



## HS-S041 – HEPA Safety Housing (bag-in-bag-out)



HS-S041 - The gastight safetyhousing offers flexible modular design to be customized for the requirements on site and contamination free filterchange (aka. Safe change, Bi-Bo, Bag-In-Bag-Out).

HS-S041 duct filter housings consist by principle from welded stainless steel (1.4301 or better). Any damages of a paint coating that occurs during transport or handling with usual housings and the resulting risk of corrosion is avoided.

The sheet metal thickness is 2,5 mm by standard. It can be up to 4mm in case higher pressure levels are demanded. Further reinforcement such as spines and armouring is optionally available. All surfaces are glass blasted and all welding seams are carefully passivated. All HS-S041 duct filter housings are intensively tested for pressure and tightness according to the parameters of their application.

DIN 25 496; 6.2(4) is respected for all weldings, meaning that stabilizing steels are used with austenitic materials.

All concerning parts and welding seams are free of cracks and slits to ensure the ease of decontamination and to avoid cranny corrosion. Upon the customers request all welding seams can be tested such as for dye penetrant test or other methods.

HS-S041 can be shipped as single module or as fully welded ready to use housing. Single modules are supplied with hole patterns on the connection flanges according to the customers specification. Beside the usual documentations such as operational manuals and declaration of conformity we also offer added documents such as seismic stress simulations or approval documents. Welding qualification certificates and raw material certificates are part of our delivery and inspection documentation in case full documentation is required.

HS-S041 duct filter housings have proven in numerous applications. These housings fulfill maximum requirements in regards of safety and efficiency in the field of particle and gasfiltration. The HS-S041 series is especially designed for safetyrelevant processes i.e.:

### Example applications

- supply- & exhaustair with pharmaceutical or biotechnological processes.
- air treatment (supply / exhaust) with medical facilities i.E. for safety environments at BSL 1 to 4 installations
- isolation wards and pandemic quarantine zones
- nuclear processes (fulfills KTA 3601)
- exhaust air treatment for chemical or pharmaceutical processes
- isotope laboratories
- other process air, requiring explosive protection according to ATEX standards
- sterile air generation
- warfare agent deconamination or destruction

### Delivery and Installation

The filterhousings are supplied as complete unit along with the connectors already welded if the transport and handling situation allows this. Otherwise the housing is supplied in easy to mount and install sections - typically for units consisting of more than 4 - 5 units. The housings are fitted with welded lifting eyes when needed. Upon request we also support you for installation, inspection or final approval with our experienced staff on site.

### Filter clamping / maintenance

The filter clamping construction is based on a uncomplicated mechanical clamping to ensure maximum safeguarding against failure. We therefore resign on pneumatic clamping or electronic controls with this particular housing type.

The filter clamping construcion consists from stainless steel clamping frame operated by ex-centers. Additional leafsprings generate constant pressure to the filter to negate effects like aging gaskets or production related tolerances of the filters.

The clamping construction is designed to ensure tightness even with maximum dust loading of the filters and aging gaskets to always fulfills tightness requirements according to DIN 25496, Tab. 3 at the seat of each filter element. A filter can only be clamped when placed in the correct position. The maintenance cover can only be fixed to the housing when a filter is set in correctly and is properly clamped. This ensures failsafe operation. Welded security barriers in the cover prevent a loosening of the clamping in case of seismic shocks. The maintenance covers can be made lockable to prevent unauthorized access to the filterbanks.



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HS-S041 can be equipped with different filters in accordance to the demand of air purity, safety and airflow. The table on the right side dives an overview about typical filtersizes. All filters can be fitted with an EX-protection according to ATEX upon request.

Installable filtertypes	Filterproperties
prefilter - coarse dust: HS-Prefiltercell HS-Alpha Pak 55	G3 to M5 (EN 779) ISO coarse to ISO ePM10 (ISO 16890)
prefilter - finedust: HS-Makro to 120°C, conforms ATEX HS-Makro F to 65°C	M6 to F9 (EN 779) ISO ePM 10 to ISO ePM1 (ISO 16890)
mainfilter HEPA: HS-Mikro S to 120°C, conformsATEX HS-Mikro SF to 65°C	E10 to H14 (EN 1822)
mainfilter molecular: HS-A053 HS-A055	high security filter (radioisotopes) VOC's odours, haz-mat

On safety critical processes we recommend the use of class E11 EPA filters for safety after carbon filters to remove possible abrasion of carbon particles from the airstream.

