HOODS & UNITS

MAKING THE WORLD SAFER, HEALTHIER & MORE PRODUCTIVE

AFPRO® Filtration Group®

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Introduction

HEPA Filter Manufacturer

Since 1979, AFPRO Filters has been able to manufacture all standard and non-standard dimensions standards meeting the specific wishes of the customer. These products manufactured by AFPRO Filters are synonymous with quality, durability and innovation. To guarantee their quality, we have equipped ourselves with a laboratory in which daily tests are carried out to make our air filters more efficient and more durable.

Classification of Very High Efficiency Filters: Standard EN1822

Standard EN 1822:2009 is used to classify HEPA and ULPA filters based on MPPS efficiency. The table gives more detailed information on the European filter classification.

Please note: AFPRO Filters provides a white paper on HEPA filters

Classes of filters	Integral MPPS values		Local MPPS values	
	Efficacy (%)	Penetration (%)	Efficacy (%)	Penetration (%)
E10	85	15	-	-
E11	95	5	-	-
E12	99,5	0,5	-	-
H13	99,95	0,05	99,75	0,25
H14	99,995	0,005	99,975	0,025
U15	99,9995	0,0005	99,9975	0,0025
U16	99,99995	0,00005	99,99975	0,00025
U17	99,999995	0,000005	99,9999	0,0001

MPPS: Most Penetrating Particle Size = most difficult particle size to stop. Depending on the filters and the air flow speeds, the MPPS is between 0.1 and 0.2 µm

Air cleanliness in Controlled Environments: Standard 14644

ISO 14644-1:2015 classifies the cleanliness of the air in clean rooms, clean zones and separative devices as defined in ISO 14644 7, based on the concentration of particles suspended in the air.

The table to the right classifies the ISOs based on the number and size of the particles.

Classes of filters	0,1 µm	0,2 µm	0,3 µm	0,5 µm	1 µm	5 µm
ISO 1	10	-	-	-	-	-
ISO 2	100	24	10	-	0	-
ISO 3	1.000	237	102	35	8	-
ISO 4	10.000	2.370	1.020	352	83	-
ISO 5	100.000	23.700	10.200	3.520	832	-
ISO 6	1.000.000	237.000	102.000	35.200	8.320	293
ISO 7	-	-	-	352.000	83.200	2.930
ISO 8	-	-	-	3.520.000	832.000	29.300
ISO 9	-	-	-	35.200.000	8.320.000	293.000

PHARMACEUTICAL, MICROELECTRONICS, FOOD INDUSTRY

Air treatment in the pharmaceutical, microelectronics and food industry

The EN ISO 14698 standard and biocontamination

The EN ISO 14698 standard (GMP) supplements the classification into ISO cleanroom classes and specifically deals with the control of biocontamination: general principles for monitoring risks and measuring methods for biocontamination in different environments (air, surfaces, textiles, liquids, maintenance of clothing, specific training of staff).

Specifically for the pharmaceutical sector, Good Manufacturing Practices or GMP have been developed, in which activities performed are classified into different classes based on risk level:

- Class A: zones in which hazardous operations are performed, such as aseptic preparation or filling processes; workplaces are located under a laminar airflow (guide value: homogeneous speed of 0.45m/s +/-20%).
- Class B: preparatory actions in the immediate vicinity of a class A work zone.
- Class C and D: areas with a controlled atmosphere where less risky operations in the production process of sterile medication take place (preparation of liquids, handling of accessories, etc.).

Class	Maximum permitted total particle concentration for classification (particles/m³)			
	At rest		In operation	
	0,5µm	5µm	0,5µm	5µm
A	3 520	29	3 520	29
B	3 520	29	352 000	2 930
C	352 000	2 930	3 520 000	29 300
D	3 520 000	29 300	Not specified	Not specified

Class	Recommended limits for biocontamination			
	Air sample cfu/m³	Settle plates (Diam : 90 mm) CFU / 4 hours	Contact plates (Diam : 55 mm) CFU / Plate	Glove prints including 5 fingers on both hands CFU/Glove
A	Lack of growth	Lack of growth	Lack of growth	Lack of growth
B	10	5	5	5
C	100	50	25	/
D	200	100	50	/

HL-PH Unit

Characteristics

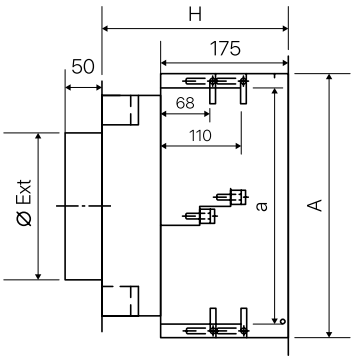
- Application Air blowing or return in clean rooms with turbulent flow and mounted HEPA filters with polyurethane joints
- Electro-galvanised steel 15/10e and 20/10e
- Epoxy paint RAL 9010, oven-baked
- Connection on the top or the side
- For HEPA filters 68 or 110 mm thick
- Pressure connector 100% accessible from the room
- Grid: interchangeable perforated, helicoid-jet or 4-way
- Wall or ceiling installation

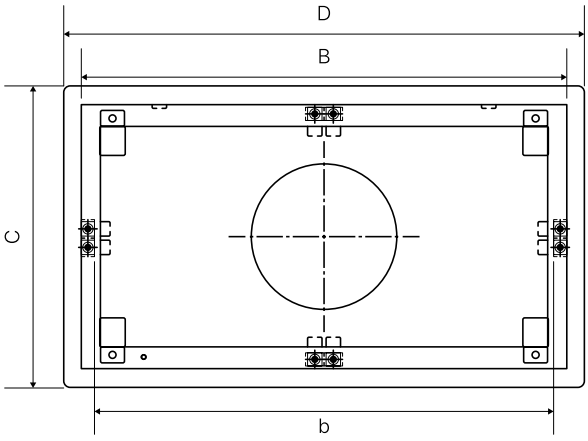
Advantages

- Robust, welded construction
- Rapid opening/closing of the diffusion grid
- Grid easy to remove
- Installation with universal system: Feet or brackets
- Wide choice of standard dimensions, compatible with most standard filters on the market
- Evolutive for filters that are 68 or 110 mm thick

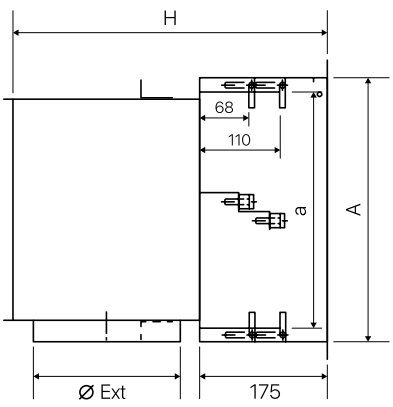
Type	Dimensions CxD (mm)	Dimensions AxB (mm)	Dimensions Reservations (mm)	Filter dimensions axb (mm)	Top connection T		Side connection S	
					ø	H	ø	H
HL-PH/ BBEQ	408x408	361x361	367x367	305x305x68/110	160	255	160	405
HL-PH/CCEQ	560x560	513x513	519x519	457x457x68/110	200	255	200	445
HL-PH/CCFPEQ	595x595	513x513	519x519	457x457x68/110	200	255	200	445
HL-PH/BEEQ	408x713	361x666	367x672	305x610x68/110	200	255	200	445
HL-PH/EEEQ	713x713	666x666	672x672	610x610x68/110	250	255	250	495
HL-PH/EGEQ	713x1018	666x971	672x977	610x915x68/110	315	255	315	560
HL-PH/EHEQ	713x1323	666x1276	672x1282	610x1220x68/110	315	255	315	560
HL-PH/SSEQ	638x638	591x591	597x597	535x535x68/110	200	255	200	445
HL-PH/FFEQ	865x865	818x818	824x824	762x762x68/110	315	255	315	560

