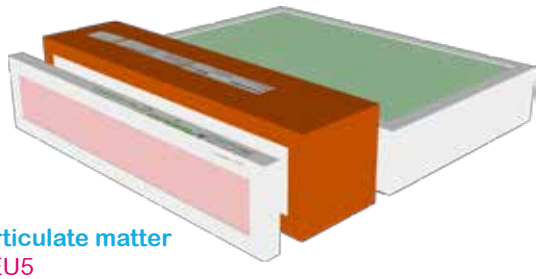
In the first slot only a P1 filter can be placed. There are other filters in a similar size but in practice it has showed that these have not enough capacity. The filter is clamped by a steel construction.

Second and third slot

When no carbon filter is used, in the third slot (this normally contains the carbon dust filter) a P3 filter can be installed. This P3 filter provides a significant increase in capacity. Therefore, a P2 filter can be installed in the second slot. Below you will find a number of common combinations including the type numbers.



Particulate matter
- VF601328EU5
- VF601515EU7
- VF594010EU13
  (hoge capaciteit)



Gases + Particulate matter
- VF601328EU5
- VF601515EU13
- KF594010A

Order number	Application	Description	Size (mm)
VF601328EU5	Broair 2004	P1 Coarse dust filter	600*138*28
VF594010EU5	Broair 2004/2007	P1 Coarse dust filter	595*400*100
VF601515EU7	Broair 2004	P2 Particulate Filter	600*155*155
VF601515EU13	Broair 2004	P3 Asbestos filter	600*155*155
VF594010EU13	Broair 2004/2007	P3 Asbestos filter (high capacity)	595*400*100
KF594010A	Broair 2004/2007	11Kg. Carbon filter A	595*400*100
KF594010AB	Broair 2004/2007	11Kg. Carbon filter AB	595*400*100
KF594010ABEK	Broair 2004/2007	11Kg. Carbon filter ABEK	595*400*100
KF594010AK	Broair 2004/2007	11Kg. Carbon filter AK	595*400*100
KF594010AX	Broair 2004/2007	11Kg. Carbon filterAX	595*400*100

5. Freshfilter control systems

FFController 3000

PLC Control on cabin pressure
When the controller is in automatic mode it will ensure that the overpressure in the cabin remains at least at 100Pa. This ensures for a flow rate as low as possible so the contact time with carbon dust will always stay correctly. This control is fully continuously and digital (PWM).

Filter detection
Up to three different filter types can be detected can showed on the control panel. When a filter is removed or installed incorrectly this will be displayed immediately.

Alarm signalling conform NEN4444
When there is too much or too little pressure in the cabin both an optical as an acoustic alarm signal will be noticeable so the machinist is immediately made aware of potential danger. 115 Pascal).

Hour meter
The FFController 3000 is equipped with an hour meter to record the lifespan of the installed filters. When installing new filters this meter can be put back to zero so you will always know exactly how long the current filters are in use.

Integrated HC measure
The panel can optionally be expanded with a hydrocarbon meter. The HC value can be displayed with a button on the LED screen. Plus, the controller warns (also if the HC value is not displayed on the screen) when there is an exceedance of 5 PPM. This HC module can also be integrated at a later stage in the FFController 3000.

Cabin leakage alarm
The advanced FFController 3000 series will warn you on time! The automatic regulation of the control panel drives the engine to 0-80% of its capacity. When over the years the cabin has started to leak to such an extend (by dehydration of rubber seals) that with 80% capacity the 100 Pascal pressure can no longer be achieved, it will give a pre-warning.

Subsequently you can plan an inspection appointment and no ad-hoc repairs will be necessary on site. These are direct savings on your maintenance costs of the machine!

EMC/CE-test

The FFController is tested conform the guidelines: EMC, R&TTE and electronical safety.
So you can be sure that all noticeable problems are fully excluded!

Always the correct cables

With the FFCVSK2 cable tree you have the ultimate preparation; with the connections supplied by us you can connect each unit plug & play. Also those of another make!

