

RHF | hightec RH13/H13-1500

Mobile recleanable filter unit



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

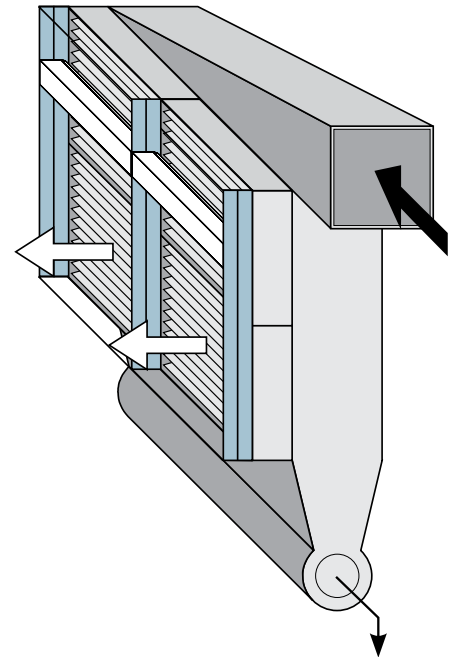
- Teardown of nuclear systems
- Pharmaceutical production processes
- Battery manufacture

Conventional RHF systems

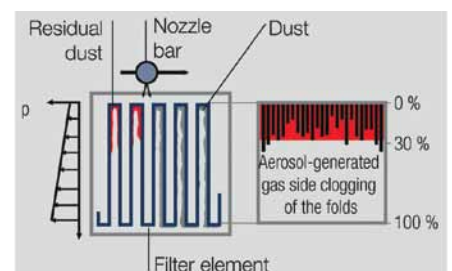
- Vertical arrangement of the filter elements
- Vertical airflow upwards
- Repeat depositing of dust during the cleaning process
- Low cleaning pressure:
 - Frequent cleaning cycles
 - Increased clogging of the filter medium
 - Short working life of filter elements
 - Problems with critical particles, 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**

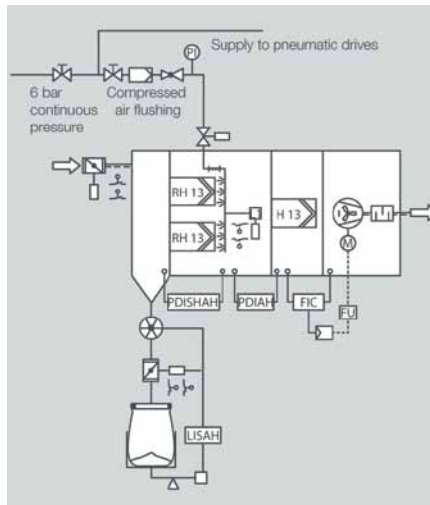
**Mobile HEPA filter unit,
Type M-RHF | hightec
2x1 RH13-1x1 H13**

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: 1,500m³/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