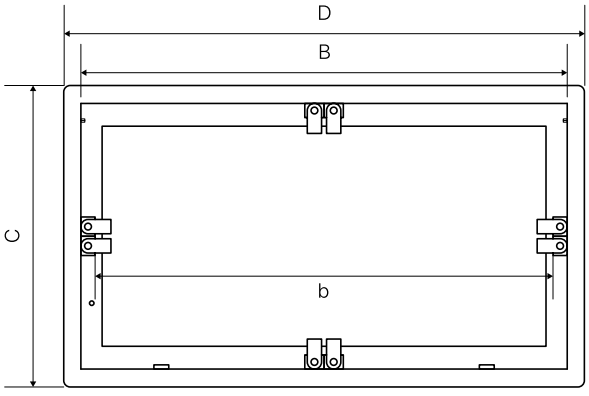
Top connection - T





Side connection - S





HL-PH Unit

Example of a configuration: HL-PH/ EE EQ W N P T G

1 2 3 4 5 6 7

1-Dimensions	
BB	305x305
CC	457x457
CC-FP	457x457
BE	305x610
EE	610x610
FF	762x762
EG	610x915
EH	610x1220
SS	535x535

2-Filter Depth	
EQ	68/110 mm
L	150 mm

3-Connector type	
SS	Rectangular Connector
T	Axial circular connector
S	Lateral circular connector
W	Without plenum

4-Connector diameter	
A	160 mm
B	200 mm
C	250 mm
D	315 mm
E	355 mm
F	400 mm
N	-

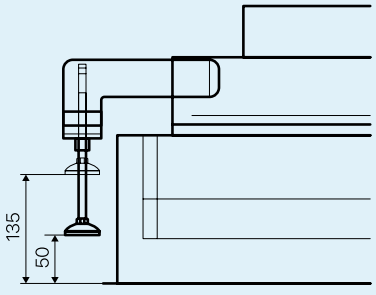
5-Filter seal applied	
P	Polyurethane

6-Closing system	
S	1/4 the tour - Grid standard
T	1/4 turn - Swivel
M	Magnetic - Swivel

7-Equipment	
G	Steel EZ RAL 9010
S	Inox 304L
SS	Inox 316L

Options

- Support feet for mounting on weight-bearing ceiling of thickness 50 to 135 mm
- Pivoting grid
- Magnetic grid closure
- Intermediate frame for the installation of 2 stages of filtration
- Rectangular pipe connection
- Specific RAL for the paint
- Made of 304L or 316L stainless steel
- Special Production of 150 mm-thick filter (H +40 mm)



HL-PH-Gel Unit

Characteristics

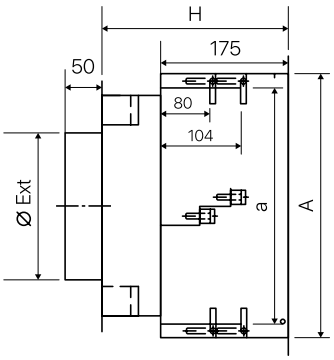
- Application: Supply or return of air in a clean room with turbulent flow and assembly of HEPA filters with gel seal
- 15/10th and 20/10th electrogalvanized steel
- Baked epoxy paint RAL 9010
- Top or side connection
- For HEPA filters 80 or 104 mm thick
- Pressure tap 100% accessible from the room
- Grid: perforated, swirl, or 4 interchangeable directions
- Ceiling installation

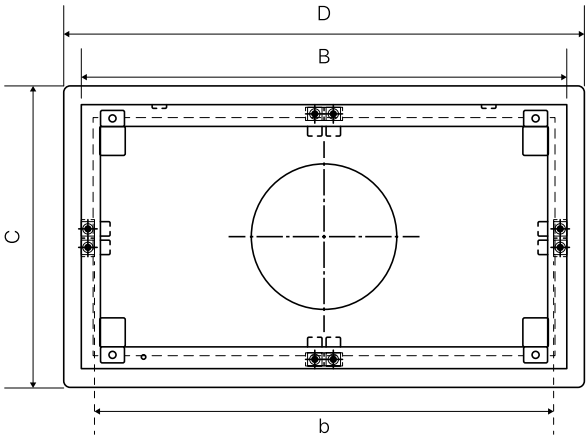
Advantages

- Rugged welded construction
- Quick opening / closing of the diffusion grid
- Easily removable grid
- Installation with universal system: Feet or brackets
- Large choice of standard sizes, compatible with most standard filters on the market

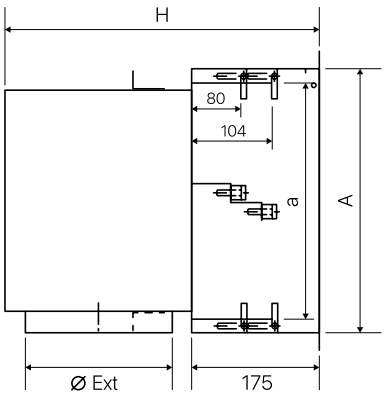
Type	Dimensions CxD (mm)	Dimensions AxB (mm)	Dimensions Reservations (mm)	Filter dimensions axb (mm)	Top connection T		Side connection S	
					ø	H	ø	H
HL-PH/ BBHV	408x408	361x361	367x367	305x305x80/104	160	255	160	405
HL-PH/CCHV	560x560	513x513	519x519	457x457x80/104	200	255	200	445
HL-PH/CC FPHV	595x595	513x513	519x519	457x457x80/104	200	255	200	445
HL-PH/BEHV	408x713	361x666	367x672	305x610x80/104	200	255	200	445
HL-PH/EEHV	713x713	666x666	672x672	610x610x80/104	250	255	250	495
HL-PH/EGHV	713x1018	666x971	672x977	610x915x80/104	315	255	315	560
HL-PH/EHHV	713x1323	666x1276	672x1282	610x1220x80/104	315	255	315	560
HL-PH/SSHV	638x638	591x591	597x597	535x535x80/104	200	255	200	445
HL-PH/FFHV	865x865	818x818	824x824	762x762x80/104	315	255	315	560

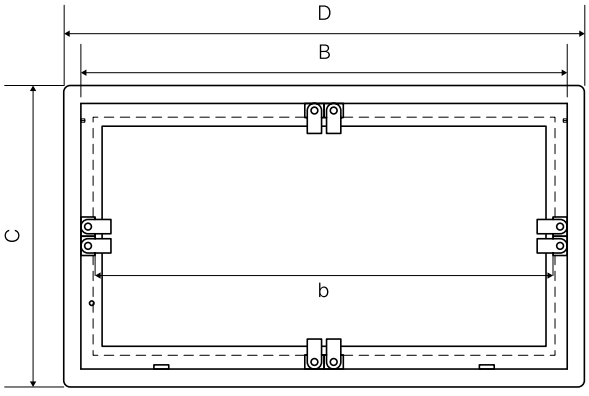
Top connection - T





Side connection - S





HL-PH-Gel Unit

Example of a configuration: HL-PH/BB HV T A G T G

1 2 3 4 5 6 7

1-Dimensions	
BB	305x305
CC	457x457
CC-FP	457x457
BE	305x610
EE	610x610
FF	762x762
EG	610x915
EH	610x1220
SS	535x535