The used Deutsch connectors ensure for a high quality connection.
Also in future the Freshfilter units will be equipped with these durable connectors, so you will always be correctly prepared.


LIEBHER

FFController 5000

All functions in one device
The new FFController 5000 series belongs to the latest generation of cabin security. All functions of the first generation controller can be found back in this all-rounder.

Everything the same, but only more
The new FFController 5000 series has an equal form factor as the 3000 series. Plus, the same cables are use so you can upgrade to this latest model without adjustments to the machine.

Clear, intuitive control
The clear display provides all the require information to maintain a safe work climate in the cabin and warns on time in case of danger. With the intuitive control you can enter, edit or request filter details, without having to read 4 manuals first.

External AUX connection
With the 12-pin external connection you can add or remove functions in module form. For example, external smell sensors, data logger (see below), green light or a 1/0 output depending on a sensor.

4 smell sensors (optional)
Up to four different smell sensors can be connected to the system so you can install specific sensors if you work in a heavily polluted environment. Plus, it is possible to install the sensors on the head of the jib.

Filter registration
The control system is standard equipped with a filter registration. Here the serial number, filter type, operating hours and installation date are stored. With the optional module GPRS you can download these details automatically from your computer.

EMC/CE-test
The FFController 5000 is tested conform the guidelines: EMC, R&TTE and electronical safety. So you can be sure that all noticeable problems are fully excluded!