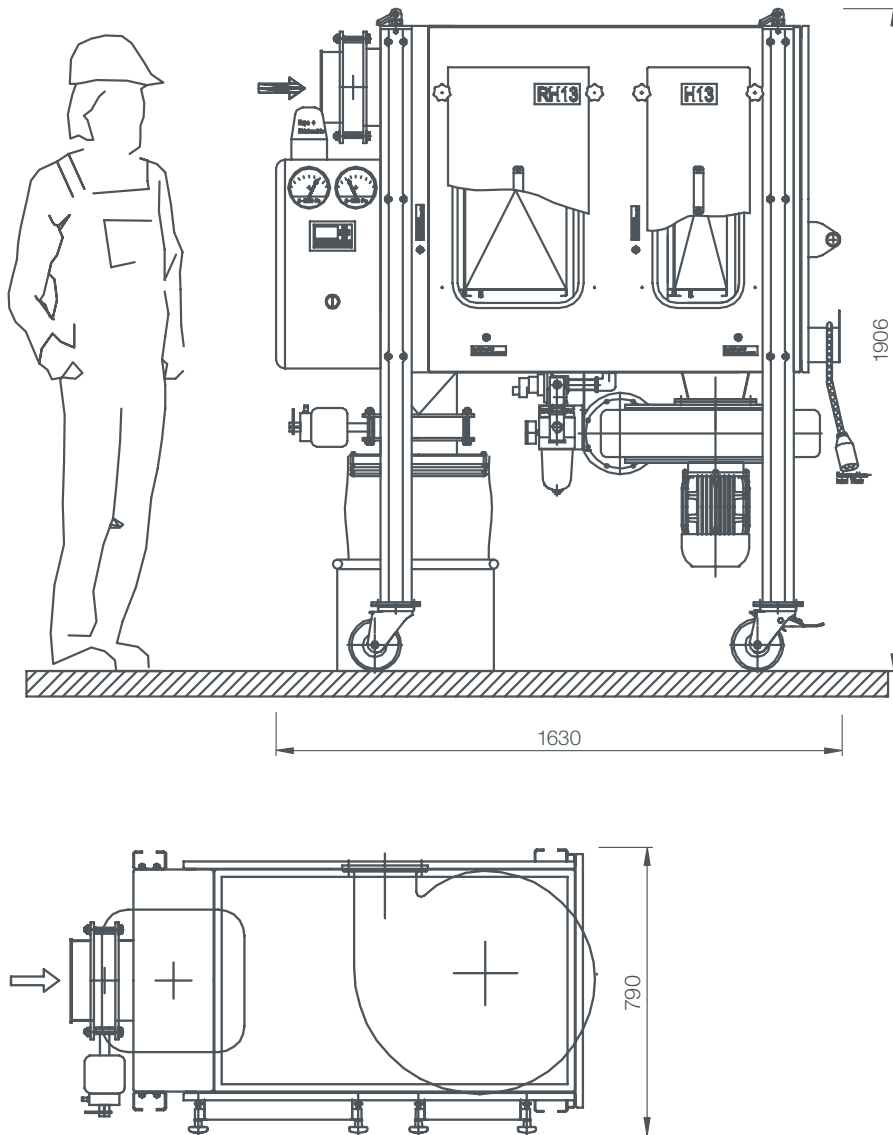
- 1 Gas-tight shut-off damper
- 2 Recleanable HEPA filter stage
- 3 HEPA filter stage (secondary safety filter stage)
- 4 Aerosol-generated air chamber with forced separator
- 5 Fan unit



Mobile recleanable filter unit,
Type RHF | hightec RH13/H13-1500



Overview



Mobile recleanable filter unit,
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Text for tender

Mobile filter for separating dust and aerosol-forming impurities. The mobile filter can be fitted with the filter elements described below:

1st filter stage:

Recleanable HEPA filter element

W/H/D 610/610/292 mm

Filter class H13 to DIN EN 1822

2nd filter stage:

HEPA filter element

W/H/D 610/610/292 mm

Filter class H13 to DIN EN 1822

The mobile recleanable HEPA filter unit is constructed as follows in air flow:

- Gas-tight shut-off damper
- Aerosol-generated air chamber with forced separator
- Recleanable HEPA filter stage
- HEPA filter stage (secondary safety filter stage)
- Fan unit

The online-recleanable HEPA filter stage recleans itself automatically while it is running. 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 reusable.

Design

• Gas-tight shut-off damper

Air intake via shut-off damper DN 200, gas-tight to DIN 25 496, with dual effect pneumatic actuator drive with built on 5/2-way valve. Limit switches for „Up and „Down“ positions. (Valve closes automatically before performing an offline recleaning).

• Aerosol-generated air chamber with forced separator

- Stainless steel aerosol-generated air chamber, material 1.4541 with pipes for connecting the gas-tight shut-off valve.
- Aerosol-generated air shaft with forced separator for separating large dust particles and protecting the downstream HEPA filter.
- The aerosol-generated air 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 H13 filter element, the extracted dust is also directed downwards to the dust hopper by gravity with 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 dual-effect 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 bag.
- Undercut sealing grooves with ideally matched hollow rings to ensure a gas-tight seat for the plastic bag.