2-Filter Depth	
HV	80/104 mm

3-Connector type	
SS	Rectangular Connector
T	Axial circular connector
S	Lateral circular connector

4-Connector diameter	
A	160 mm
B	200 mm
C	250 mm
D	315 mm
E	355 mm
F	400 mm

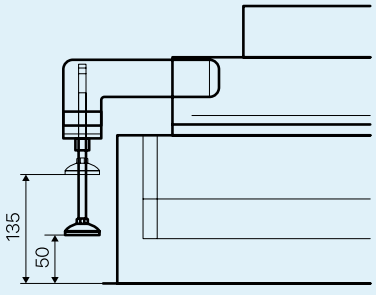
5-Filter seal applied	
G	Gel

6-Closing system	
S	1/4 the tour - Grid standard
T	1/4 turn - Swivel
M	Magnetic - Swivel

7-Equipment	
G	Steel EZ RAL 9010
S	Inox 304L
SS	Inox 316L

Options

- Support feet for mounting on load-bearing ceiling 50 to 135 mm thick
- Pivoting grid
- Closure of the grid by magnets
- Rectangular stitching
- Specific paint RAL
- Manufactured in 304L or 316L stainless steel



HL-PHR Unit

Characteristics

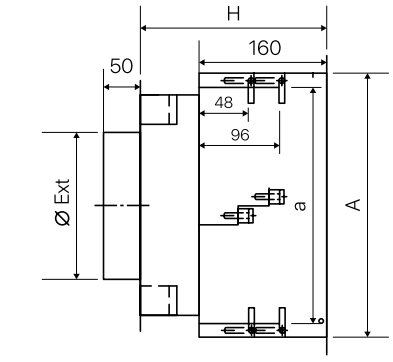
- Application: Clean room air intake with turbulent flow for mounting prefilters and fine filters
- 15/10th and 20/10th electrogalvanized steel
- Baked epoxy paint RAL 9010
- Top or side connection
- For 48 or 96 mm thick filters
- Pressure tap accessible from the room
- Perforated grid
- Wall and ceiling installation

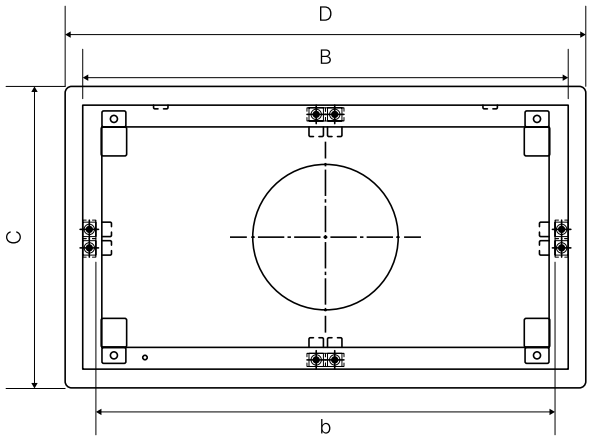
Advantages

- Rugged welded construction
- Quick opening / closing of the grid
- Easily removable grid
- Installation with universal system: Feet or brackets
- Scalable for 48 or 96 mm thick filter

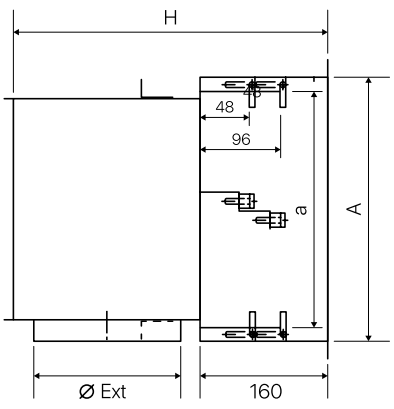
Type	Dimensions CxD	Dimensions AxB	Dimensions Reservations	Filter dimensions	Height without plenum	Top connection T		Side connection S	
	(mm)	(mm)	(mm)	axb (mm)		ø	H	ø	H
HL-PHR/AA	408x408	361x361	367x367	287x287x48/96	160	160	245	160	395
HL-PHR/AD	408x713	361x666	367x672	287x592x48/96	160	200	245	200	435
HL-PHR/MM	611x611	564x564	570x570	490x490x48/96	160	250	245	250	485
HL-PHR/MM-FP	595x595	564x564	570x570	490x490x48/96	160	250	245	250	485
HL-PHR/DD	713x713	666x666	672x672	592x592x48/96	160	250	245	250	485
HL-PHR/DR	713x1018	666x971	672x977	592x892x48/96	160	315	245	315	550

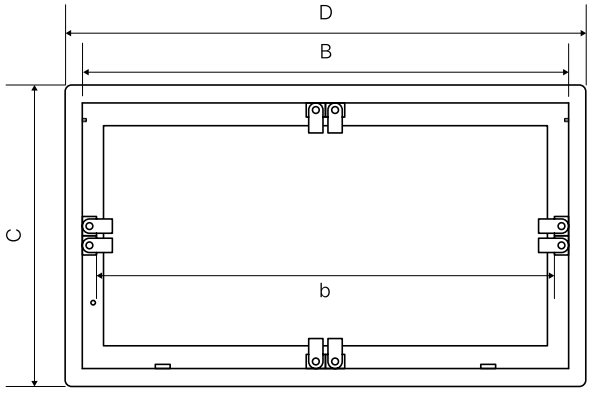
Top connection - T





Side connection - S





HL-PHR Unit

Example of a configuration: HL-PHR/ DD A T C P T G

1 2 3 4 5 6 7

1-Dimensions	
AA	287x287
AD	287x592
MM	490x490
MM-FP	490x490
DD	592x592
DR	592x892

2-Filter Depth	
A	48/96 mm

3-Connector type	
SS	Rectangular Connector
T	Axial circular connector
S	Lateral circular connector
W	Without plenum

4-Connector diameter	
A	160 mm
B	200 mm
C	250 mm
D	315 mm
N	-

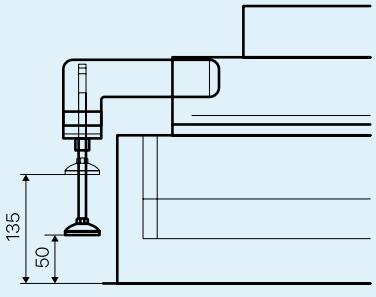
5-Filter seal applied	
P	Polyurethane

6-Closing system	
S	1/4 the tour - Grid standard
T	1/4 turn - Swivel
M	Magnetic - Swivel

7-Equipment	
G	Steel EZ RAL 9010
S	Inox 304L
SS	Inox 316L

Options

- Support feet for mounting on load-bearing ceiling 50 to 135 mm thick
- Removable pivoting grid
- Closure of the grid by magnets
- Rectangular stitching
- Specific paint RAL
- Manufactured in 304L or 316L stainless steel



Diffusion grids for HL-PH, HL-PH-G, HL-PHR

Example of a configuration: GR-PH/BB P T G

1 2 3 4 5

1-Group	
GR-PH	HL-PH
GR-PHR	HL-PHR

2-Dimensions	
Size	**Height**
BB	305x305
BE	305x610
CC	457x457
EE	610x610
EG	610X915
EH	610x1220
EF	610x762
FF	762x762
AA	287x287
AD	287x592
MM	490x490
MM-FP	490x490
DD	592x592
DR	592x892