## Variants & Options

HS-S041 housings can be customized to meet your individual requirements. A broad range of options is available:

- DEHS-Testport for injection and measurement of particles. The ports are gas tight sealed when the filter is in operation. The construction is either made from tri-clamp-port or gas tight ball cocks.
- The two-groove maintenance board (bag-in-bag-out filterchange) is made of a welded profile. The profile is designed to firmly fix the O-Rings and maintenance bags. The special profile prevents that O-rings and bags accidentally flip away.
- The optional maintenance table can be hooked simply to the matching eyes to provide more comfort during the Bag-In-Bag-Out filterchange.
- On demand the housings can be fitted with gastight dampers. These will shut off the housing during revision and decontamination. All dampers come with a leak-test groove to perform in-situ tightness checks.
- An optional pressure-discharge filter allows quick pressure equalisation before a filterchange. Contaminated air is lead over a gastight pressure valve to a HEPA or ULPA safety filter.
- Connections and adapters to the air-channels are defined by the user i.e. square-to-round. The connectors are already gastightly welded to the corpus when feasible.
- The arrangement of the filterbanks may be either horizontal or vertical. The maintenance covers can be made lockable to prevent unauthorized access.
- Electric discharge connections are optionally installed explosion protection according to ATEX regulations.
- Each particlefilterstage can be equipped with a pressure gauge to monitor the saturation of the filters.
- Potential-free pressure switches can signal the saturation level to the main control of the air handling unit.
- The base-rack is made from welded square profiles. The baseplates allow to fix the unit on the floors. By standard the Housing offers a grounding screw (M8) to discharge eventual electrical potentials.



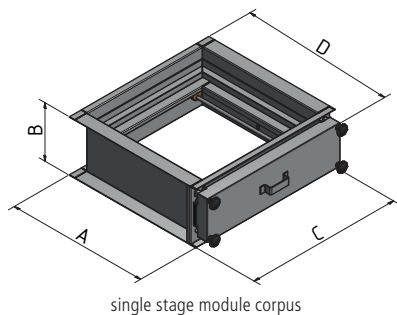


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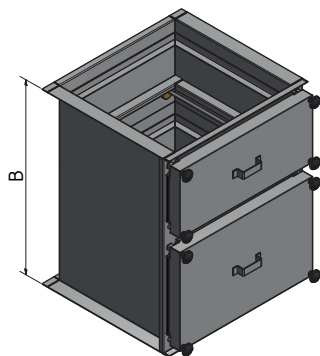
### Dimensions of single modules

Up to six filterstages can be integrated in one module if required.

The height [B] is added with the combinations of several stages per corpus. The total height should not exceed 2400mm.



single stage module corpus



two stage module corpus

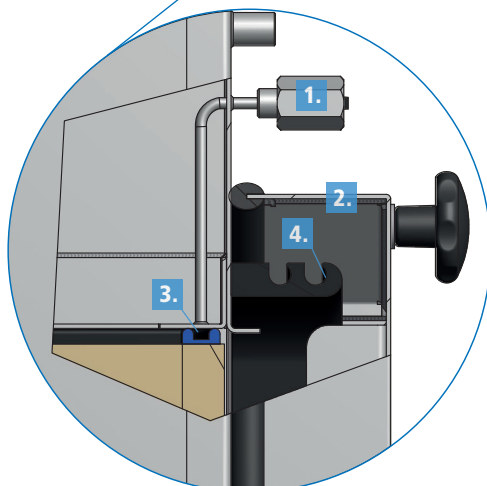
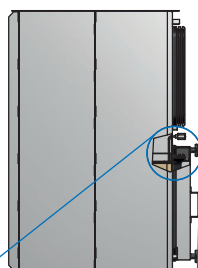
Dimension Filter [mm]			Dimension Housing [mm]				Weight [kg]	
B	H	T	A	B	C	D	w/o filter	with filter
610	610	50	680	270	749	720	30	50
610	610	150	680	380	749	720	50	70
610	610	292	680	525	749	720	65	85
305	610	50	380	270	749	430	20	35
305	610	150	380	380	749	430	35	50
305	610	292	380	525	749	430	50	65
305	305	50	380	270	444	430	10	20
305	305	150	380	380	444	430	20	30
305	305	292	380	525	444	430	35	45
610	762	150	832	380	749	892	55	80
610	762	292	832	525	749	892	70	95

HS-S041 can be designed according to the processes specific needs.

Please ask for other desired dimensions and designs.

### View from side / sectional view cover & gasket leak testing

1. Gastight vent bypass test vent, welded piping to the test outlet in the clamping frame.
2. Gastightly fixed cover with star-screw.
3. Leak test gasket on the filter. A possible loss of pressure in the reservoir indicates a bypass over the filter gasket.
4. Maintenance board with two grooves to securely fix o-rings and maintenance bags.



### Key features

- filterhousing consists of stainless steel 1.4301, on demand higher classifications
- gastight welded construction. The housing comes fully welded and pressure tested if transport limitations allow it. All connectors are then gastight welded to the filterbanks
- standard pressure limit is up to +-100 mbar
- optional: pressure resistant up to +- 500 mBar
- the selfregulating safety clamping frame ensures all time for tightness between filters, gasket and housing.
- all surfaces are glass blasted and passivated for maximum corrosion resistance and easy decontamination
- the filter housing is made from modular design to be easily adapted to the requirements.
- loads of innovative special options are available
- bypass test facilities according to DIN 1946-4 and DIN 25414
- gastight DEHS-testports for particle measurement / In-Situ testing.
- mechanical installations ensure fail safe operation and filter change.
- temperature resistance is in accordance with additional options up to >120°C.
- more safety by filter-chambers that can be safe-locked to prevent unauthorized access.

