

Mobile recleanable HEPA filter units for a flow of 3.000 m³/h

consisting of

- Mobile online recleanable HEPA filter block,
Type M-RHF | hightec 1 x2 and
- Mobile air conveyor block, Type M-SCF | classic 1 x1 V



RHF | hightec
Recleanable HEPA filter –
Basics

Application

- Demanding requirements on the filter separation performance (HEPA)
- High particle concentration
- Abrasive dusts
- Optional possibility of recycling the purified dusts
- Low disposal costs
- No filter element exchange necessary

Examples of industrial uses

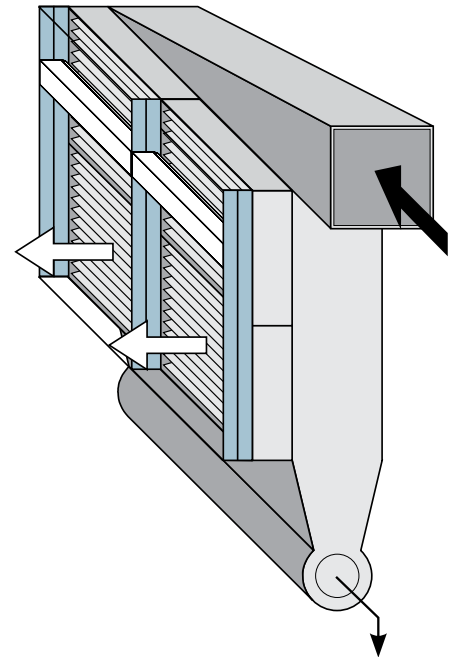
- Teardown of nuclear systems
- Pharmaceutical production processes
- Battery manufacture

Conventional RHF systems

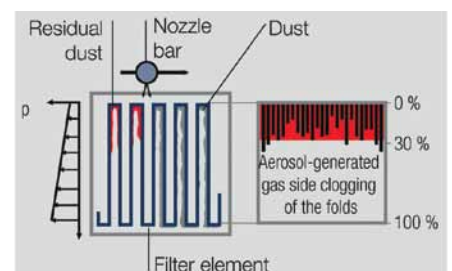
- Vertical arrangement of the filter elements
- Vertical airflow upwards
- Repeat depositing of dust during the cleaning process
- Low cleaning pressure:
 - Frequent cleaning cycles
 - Increased clogging of the filter medium
 - Short working life of filter elements
 - Problems with critical particles, sometimes necessary to introduce pre-coating material between cleaning cycles in off-line connected systems.

Special properties of
Krantz RHF | hightec-technology

- Top-down principle
- Lower depths of filter elements for critical dusts
- Very high cleaning pressure (up to 4 bar overpressure in nozzle bar)
- Patented, reinforced RHF® standard size elements
 - Pressure loss reduction through cleaning process, i. e.
 - Lower and more constant initial pressure drop after cleaning
 - Higher working pressure drop in filter possible
 - Formation of a filter “cake” on the surface of the filter medium
 - Good separation of agglomerated dust in the hopper
 - Suitable for different kinds of dust, especially for critical particles (rough, sticky, etc.)



Increase of static pressure due to decreasing velocity according to the Bernoulli principle



RHF | hightec
Recleanable HEPA filter –
Execution example

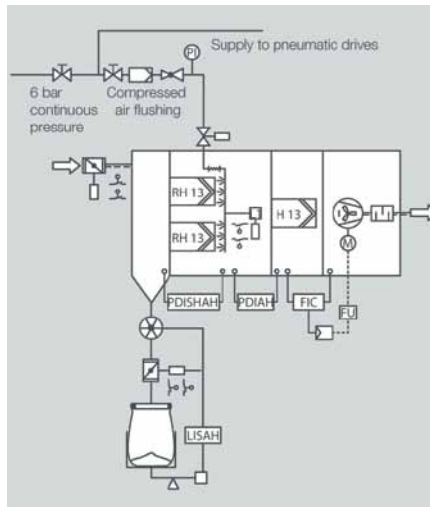
Mobile HEPA filter unit,
Type M-RHF | hightec
2x1 RH13-1x1 H13

AWE, Aldermaston

- Specially designed for dust from plasma cutting processes
- Automatic dust removal, including over-filling alarm
- Constant volume flow control
- Secondary safety filter stage
- Integrated sound damper
- Remote controlled mode
- Movable by rollers
- Transport position (lowered) and working position (raised)