3-Grid type	
4W	4 directions
P	Perforated
S	Helical

4-Closing system	
S	1/4 turn - Standard grid
T	1/4 turn - Swivel
M*	Magnetic - Swivel

* Option "M" not available for 4D grids

5-Equipment	
G	Steel EZ RAL 9010
S	Inox 304L
SS	Inox 316L

4 way grid (4W)

Perforated grid (P)

Helical grid (S)

Canister boxes SF-CH

Characteristics

- Application: Installation on contaminated air extraction networks, safe replacement of the filter in a plastic bag
- 20/10 steel welded
- Baked epoxy paint RAL 9010
- Tear-proof bag with integrated elastic
- Tightening of the filter by eccentric cams
- Maximum service temperature: 90°C

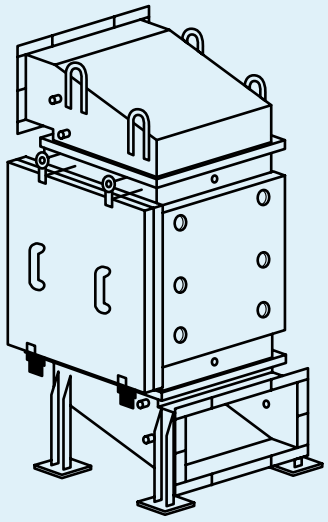
Advantages

- Continuous welded
- Robust and modular
- Closing hatch with polarizing system, guaranteeing the correct installation of the filter
- Mechanical resistance +/-5000 Pa
- Qualified casing: Class D according to EN 12237, Class C according to Eurovent 2/2, L1 according to EN 1886
- Pressure taps with valves

Reference	Box dimensions (mm)				Filter dimensions (mm)			Weight (Kg)
	C	B	B dual version	A	L	W	H	
SF-CH BB	450	498	996	376	305	305	98	16,2
SF-CH BBL	450	498	996	428	305	305	150	19,8
SF-CH BBM	450	498	996	570	305	305	292	26,6
SF-CH BE	450	804	1608	376	305	610	98	20,6
SF-CH BEL	450	804	1608	428	305	610	150	24,2
SF-CH BEM	450	804	1608	570	305	610	292	31
SF-CH EB	755	498	996	376	610	305	98	27,4
SF-CH EBL	755	498	996	428	610	305	150	31
SF-CH EBM	755	498	996	570	610	305	292	37,8
SF-CH EE	755	804	1608	376	610	610	98	31,8
SF-CH EEL	755	804	1608	428	610	610	150	35,4
SF-CH EEM	755	804	1608	900	610	610	292	42,2
SF-CF/EEM-DUO	755	804	-	900	610	610	98 + 292	42,2
SF-CH EF	755	956	1912	376	610	762	98	36,8
SF-CH EFM	755	956	1912	570	610	762	292	44

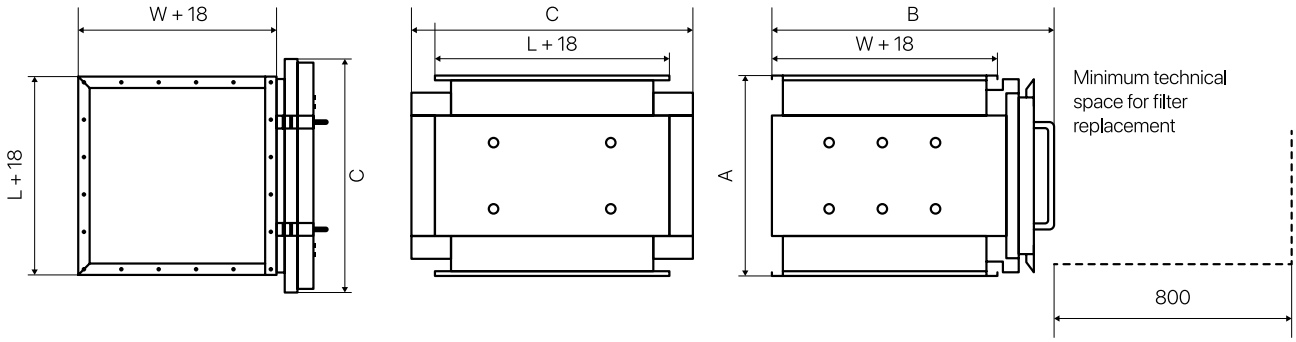
Options

- Horizontal airflow
- Upper/lower manifold - Support feet
- AISI 304 or AISI 316 stainless steel version
- ATEX version
- Built-in manual test scan. Global integrity check according to ISO 14644-3
- Double version with only one door
- Casing with integrated pre-filter DUO Version
- Integrated maintenance table
- Door with inspection window
- Pressure gauge with support
- Factory assembly or pre-assembly
- Individual test report according to EN12237 class D
- Scissors heat sealer