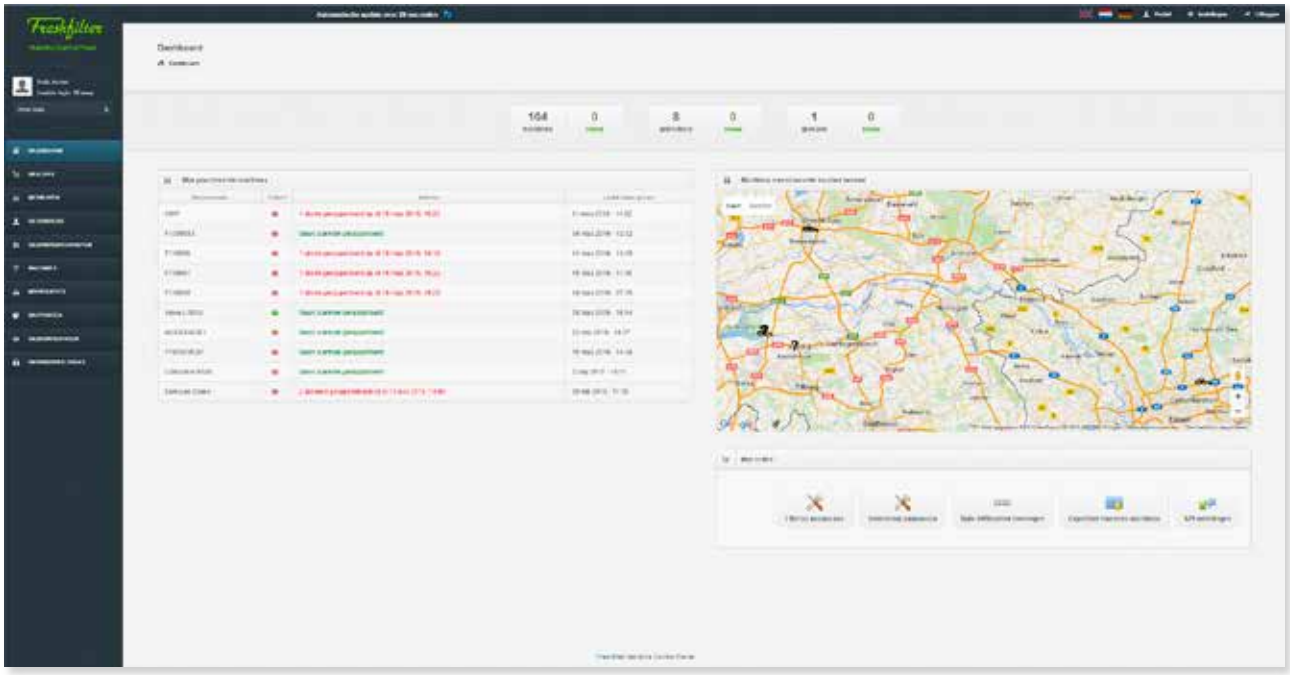
Remote monitoring

With the in-built 2G/3G data modem the status of the cab air quality controller is constantly synchronised with the online Machine Control Panel (MCP). With this you can remotely monitor and configure the work climate of your personnel. The controller is also equipped with GPS, so you can not only see the overpressure, warnings and configuration online but also the location of your machines!
With a data subscription of just a few euros per month you can simply control and manage your fleet from your internet browser anywhere in the world.

In the online MCP you can see a single review of which machined are turned on, if there currently is a warning, which warnings are currently taking place and what the location is of all your machines. Plus, you can zoom in on a machine to determine when the machine was operational and which warnings have taken place at which moment in time. You will see the extensive configuration of the Freshfilter cab air quality controller and you can immediately adjust this remotely.

Graphs and reports show the saturation level of the filters and provide an estimation when the filters should be replaced. This will make to work safer for your employees and it gives you the opportunity to take necessary measures based on actual information.

For more information, please check on **www.freshfilter-mcp.com** and apply for a demo account!



6. Freshfilter cab air quality filter systems

FFBox
Extreme filter surface

Round filters
The FFBox is a universal filter unit, for both lorries as digging machines.
For lorries the system will be equipped with a skylight adaptor when installing on the roof.
Various installation sets are available per make of vehicle. The control system is installed in the inner panel so it can be read and operated easily.

For installation on off-road machinery the FFBox is equipped with a hose connection. A big advantage of the FFBox is the application of round filers; the end user can therefore do nothing wrong in relation to the installation of the filters, the round filter elements will match each other perfectly and therefore no fillers or filter order etc. are/is to be considered.

Due to the large round filter the FFBox system also acquires a 100% equal air suction, what results in an optimum dirt collection of the filters; preferential air flows are not present.
The FFBox filter surface is more than double compared with conventional filter systems.

FFM10

Filter detection

The Freshfilter FFBox has three filter detection sensors. The P1, P3 and carbon filter are checked for presence if the system is combined with a control unit from the 2000/3000 or 5000 series. With the latter the system can also be equipped with an hour meter, serial number registration and remote reading.

Durable

As all Freshfilter cab air quality systems the FFBox is made from RVS304 plate material. The hood is from power coated aluminium. The applicable materials are only from the highest quality. Semi-finished products are used conform the industry standard (water tight and vibration proof) and only certified raw materials. The own production of the base material ensures for continuous quality assurance.

Technical specifications FFBox	
Size	850 x 850 x 215mm
Weight empty	32Kg. excl. filters
Casing	SS304 bottom tray and short hood, long hood: Aluminium
Voltage	12 or 24V, 240Watt (max)
Controlling	FFController or manual
Max. overpressure	440 Pascal, 120m3/h
Standardization	NEN4444 or CROW132
Dust filtration	P1/P2 and P3 filter
Carbon filtration	Up to 10Kg Carbon
Montage	In hatch or four-point mounting
Connection	Deutsch 6-pin DT serie male
Filter detection	3x SS n open circuit

Ultimate roof unit

Installation on all your machinery

The Freshfilter M10 system is a universal system for all types of on and off road machines. The limited height of the system makes it ideal for installation on the roof on both digging machines as lorries.

For lorries the system will be equipped with a skylight adaptor when installing on the roof. Various installation sets are available per make of vehicle. The control system is installed in the inner panel so it can be read and operated easily. With digging machines in the mini segment, this unit is often installed on the roof or against the back window screen an equipped with a quick exchange frame so the unit can be easily removed from the machine.

Filters and application

The Freshfilter M10 uses filters in the size 600x366 and has a filling height of 120mm and a separate slot for the P1 dust filter. In the filter box a (ABEK) carbon filter of 10 kg can be placed in combination with a P3 filter. With this the unit is suitable for the heaviest clean-up classification. The UV resistant ABS hood on the unit can be easily tilted forward with the tilting system, so it will not have to be completed disassembled in case of a filter exchange. So you do not have to rest heavy lids or clumsy hoods on the machine and you will have your hands free to install the filters.