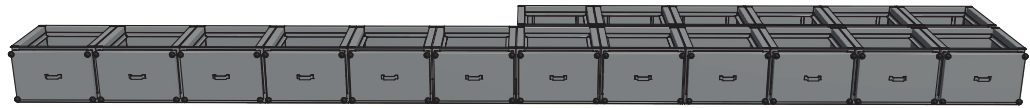
### Maintenance Cover and Filter-Bypass-Test

Each maintenance cover comes with a welded hand grip. The cover is gastightly fixed by four (with high pressure units: six) easy to handle star screws. The starscrews are undetachably connected to the cover. For safety the cover can only be mounted to the housing when the filter is correctly set in and properly clamped in the housing. The cover also serves as reservoir for the maintenance bag.

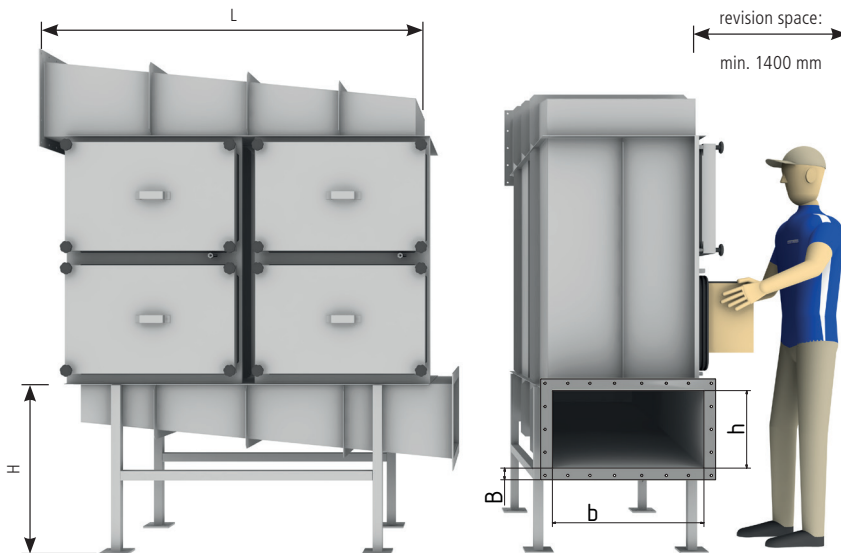
HS-S041 filterunits can offer a leak test groove for bypass testing in the housing but we prefer to fit the filter with a groove gasket. This helps to prevent malfunctions caused by damages and false measure readings caused by dirt on the hardware.

The test pressure is led to a test groove gasket over a gastight stainless tube. The proof of a bypass free filter clamping is detected by using a leak test device. Alternatively a hardware testgroove can be welded to the housing. Then the filters are fitted with a flat gasket that forms a reservoir when pressed against the groove.

The mounting and fixing of the covers is eased by guidance plates.



Module combinations	1/1	1/2	1/3	1/4	1/5	1/6	2/2	2/4	2/6	2/8	2/10	2/12
Filtermodule fitting for filtersize: # of units	1	2	3	4	5	6	2	4	6	8	10	12
Connector pair (in / out) for Filtersize 610 x 610 [mm]	Filter unit single line						Filter unit double line					
Total length, L [mm]	810	1565	2320	3075	3830	4585	810	1565	2320	3075	3830	4585
Clear connector width, b [mm]	615	615	615	615	615	615	1325	1325	1325	1325	1325	1325
Clear connector height, h [mm]	200	315	400	500	630	710	200	315	400	500	630	710
Weight of the connectors, [kg]	30	45	65	105	130	155	40	65	90	140	175	210
Connector pair (in / out) for Filtersize 762 x 610 [mm]	Filter unit single line						Filter unit double line					
Total length, L [mm]	810	1565	2320	3075	3830	4585	810	1565	2320	3075	3830	4585
Clear connector width, b [mm]	767	767	767	767	767	767	1629	1629	1629	1629	1629	1629
Clear connector height, h [mm]	200	315	400	500	630	710	200	315	400	500	630	710
Weight of the connectors, [kg]	35	50	70	110	140	170	45	75	105	155	200	135



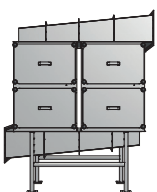
HS-S041 can be installed either horizontal or vertical.

With higher air flow rates we recommend to construct the complete housing in two lines. This may be necessary even in unfavorable structural relations. The height of the base rack [H] can be adapted to your needs. If nothing is specified we assume a height of 800 mm..

## Connector arrangement & Dimensions

The typical flow direction is horizontal. Typical connector arrangements result like following:

single / double line:  
right in / left out



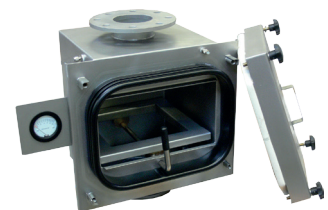
single / double line:  
right in / right out



single / double line:  
left out / right in



single / double line:  
left in / left out



Small, but safe like a big one.  
Example: Housing for filtersize 305x305x292 mm.

Individual designed connectors and other options like bypasses can be realized.