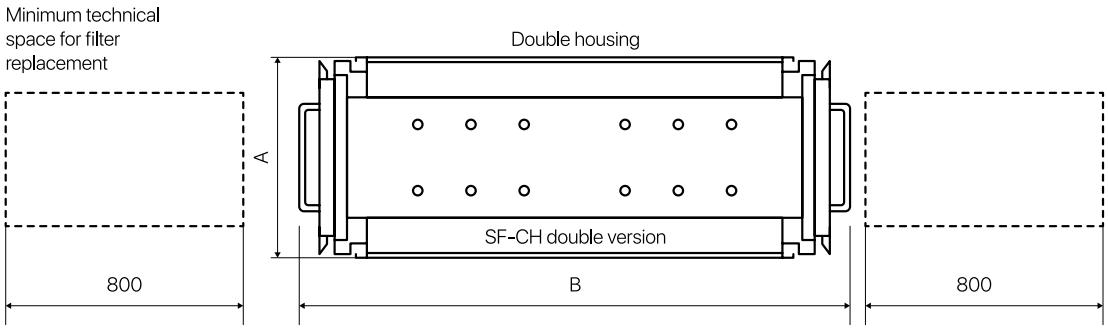


Canister boxes SF-CH

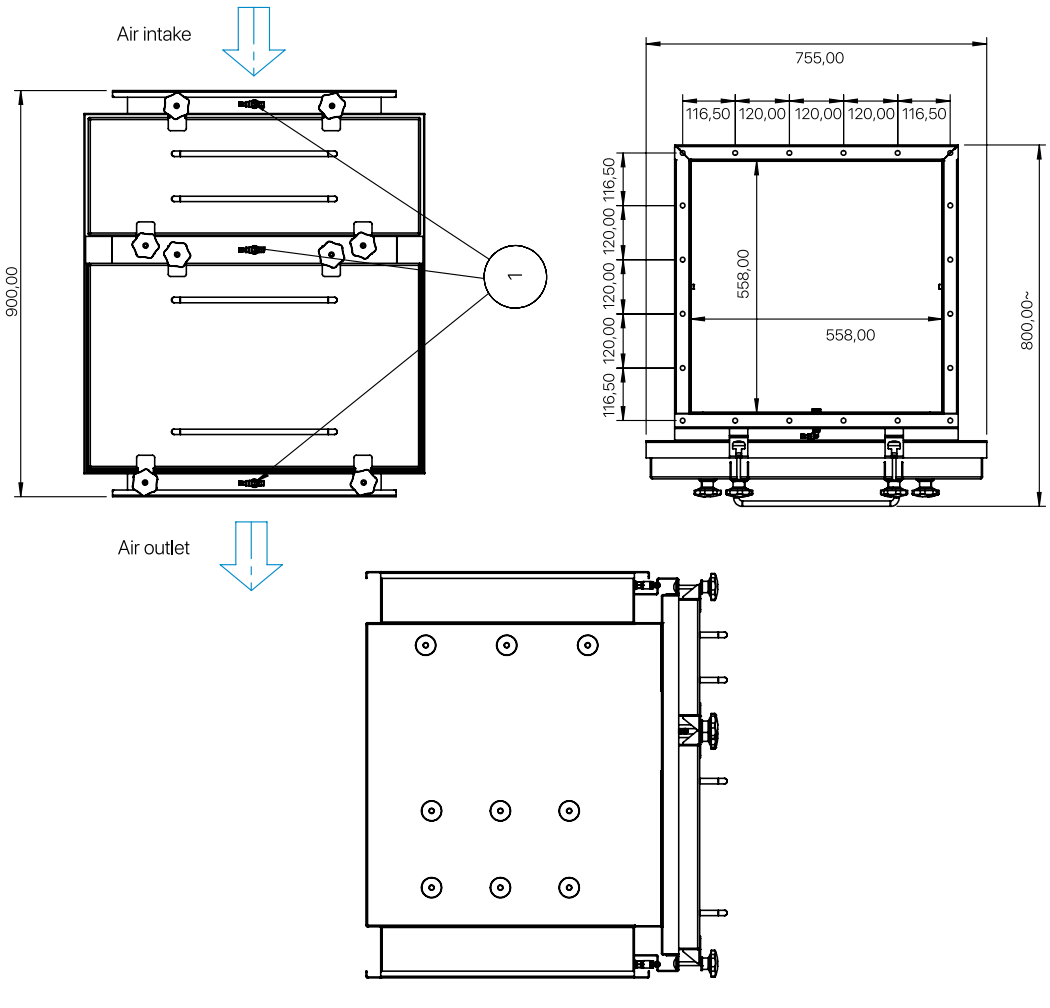
Single entry version



Double entry version

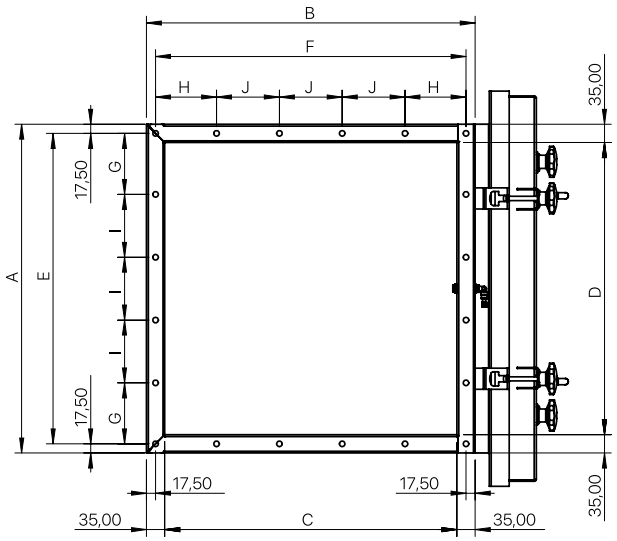


Duo version



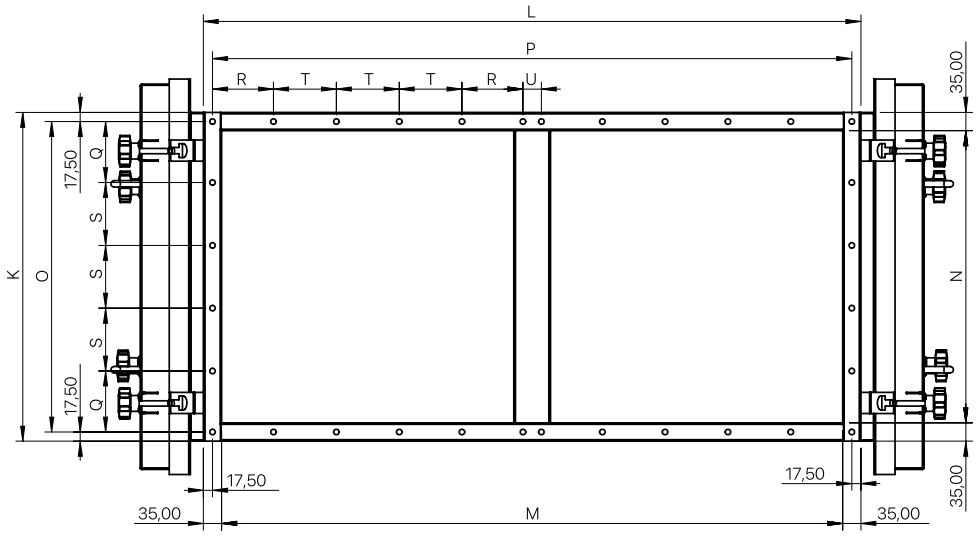
Canister boxes SF-CH

Single door drilling plan



Reference	Dimensions in mm										
	A	B	C	D	E	F	G	H	I	J	No. of holes
EEM EEL EE	628	628	558	558	593	593	116,5	116,5	120	120	20
EBM EBL EB	628	323	253	558	593	288	116,5	96	120	96	16
BEM BEL BE	323	628	558	253	288	593	96	116,5	96	120	16
BBM BBL BB	323	323	253	253	288	288	96	96	96	96	12
EFM EF	628	780	710	558	593	745	116,5	116,5	120	128	22

Double door drilling plan



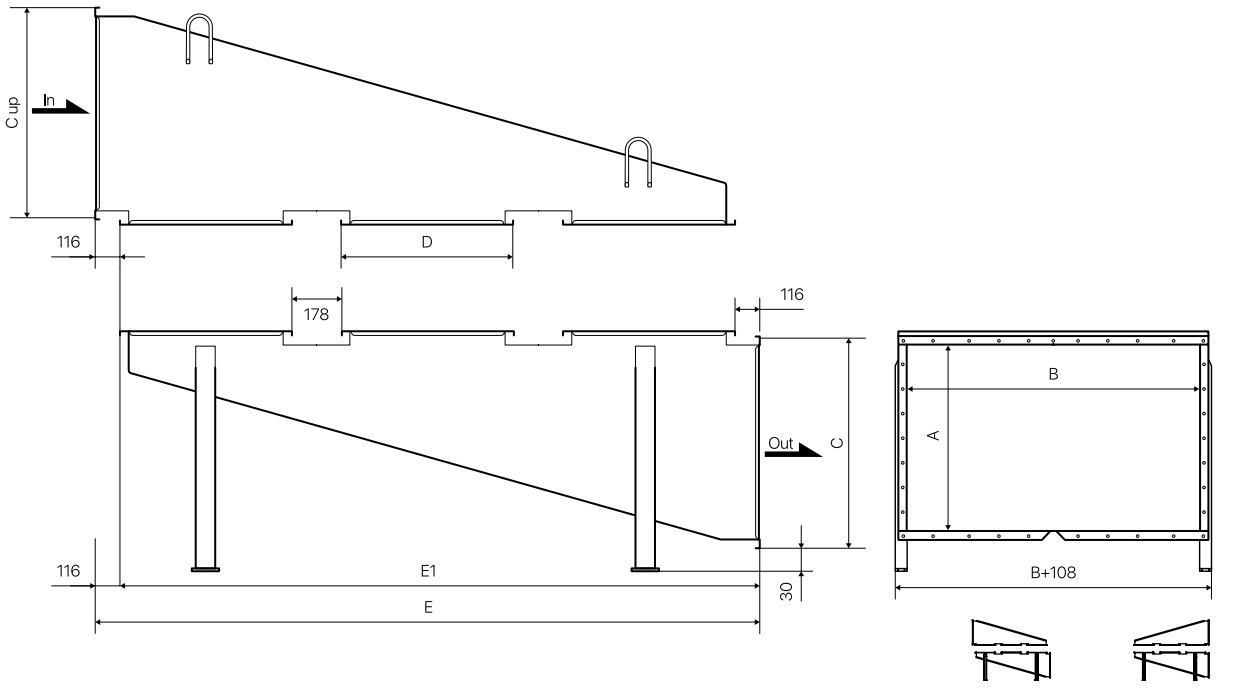
Refe-rence	K	L	M	N	O	P	Q	R	S	T	U	No. of holes
EEM EEL EE	628	1256	1186	558	593	1221	116,5	116,5	120	120	35	20