Optical filter detection

The Freshfilter M10 has two filter detection sensors. The P3 and carbon filter are checked for presence if the system is combined with a control unit from the 2000/3000 or 5000 series. With the latter the system can also be equipped with an hour meter, serial number registration and remote reading.

Durable

As all Freshfilter cab air quality systems theM10 is made from RVS304 plate material. The applicable materials are only from the highest quality. Semi-finished products are used conform the industry standard (water tight and vibration proof) and only certified raw materials. The own production of the base material ensures for continuous quality assurance.

Technical specifications FFM10	
Size	735 x 645 x 205mm
Weight empty	21Kg. excl. filters
Casing	SS304 unit ABS with UV resistant cap
Voltage	12 or 24V, 240Watt (max)
Controlling	FFControlle or manual
Max. overpressure	440 Pascal, 120m3/h
Standardization	NEN4444 or CROW132
Dust filtration	P1/P2/P3
Carbon filtration	Up to 10Kg Carbon
Montage	Brackets or quick release frame (opt.)
Connection	Deutsch 6-pin DT serie male
Filter detection	2x IP67 proximity sensor

FFMultibox
Patented technology

Air flow: patented design

The FFMultibox has the largest filter capacity due to a patented air suction. The filter system is designed that the sucked outside air – in contract to conventional systems – flows into the unit against gravity.

The sucked air therefore also has an extreme low air speed as the complete filter surface (more than 2000 square metres) is direct approachable. In contrast to the conventional unit that normally operates with a suction nozzle with a surface of 200 square metres at the most.

This two features ensure for an unprecedented lifespan of the filter package. Dust particles are sucked up with a low air speed, against gravity. Therefore, the larger dust particles that cause blockages do not even reach the installed filter. An additional advantage is that when the particles are stopped by the filter cloth, these will fall from and out of the filter unit due to the vibration of the machine.
With a conventional unit, where in a similar situation the dust remains on the filter, the dust can only leave the unit by replacing the filter. The construction of the unit has proven in practice that a dust filter lasts four times longer under similar circumstances than in a conventional system!

Multi size

The Freshfilter Multibox is standard supplied for the applications of filters with size 595x395mm, with a filling height of 200mm. In the standard configuration a P1, P3 and 11kg carbon filter can be installed.

The FFMultibox is also available in XS and XL size. These different sizes are related to the filter size that is installed; the XS uses filters with a size 600x336mm (same as FFM10), with a filling height of 150mm. The FFMultibox XL uses filters with a size 595x595mm, with a filling height of 200mm. The 2 different sizes are all suitable for the heaviest clean-up classification.

Replace carbon filter

Due to the patented design the installed filters should be stacked in reverse compared to a conventional system. This has the advantage that the carbon filter is not placed in the bottom of the filter box, but on top of all other filters. When the carbon filter has to be replaced, the others filters do not have to be removed which minimalizes the risk on dangerous substances.