Technical specification

- Volume flow: 1,500 m³/h
- Total pressure difference: 4,000 Pa
- Permitted working pressure: 10,000 Pa
- Permitted working temperature: 90 °C
- Voltage/Frequency: 400 V/50 Hz
- Compressed air consumption: 0.4 Nm³/filter element
- Recleaning time: 6 seconds per filter element
- Filter housing sealing/seat: to DIN 25 496
- RH13- /H13 filter elements: 2 units/1 unit
- Aerosol-generated air connection: DN 350



FAT Factory acceptance test
 M-RHF | hightec 2x1 RH13-1x1 H13

- 1 M-SCF-V secondary safety filter stage
- 2 HEPA filter block M-RHF



Mobile online recleanable HEPA filter block, Type M-RHF



Illustration of a recleanable filter and air conveyor block, Type M-RHF und M-SCF-V



Mobile air conveyor block with integrated secondary safety filter stage, Type M-SCF-V

Mobile recleanable HEPA filter units for a flow of 3.000 m³/h

Mobile recleanable HEPA filter units for a flow of 3,000 m³/h consisting of an online recleanable HEPA filter block M-RHF and an air conveyor block with integrated secondary safety filter M-SCF-V. Both blocks form independent units and can be transported independently.

For simple room air filtering, M-SCF-V alone can be used. For this block, an extensive range of special accessories is available on request, such as additional HEPA filter stages, active carbon filter stages, plug-in sound damper units, etc.

When welding, consideration of DIN 25 496, paragraph 6.2 (4), i. e. use of stabilised steels with austenitic materials, e. g. 1.4541; 1.4571 and use of tempered steels with ferritic materials. To ensure easy decontamination, welded seams on components in contact with the media are free from any gaps and continuously welded.

The clamping mechanisms for HEPA filter elements can be operated from outside and are dimensioned such that with maximum permitted loading and soft sealing elements, compliance with the sealing requirement to DIN 25 496, table 3, at the seat of the filter element is guaranteed.

The filter housing is designed so that changing filter elements according to the bag in bag safe exchange method is possible without contaminating the environment.

The sealing of the screwed housing walls is guaranteed by the use of silicone profile seals. It is beneficial that this sealing system does not bond and is therefore easy to break for servicing and re-usable.

Type M-RHF Mobile online recleanable HEPA filter blocktype

Mobile online recleanable HEPA filter block, type M-RHF for separating airborne dust and aerosols, subject to compliance with minimum emission values, designed for vertical layout of adjacent particle air filter elements:

2 units –

Online recleanable HEPA filter elements

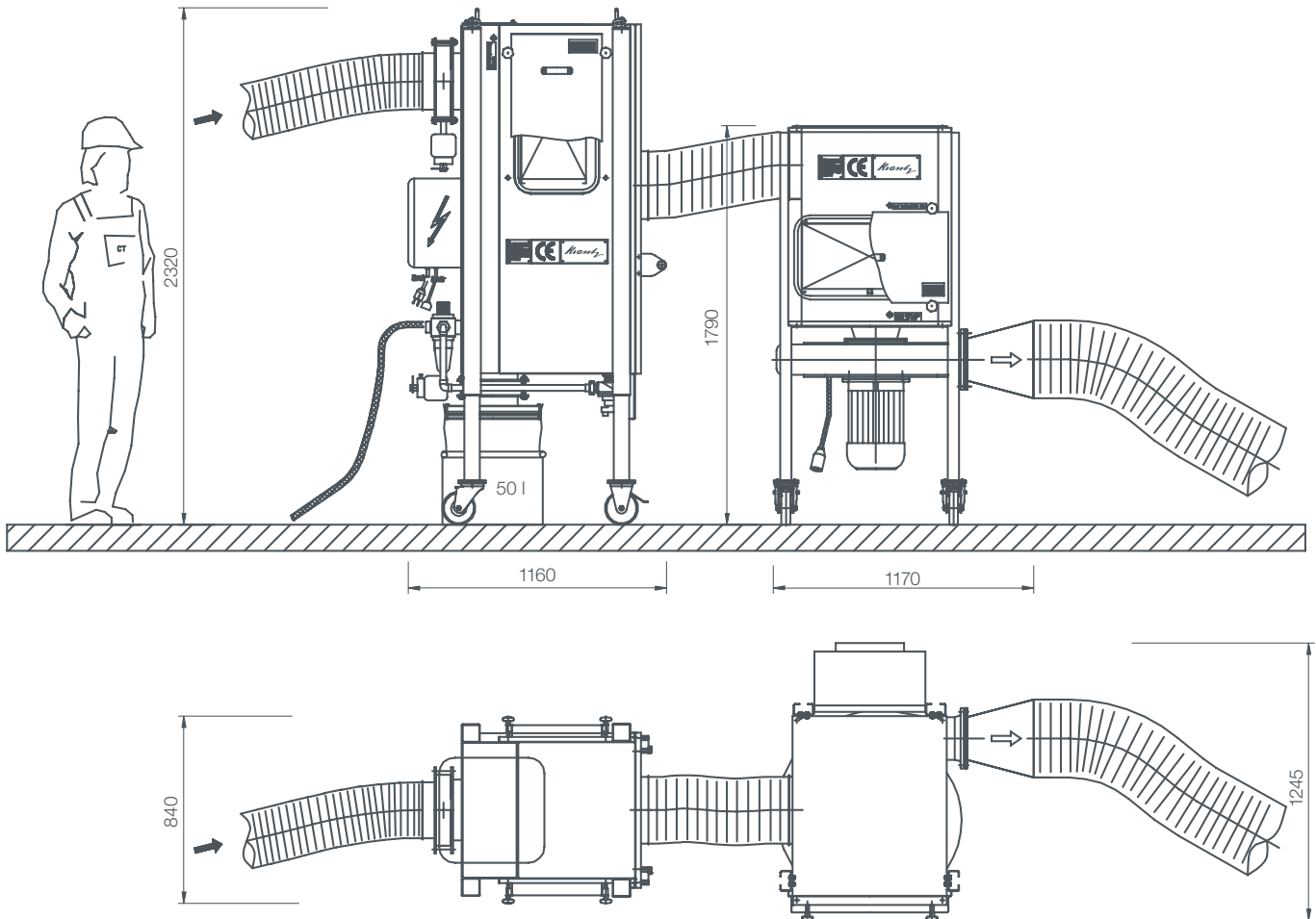
W/H/D 610/610/292 mm

Filter class H13 to EN 1822

in special highly rigid design (patented).

Extremely compact construction by fitting the filter elements directly above each other.

Overview



Drawing of the combined filter units

Text for tender
M-RHF | hightec 1 x 2

- **Stable filter housing,** stainless steel, material 1.4541, in a gas-tight design to the sealing requirements of DIN 25 496, table 3, for housing the filter elements.
- **Shut-off damper, gas-tight** to DIN 25 496, with double action pneumatic actuator drive with mounted 5/2-way valve. Damper closes automatically before performing an offline recleaning. Limit switches for „Up“ and „Down“ positions.
- **Raw gas inlet with impact plate, one-way pipes and connecting flange** for shut-off valve. The raw gas flows into the shaft from top to bottom – in other words, the flow rerouting to the horizontally fed filter elements performs a preliminary separation of the large dust particles. When recleaning the filter elements, the extracted dust is also directed downwards to the dust hopper by gravity for the selected air control (down-flow effect).
- **Dust removal system**
 - consisting of a shut-off damper, gas-tight to DIN 25 496 and special collar for the bag in bag safe exchange system.
 - Shut-off damper with double action pneumatic drive and mounted hand lever valve.
 - Special aluminium collar with two surrounding sealing grooves to DIN 25 466, Attachment 1, for housing the hollow rings for fastening the plastic sack. Undercut sealing grooves with ideally matched hollow rings guarantee a gastight seat for the plastic bag.
- **Clean gas chamber, with housing devices for filter elements.**
 - Clamping the filter inserts with automatically adjusting springs, which also ensures compliance with the sealing requirement to DIN 25 496, table 3, even if the seal has softened through ageing.
 - Rapid destressing of the clamping mechanism for the filter elements using pneumatic actuator cylinders. When changing a filter element, the pneumatic actuator cylinder is supplied via a snaplock coupling, fitted to the front of the filter housing, connected to the compressed air supply (6 bar; oil- and water-free).
- **Stainless steel test groove** to DIN 1946-4 and DIN 25 414 for each filter element. To demonstrate tightness of the seal seat, connection of the relevant test groove via snaplock coupling, fitted to the front of the filter housing with a sealing seat testing device.
- **Independent recleaning system,**
 - consisting of pneumatically driven linear drive and the jet lance with associated blown air valve. Reed switch (24 VDC) for top and bottom limit positions of the linear drive.
 - With the recleaning system, designed specially as a backflushing system, it is possible to reclean even problem dusts in online mode.
 - Pressure reduction system for blown air, consisting of shut-off damper, filter controller and manometer.
- **Separate insert opening for each filter element,**
 - fitted with special collar for performing the bag in bag safe exchange method.
 - Special aluminium collar with two surrounding sealing grooves to DIN 25 466, Attachment 1, for housing the hollow rings for fastening the plastic bag. Undercut sealing grooves with ideally matched hollow rings guarantee a gas-tight seat for the plastic sack.
- **Stainless steel servicing cover** material 1.4541, for ensuring a gas-tight seal of the insert openings for filter elements and protection of the special collars and plastic bags Fastening the servicing cover to the filter housing with four screw elements with star grip. For simple handling, each servicing cover has a handle in its centre.
- **Connection** for a pressure differential measuring device
- **4 off craning eyes,** placed on the head of the filter housing, for safe attachment of lifting gear. Attached eyes BG-tested, folding and rotating on all sides.
- **Steering and handle**
- **Variable height filter legs**
- **Four stable heavy load rollers** for moving the mobile filter, two of which are fitted with wheel and turntable brakes.
- **Switchgear box to IP 54 protection class,** integrated therein:
 - Differential pressure display, upstream filter element, display instrument manufacturer Magnehelic®
 - Differential pressure switch for initiating recleaning, preset to 1,800 Pa.
 - Differential pressure switch for „Filter element change“ message, preset to 2,500 Pa.
 - 5/2-way valve to change the linear drive control
 - Key switch for „open/close“ damper positions
 - Key for offline cleaning (only active if shut-off damper closed)
 - Light alarms for „open/close“ damper positions.
 - Power supply 230 VAC to 24 VDC
 - Mains lead with Schuko plug, 230 V, 5 m long
 - Fault reporting cable with plug, 5 m long