Canister boxes SF-CH

Standard version

ATEX version

Standard version



Number of enclosures	A	B	C	C up	D	E	E1
1	254	558	376	346	628	860	744
2	254	558	376	346	628	1666	1550
3	406	558	528	498	628	2472	2356
4	558	558	680	650	628	3278	3162
5	558	558	680	650	628	4084	3968
6	812	558	934	904	628	4890	4774
7	812	558	934	904	628	5696	5580
8	915	558	1037	1007	628	6502	6386

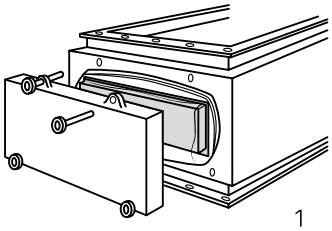
N.B.: the dimensions of the connectors apply to filter sizes 610x610 mm
Check the air speed at the entrance/exit of the collectors, it must be < 10 m/s

Filter replacement procedure

Replace filter

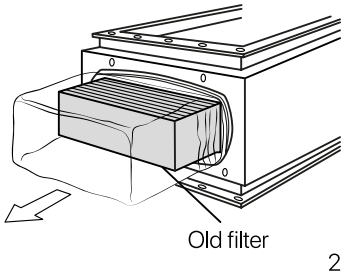
Replace filter

- Turn off the fan
- Close the registers upstream and/or downstream (if present)
- Level the pressure (if balance valve is present)
- Loosen the star knobs and remove the door
- Release the filters by turning the handles horizontally



1

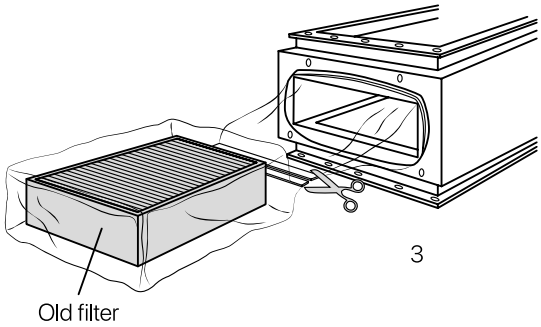
- Unroll the plastic bag
- Pull the filter into the plastic bag and place it on a flat surface or maintenance table



2

Sealing the plastic bag

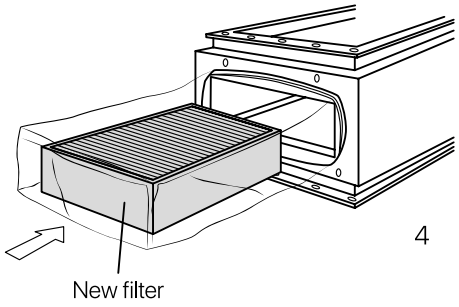
- Flatten the bag without creases
- Seal the bag with a thermal welding machine at 2 points and cut the bag between the 2 welds



3

Placing a new filter

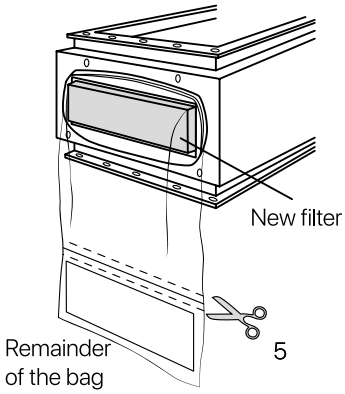
- Place the filter in the bag with the seal facing up towards the air inlet
- Place the elastic of the new plastic bag over the groove around the opening of the housing



4

Remove the rest of the old plastic bag

- Detach the remainder of the old bag from the housing and pull it into the recess provided in the new bag
- Slide the new filter into place in the housing without damaging the seal
- Use the lever system to tighten the filter
- Roll up the plastic bag with the remainder of the old bag and place it against the filter
- Replace the door and tighten the knobs



5

Canister boxes SF-CH

Example of a configuration: SF-CH/EF M S G -

1 2 3 4 5

1-Dimensions	
BB	305x305
BE	305x610
EB	610x305
EE	610x610
EF	610x762

2-Filter depth	
-	98 mm
L	150 mm
M	292 mm

3-Version	
S	Single version
Bi-Side	Double version

4-Equipment	
G	Steel RAL 9010
S	AISI 304L
SS	AISI 316L

5-Option	
DUO	Filter 610*610*292 + 610*610*98 (48)

HOSPITALS : TERMINAL HOODS

Air treatment in hospitals

NF S 90 351 standard defines four types of risk areas

- Zone 1 (low risk) for areas where only comfortable climate control is required.
- Zone 2 (moderate risk) for external consultations, rehabilitation services, maternity hospitals, outpatient clinics for infectious diseases.
- Zone 3 (high risk) for CPR, intensive care, surgery, chemotherapy, etc.
- Zone 4 (very high risk) for aseptic operating rooms, cancer care, transplants, ophthalmology, etc.

Risk class	Class	Elimination-kinetics particles	Microbiological purity class	differential pressure (positive or negative)	Temperature range	Airflow type in protected zone	Other specifications minimum value
4 (1)	ISO 5	CP 5	M1	15 Pa ± 5Pa	19 °C à 26°C	Unidirectional airflow	Area under the plenum airspeed 0.25 m/s to 0.35 m/s Air exchange rate for the space ≥ 6 volumes/hour
3	ISO 7	CP 10	M10	15 Pa ± 5Pa	19 °C à 26°C	Unidirectional or non-unidirectional airflow	Ventilation rate ≥ 15 volumes/hour unidirectional airspeed 0.25 m/s to 0.3 m/s
2	ISO 8	CP 20	M100	15 Pa ± 5Pa	19 °C à 26°C	Non-unidirectional airflow	Ventilation rate ≥ 10 volumes/hour

(1) With unidirectional airflow, the ventilation rate must be determined separately for the area below the plenum and for the total room.

Calculation example: for a 200 m3 operating room with a recirculated unidirectional airflow of 3 m x 4 m. A 3 x 4 m ceiling blowing air at a velocity of 0.3 m/s produces 12,960 m3/h.

The volume of the area under the airflow is 40 m3, which gives a ventilation rate of 324 vol/h.

Assuming that 6 vol/h of fresh air is sufficient to create overpressure in the room and remove pollutants, the required air flow rate is 1,200 m3/h of fresh air.