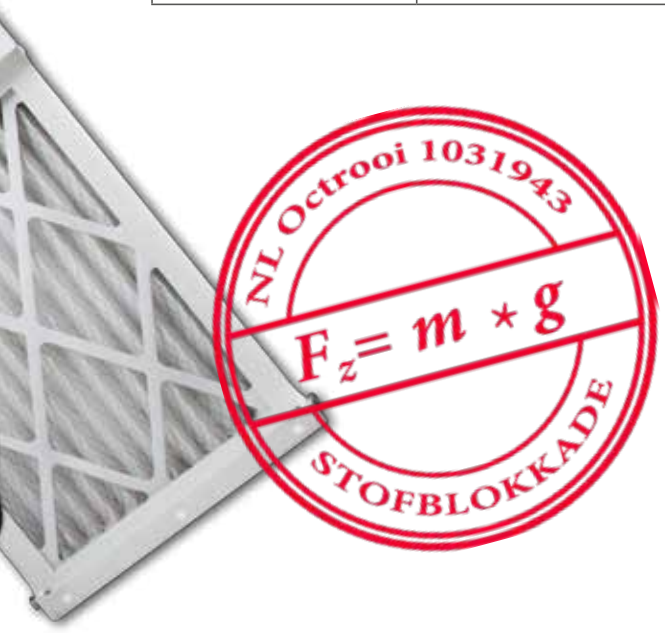
Optical filter detection

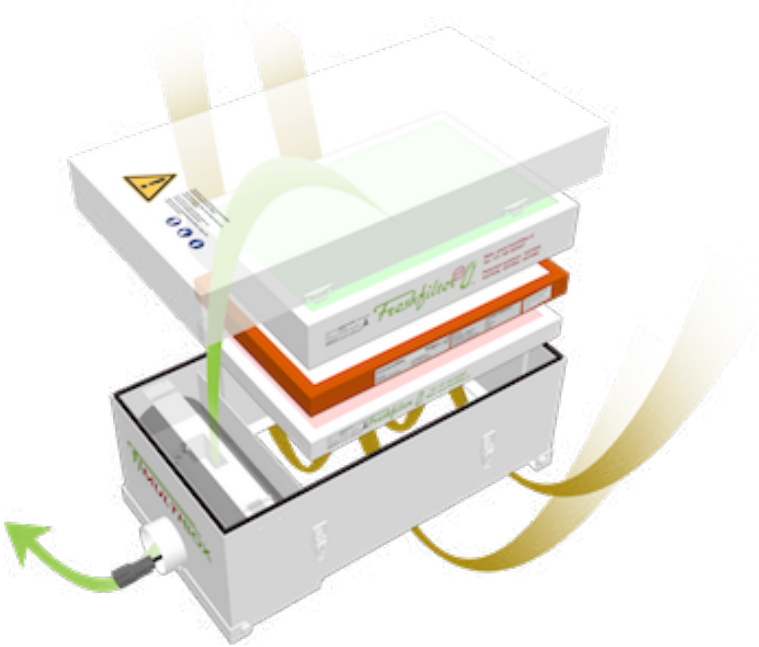
The Freshfilter Multibox has three filter detection sensors. The P1, P3 and carbon filter will be inspected for presence if the system is combined with a control unit from the 3000 or 5000 series. With the latter the system can also be equipped with an hour meter, serial number registration and remote reading.

Durable

As all Freshfilter cab air quality systems the FFMultibox is made from RVS304 plate material. The applicable materials are only from the highest quality. Semi-finished products are used conform the industry standard (water tight and vibration proof) and only certified raw materials. The own production of the base material ensures for continuous quality assurance.

	FFMultibox XS	FFMultibox	FFMultibox XL
Size	815 x 375 x 235mm	815 x 435 x 295mm	830 x 670 x 297mm
Size filter	600 x 336mm	595 x 395mm	595 x 595mm
stacking	150mm	200mm	200mm
Weight empty	21Kg. excl. filters	28Kg. excl. filters	38Kg. excl. filters
Casing	SS304 bottom tray and cover	SS304 bottom tray and cover	SS304 bottom tray and cover
Voltage	12 or 24V, 240Watt (max)	12 or 24V, 240Watt (max)	12 or 24V, 240Watt (max)
Max. overpressure	440 Pascal, 120m3/h	440 Pascal, 120m3/h	440 Pascal, 120m3/h
Standardization	NEN4444 or CROW132	NEN4444 or CROW132	NEN4444 or CROW132
Dust filtration	P1/P2/P3	P1/P2/P3	P1/P2/P3
Carbon filtration	10Kg. Carbon	17Kg. Carbon	30Kg. Carbon
Mounting	Brackets or q.r.f. (opt.)	Brackets or q.r.f. (opt.)	Brackets or q.r.f. (opt.)
Connection	Deutsch 6-pin DT serie	Deutsch 6-pin DT serie	Deutsch 6-pin DT serie male
Filter detection	2x IP67 opt. filterdetection	Stainless steel 3 x n-open circuit	Stainless steel 3 x n-open circuit





FOR THE AVAILABLE FILTERS AND POSSIBLE COMBINATIONS SEE SECTION FILTERS


HITACHI
DEMOCOM

FFMultibox
Performance

Dust test

In 2010 it was tested how the patented air suction of the FFMultibox is performing compared to conventional cab air quality systems. In testing area very dusty circumstances are simulated. This area contains three different simulation units all connected with a hose to the cabin in which overpressure is created.