Text for tender
M-SCF | classic 1 x 1 V

For simple room air filtering, M-SCF-V alone can be used. For this block, an extensive range of special accessories is available on request, such as additional HEPA filter stages, active carbon filter stages, plug-in sound damper units, etc.

Design

- **Stable housing**, stainless steel, material 1.4541, in a gas-tight design to the sealing requirements of DIN 25 496, table 3, including:
 - **Raw gas chamber with air inlet pipes**
Air inlet pipes with snaplock mechanism (Jacob system) for connecting a flexible hose.
 - **Filter chamber with housing frame**
mechanism for a HEPA filter element W/H/D: 610/610/292(mm), filter class H13, to EN 1822. Clamping the filter inserts with automatically adjusting springs, which also ensures compliance with the sealing requirement to DIN 25 496, table 3, even if the seal has softened through ageing. Rapid destressing of the clamping mechanism for the filter elements using pneumatic actuator cylinders. When changing a filter element, the pneumatic actuator cylinder is supplied via a snaplock coupling, fitted to the front of the filter housing, connected to the compressed air supply (6 bar; oil- and water-free).
 - **Stainless steel test groove**
to DIN 1946-4 and DIN 25 414 for the filter element. To demonstrate tightness of the seal seat, connection of the test grooves via snaplock coupling, fitted to the front of the filter housing with a sealing seat testing device.
- **Insert opening for HEPA filter element**, fitted with special collar for carrying out the bag in bag safe exchange method. Special aluminium collar with two surrounding sealing grooves to DIN 25 466, Attachment 1, for housing the hollow rings for fastening the plastic bag. Undercut sealing grooves with ideally matched hollow rings guarantee a gas-tight seat for the plastic bag.
- **Stainless steel servicing cover**, material 1.4541, for ensuring a gas-tight seal of the insert openings for filter elements and protection of the special collars and plastic sacks. Fastening the servicing cover to the filter housing with four screw elements with star grip. For simple handling, each servicing cover has a handle in its centre.
- **Connection**
for a pressure differential measuring device
- **Stainless steel panel**
for generating a stable measuring signal for constant volume flow control
- **Adapter plate**
as lower housing closure with fastening mechanisms for a radial fan.
- **Four filter leg units**
with heavy load rollers for moving the air conveyor mechanism, two of which are fitted with wheel and turntable brakes.
- **Steering and handle**
- **Radial fan**
with balanced aluminium rotor, cast aluminium housing for vibration-free, low noise operation, drive motor, heat class F, fitted with thermal contact.
- **Frequency converter**
for constant volume flow control (rms processing of the input signal)
- **Pressure difference transformer**
100–300 Pa / 4–20 mA for constant volume flow control
- **20 metre run of flex**
with Cekon 16A plug, including cable holder, stainless steel cable holder, fastened to the housing directly over the frequency converter
- **Switchgear box to IP 54 protection class**, integrated therein:
 - Differential pressure display, upstream filter element, display instrument manufacturer Magnehelic®
 - Differential pressure switch for reporting downstream safety filter contaminated
 - Master switch with emergency cutout function, On/Off switch
 - „Collective fault“ light alarm
 - Light alarm - „Filter contaminated“
 - Fused outlet with 230V/10A socket
 - Socket for receiving a collective fault signal from an external device
 - Socket for housing an external cable for forwarding the collective fault report
 - Flashing lights for optical collective fault signalling