When the air is blown into the room via the unidirectional airflow, the area under the airflow is covered by 11,760 m3/h of recirculated air and 1,200 m3/h of fresh air. For risk zone 4 (or 3 in case of a unidirectional airflow) the following is therefore required:

- A unidirectional airflow with sufficient dimensions to protect the entire risk zone for the patient
- An air velocity sufficient to ensure air cleanliness for the entire volume below the plenum
- An air exchange rate that is sufficient to remove the contaminants in the room and to ensure overpressure with respect to the environment

Filtering Ceiling for Operating Theatres

HD-CE

Characteristics

- Diffuse OR ceiling with high efficiency, suitable as a solution for risk zones 3 and 4 according to NFS90:351 and operating rooms A and B according to DIN1946
- Construction in galvanized steel, powder coated, plenum and filter housing airtight (pre)assembled in the factory, total height 450 mm
- Design: in one or more parts for mounting on site, depending on the dimensions and design.
- With airtight lead-through for operating light
- Air supply connection on the side or top of the plenum (dimensions and position depend on the air volume and construction options)
- 25 mm finishing profile around the plenum
- Fixing system above for the suspension and support
- Connection 100% point for the integrity tests and differential pressure measurement filters
- 1-piece sealing surface to ensure airtightness
- Fixing for 68 or 90 mm thick dry-seal filters
- Diffusion of the air by means of perforated grids that cover the entire surface to guarantee a homogeneous distribution and avoid dead zones

Type	Dimensions A x W x H (mm)	Number of parts	Number of filters				Flow rate m³/h		Gewicht (kg)
			305×610×68	610×610×68	610×915×68	610×1220×68	à 0,25 m/s	à 0,32 m/s	
A	2730x1330x450	1	2			3	2350	3000	160
B	2000x2060x450	2		2	4		2670	3420	160
C	2610x2060x450	2			2	4	3670	4700	200
D	2975x2060x450	2			7	1	4170	5340	250
E	2670x2730x450	2			10		5000	6400	220
F	3280x2730x450	4			2	8	6340	8110	300
G	3280x3400x450	4				12	8000	10240	350
H	4070x3280x450	4	2			14	9670	12380	430

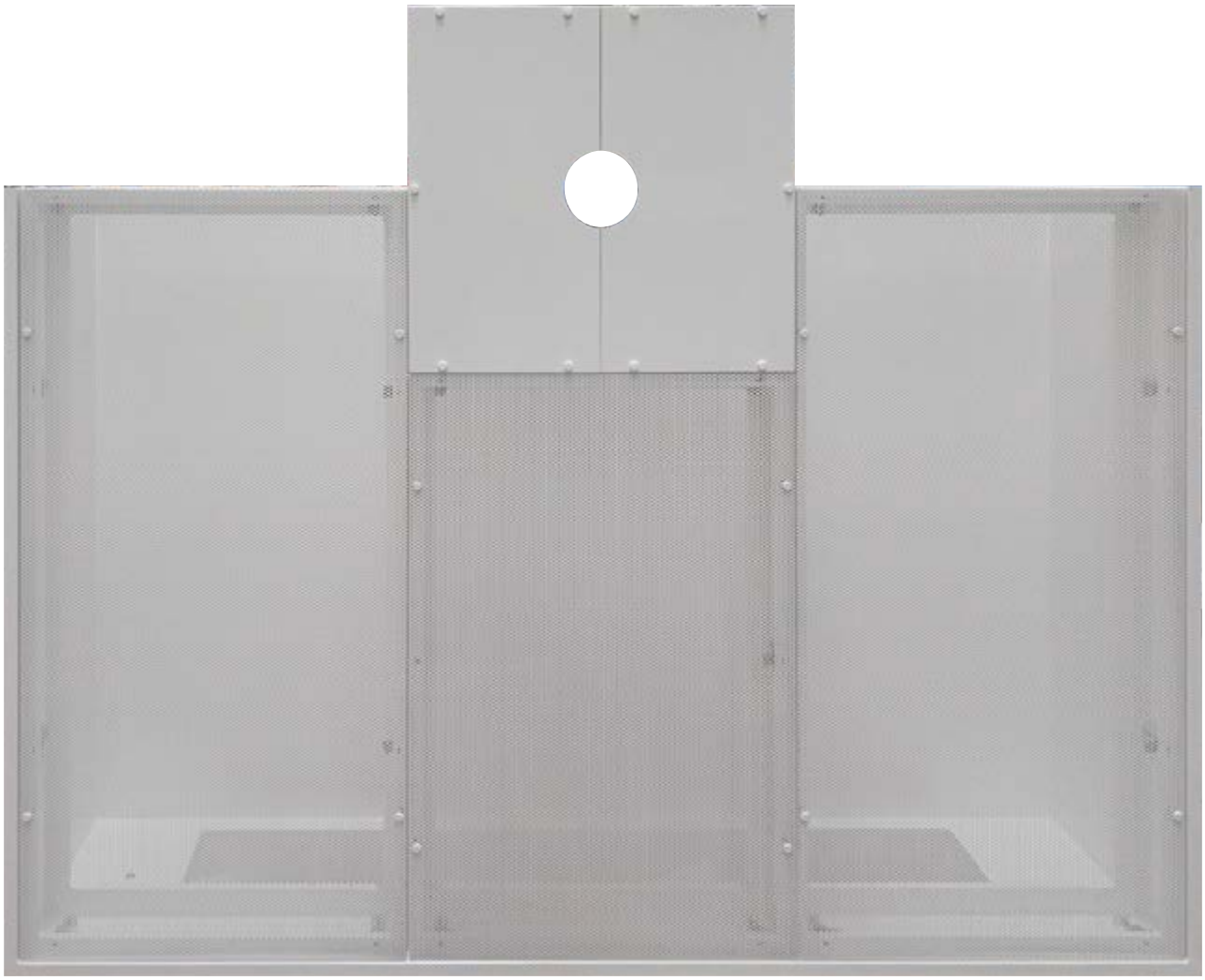
Type	Dimensions A x W x H (mm)	Number of parts	Number of filters				Flow rate m³/h		Gewicht (kg)
			260x560x68	560x560x68	560x860X68	560x1160x68	à 0,25 m/s	à 0,32 m/s	
E1	2510x2530x450	2			10		4430	5540	210
F1	3110x2530x450	4			2	8	5530	7075	290
G1	3110x3150x450	4				12	7000	8960	340
H1	3770x3110x450	4	2			14	8430	10780	420