Due to the extreme dusty circumstances in the test the installed filters gradually are saturated and the ventilator in the unit will have more trouble to maintain the same amount of overpressure in the cabin. Therefore, the pressure will go down.

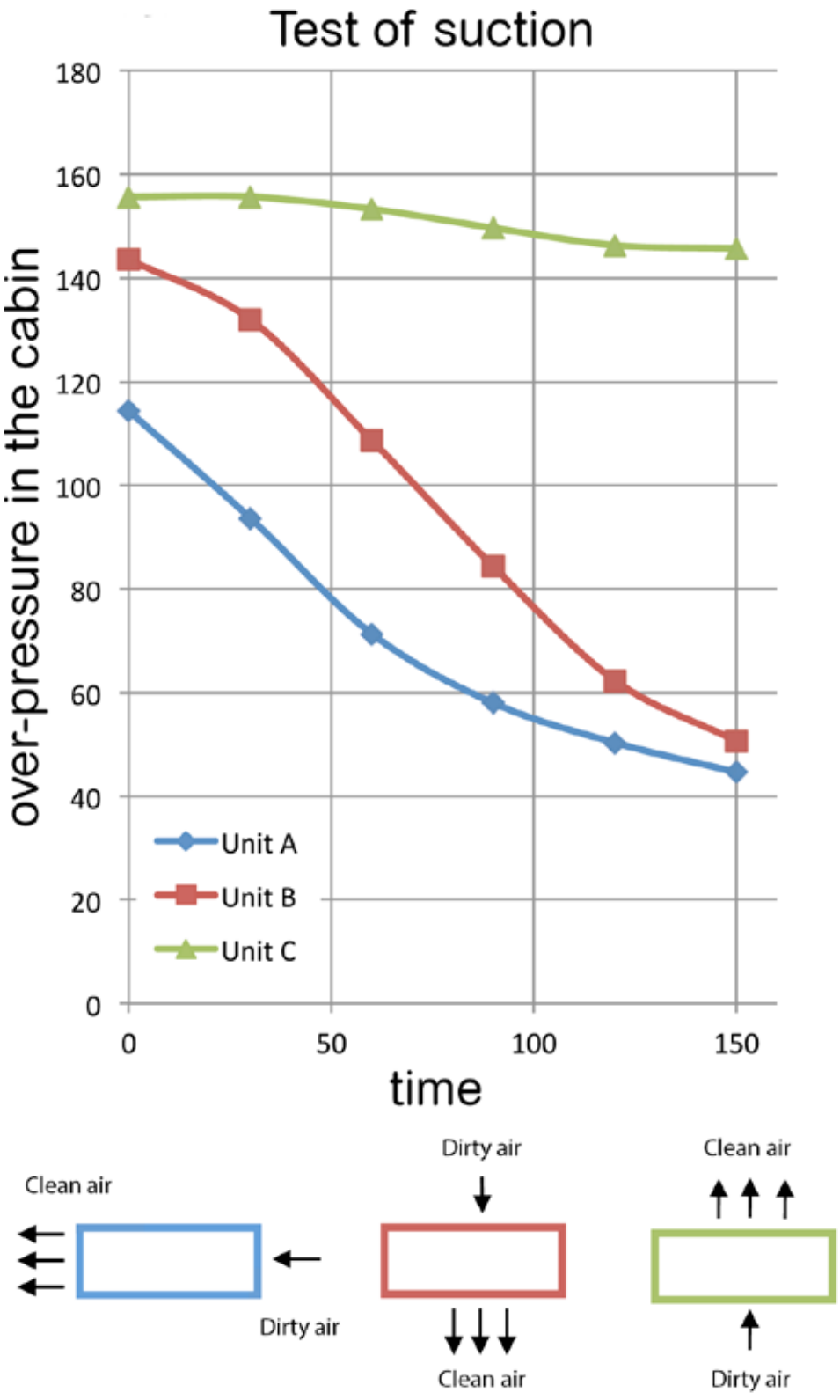
To obtain substantiated results the different simulating units change place in order to exclude unknown variable. Averages are recorded and composed in a graph. By letting the dust circulate well a filter, depending on the unit type, is saturated within 150 minutes. The circumstance in practise are less extreme but the principle of pollution and filter saturation are exactly the same.