Technical specification M-RHF | **hightec** 1 x 2

- Manufacturer: Krantz
- Type: M-RHF | **hightec** – 1 x 2
- Volume flow: bis 3,000m³/h
- Permitted pressure difference: ±6,000 Pa
- Permitted working temperature: 60 °C
- Compressed air consumption per recleaning: approx. 0.4Nm³/filter element
- Recleaning time per filter element: approx. 6 seconds
- Necessary upstream pressure: 6bar continuous pressure
- Compressed air quality: oil- and water-free, dewpoint -5 °C
- Connecting pipes, raw gas side: DN 250 (Jacob system)
- Connecting pipes, clean gas side: DN 350 (Jacob system)
- Switchgear cabinet supply: 230V/50Hz
- Outer sealing (filter housing) according to DIN 25 496: Leakage volume flow < 3 · 10⁻⁵ of rated volume flow at Δp = 2,000 Pa
- Inner sealing (filter seat) according to DIN 25 496: Leakage volume flow < 3

Recleanable HEPA filter elements

in special highly rigid design (patented)

- Filter class: H13 to EN 1822
- Dimensions – W/H/D: 610/610/292mm
- Acceptance capacity: 2 unit

Technical specification M-SCF | **classic** 1 x 1 V

- Manufacturer: Krantz
- Type: M-SCF | **classic** – 1 x 1 V
- Volume flow (variable): bis 4,000m³/h
- Total pressure differential fan: 6,800 Pa
- Permitted pressure difference: ±7,000 Pa
- Permitted working temperature: 80 °C
- Motor output fan: 10.5 kW (400V/50Hz)
- Necessary upstream pressure: 6bar continuous pressure
- Compressed air quality: oil- and water-free, dew point -5 °C
- Aerosol-generated gas side connection pipes: DN 350 (Jacob system)
- Outer sealing (filter housing) according to DIN 25 496: Leakage volume flow < 3 · 10⁻⁵ of rated volume flow at Δp = 2,000 Pa
- Inner sealing (filter seat) according to DIN 25 496 Leakage volume flow < 3 · 10⁻⁵ of rated volume flow at Δp = 2,000 Pa

HEPA filter element

- with large filter area > 30m²
- Filter class: H13 to EN 1822
- Dimensions – W/H/D: 610/762/292 mm
- Acceptance capacity: 1 unit

Accessories

Stainless steel cover keg, 50 l

Trunk and base:	Stainless steel, 1.4435
Cover, locking ring, base ring:	Stainless steel, 1.4301
Seal:	Silicone
Contents:	50 l



Contacts

Caverion Deutschland GmbH
Riesstraße 25
80992 München, Germany
Phone: +49 89 374288-500
Fax: +49 89 374288-520

Krantz Filter Systems and Dampers
Uersfeld 24
52072 Aachen, Germany
Phone: +49 241 434-1
Fax: +49 241 434-500

Production workshop
Mallersdorf
Schillerstraße 16
84066 Mallersdorf-Pfaffenberg, Germany

Claus Schweinheim
Division Manager
Krantz Filter Systems and Dampers
Phone: +49 241 434-501
Fax: +49 241 434-500
Mobile: +49 173 3888718
email: claus.schweinheim@krantz.de

Reinhold Goettgens
Sales Manager
Phone: +49 241 434-269
Fax: +49 241 434-500
Mobile: +49 174 1658185
email: reinhold.goettgens@krantz.de