• Recleanable HEPA filter stage:

- Housing mechanism for positioning the recleanable HEPA filter element with vertical flow.
- 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 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.
- Clamping the HEPA filter element 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 mechanisms 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 grooves to DIN 1946-4 and DIN 25 496. To demonstrate tightness of the sealing seat of the HEPA filter element. Test grooves connected via snaplock coupling, fitted to the front of the filter housing with a sealing seat testing device.
- Connection for a pressure differential measuring 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. The filter element is recleaned with a jet lance over the entire width of the filter element in a single cycle.
 - Recleaning system designed as a special backflush system. The online-recleanable HEPA filter stage recleans itself while it is running, even of the finest dust particles. The recleaning system builds up a pressure in the filter folds of up to 6,000 Pa.
 - Pressure reduction system for blown air, consisting of shut-off damper, filter controller and manometer.
- **HEPA filter stage (secondary safety filter stage):**
 - Housing mechanism for positioning the HEPA filter element with vertical flow. Separate insert opening for 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 sack.
 - 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.
 - Clamping the filter insert 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 mechanisms 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 grooves to DIN 1946-4 and DIN 25 414 for HEPA 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.
 - 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.
- **Fan unit**
 - Fan provided for direct building on to the floor pan. Medium pressure radial fan with directly coupled short circuit rotor motor, suitable for frequency converter operation. Fan with balanced aluminium rotor, cast aluminium housing for vibration-free, lownoise operation, drive motor, heat class F, fitted with thermal contact.
 - **Transport attachments**
 - 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
 - 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:**
 - Master switch with emergency off function
 - On/off switch
 - Flashing lights for optical collective fault signalling
 - Horn for audible warning of a collective fault
 - „Horn Reset“ button
 - Differential pressure indication, pointer manufacturer Magnehelic®, for showing recleaned HEPA filter stage, as well as secondary downstream filter stage
 - Pressure differential switch for automatic introduction of recleaning
 - Pressure differential switch for reporting recleanable HEPA filter step loaded
 - Differential pressure switch for reporting downstream safety filter loaded
 - „Collective fault“ light alarm
 - Light alarm to indicate filter contamination of the HEPA filter stage, as well as the safety filter stage
 - 5/2-way valve to change the linear drive control
 - Key switch for „open/close“ damper positions
 - Light alarms for „open/close“ damper positions.
 - Power supply 230V AC to 24V DC
 - 20 metre run of flex with Cekon 16 A plug, including cable holder, stainless steel cable holder, fastened to the housing

Technical data

- Manufacturer: Krantz
- Type: RHF | hightec RH13/H13–1500
- Volume flow: 1,500 m³/h
- Permitted working pressure: 6,000 Pa
- Permitted working temperature: 90 °C
- Voltage/Frequency: 400 V/50 Hz
- Rated motor output: 3.1 kW
- Compressed air consumption per recleaning: approx. 0.4 Nm³/filter element
- Recleaning time per filter element: approx. 6 seconds
- Necessary upstream pressure: 6 bar continuous pressure
- Compressed air quality: oil- and water-free, dewpoint –5 °C
- Outer sealing (filter housing), according to DIN 25 496: Leakage volume flow <math> < 3 \cdot 10^{-5}</math> of rated volume flow at $\Delta p = 2,000$ Pa
- Inner sealing (filter seat), according to DIN 25 496: Leakage volume flow <math> < 3 \cdot 10^{-5}</math> of rated volume flow at $\Delta p = 2,000$ Pa
- Dimensions: 1,600 x 1,900 x 790 mm

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

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The logo for Krantz GmbH, featuring the word "Krantz" in a stylized, blue, cursive script font.