Set up

Unit A: Horizontal air flow through a thick filter package with a surface of 570x170mm and suction opening of 570x170mm.
Unit B: Vertical air flow from top of the filter with a filter surface of 600x335mm and suction opening of 50x300mm.
Unit C: Vertical air flow against gravity, filter surface of 595x395mm and suction opening of 575x375mm (FFMultibox).

Results

Unit C: (FFMultibox) is the only unit that remains stable, as this is sucking the air against gravity. The large suction opening provides less counter-pressure straight from the first minute. The dirt does not stick to the filter, in contract to unit A and B, due to the counter-operation of the gravity.


Test of suction
over-pressure in the cabin
180
160
140
120
100
80
60
40
20
0
0
50
100
150
time
Unit A
Unit B
Unit C
Clean air
Dirty air
Dirty air
Clean air
Clean air
Dirty air

FFTube
Super compact

Air flow: patented design
Since the introduction of the FFTube this model is used a lot for machines of 3 to 100 tons. The system is characterised by its compact size in combination with the high filter capacity. A part of the applied technology originates from the FFMultibox. So the FFTube sucks the air against the gravity through the filter media which significantly extends the operation life of the filters. Plus, the dirt can fall outside the unit due to the vibrations of the machine.

The round filters ensure that these cannot be installed incorrectly. Thereby the air is 100% equally distributed over the filter and preferable air flows are a thing from the past.
The single radial blower in the unit is less noisy compared to other units, as the engine speed is lower with a similar air return. The important feature of the FFTube is the compact size. Machines are getting more compact every day which means that the installation of cab air quality systems is less easy. The FFTube can be installed on all machines without an expensive sub-frame; the unit has a 350mm diameter only with a height of 420mm and can filter up to P3/HEPA level combined with 3.3 kg coal! If the cleaning-up should require a carbon filter of 10 kg then the unit can optionally be equipped with a high hood. This hood can be placed on the bottom part of the FFTube and can be changed without tools.

Filter detection

The Freshfilter FFTube has two filter detection sensor. The P1/P3 combination filter and carbon filter are inspected for presence if the system is combined with a control unit from the 3000 or 5000 series. With the latter the system can also be equipped with an hour meter, serial number registration and remote reading.

Durable

As all Freshfilter cab air quality systems the FFMultibox is made from RVS304 plate material. The applicable materials are only from the highest quality. Semi-finished products are used conform the industry standard (water tight and vibration proof) and only certified raw materials. The own production of the base material ensures for continuous quality assurance.

Technical specifications FFTube	
Size	Diameter 350mm, height short hood: 420mm, long hood: 830mm
Weight empty	13Kg. excl. filters
Casing	SS304 bottom tray and short hood, long hood: Aluminium
Voltage	12V or 24V, 240W
Controlling	FFController or manual
Max. overpressure	440 Pascal, 120m3/h
Standardization	NEN4444 or CROW132
Dust filtration	P1/P3 combination filter
Carbon filtration	Up to 10Kg. Carbon
Montage	4 x trildemper M10
Connection	Deutsch 6-pin DT serie male
Filter detection	2x stainless steel n open circuit

Freshfilter

Freshfilter Service Raamsdonksveer
Ramgatseweg 38,
4941 VS Raamsdonksveer, Netherlands
(+31) 162 522 427

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