Filtering Ceiling for Operating Theatres

HD-CE

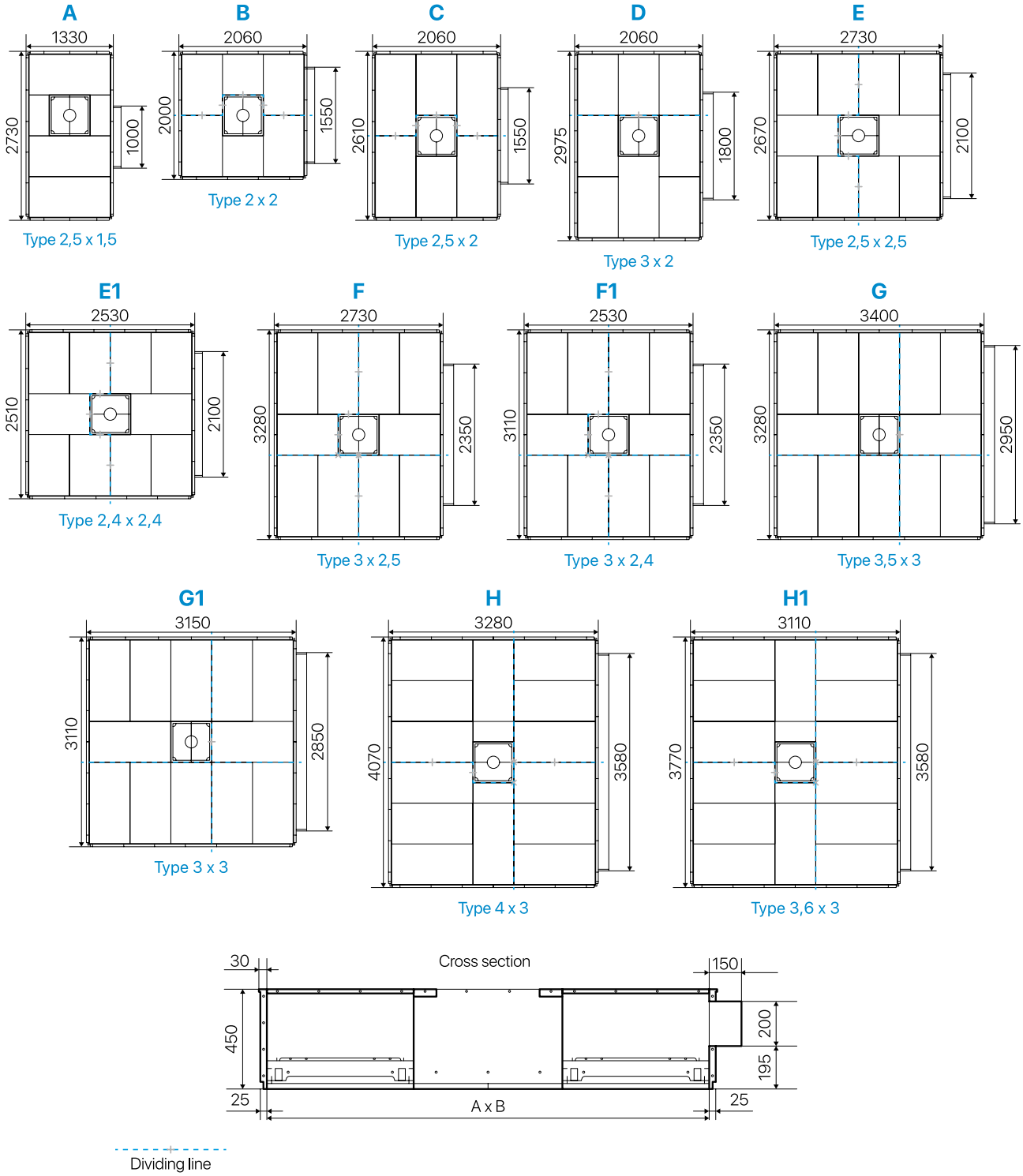
Construction variants and options

- AISI version
- Construction for mounting filters with a gel seal
- Construction for 110mm high filters for lower resistance
- Specially sized air inlet
- Lowered construction of 300 mm possible, max. height air inlet is 140 mm



Filtering Ceiling for Operating Theatres

HD-CE: Schedule default configurations



Filtering Ceiling for Operating Theatres

Example of a configuration: HD-CE/B P A CS G

1 2 3 4 5

1-Dimensions	
A	2730x1330 mm
B	2000x2060 mm
C	2610x2060 mm
D	2975x2060 mm
E	2730x2670 mm
F	3280x2730 mm
G	3280x3400 mm
H	4070x3280 mm
E1	2530x2510 mm
F1	2530x3110 mm
G1	3150x3110 mm
H1	3110x3770 mm

2-Grid type	
P	Standard perforated grid - screw fixing
PT	Perforated grid with 1/4 turn latches

3-Connection	
A	On side A
B	On side B
SP	Special air inlet

4-Operating lamp	
CS	Centered Passage Operating Light
WS	Without passage for operating lamp
ES	Off-Center Passage operating lamp

5-Equipment	
G	Steel RAL 9010
S	AISI 304L

Terminal hoods HL-HD

HL-HD

Characteristics

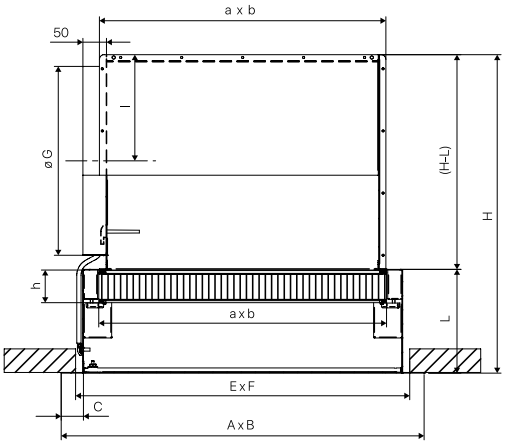
- Galvanized steel, powder coated RAL9010
- Top or side connection
- 68/110mm or 150mm thick HEPA filters
- 2 differential pressure connection ports
- Interchangeable diffusion grid: perforated, swirl or 4-way
- Wall and ceiling mounting

Advantages

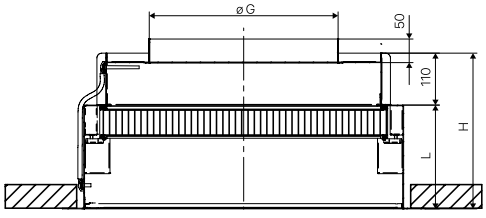
- Multifunctional application: air supply/extraction, wall or ceiling installation
- 3 models of diffusers adapted to different types of distribution:
  - Perforated grid for diffusion vertical
  - Helicoidal grid for a diffusion of air by mixing
  - 4-way grid for a multidirectional diffusion
- L1 tightness according to EN 1881, class C EN1775

Size	Filter dimensions			Installation dimensions			Height connection H		External dimensions (mm)		Flange	Shaft con-nection	
	a	b	h	E	F	L	S	T	A	B	C	I	ØG
HL-HD/BBE	305	305	68-110	410	410	180	390	290	469	469	47	105	159
HL-HD/BBQ	305	305	68-110	410	410	180	430	290	469	469	47	125	199
HL-HD/BBL	305	305	150	410	410	220	470	330	469	469	47	125	199
HL-HD/BEE	305	610	68-110	410	710	180	430	290	469	769	47	125	199
HL-HD/BEQ	305	610	68-110	410	710	180	480	290	469	769	47	150	249
HL-HD/BEL	305	610	150	410	710	220	520	330	469	769	47	150	249
HL-HD/CCE	457	457	68-110	560	560	180	430	290	635	635	55	125	199
HL-HD/CCQ	457	457	68-110	560	560	180	480	290	635	635	55	150	249
HL-HD/CCL	457	457	150	560	560	220	585	314	635	635	55	150	314
HL-HD/EEE	610	610	68-110	710	710	180	480	290	769	769	47	150	249
HL-HD/EEQ	610	610	68-110	710	710	180	545	290	769	769	47	225	314
HL-HD/EEL	610	610	150	710	710	220	670	330	769	769	47	225	399
HL-HD/EGE	915	610	68-110	1010	710	180	545	290	1069	769	47	182.5	314
HL-HD/EGQ	915	610	68-110	1010	710	180	630	290	1069	769	47	225	399
HL-HD/EGL	915	610	150	1010	710	220	670	330	1069	769	47	225	399
HL-HD/EHE	1220	610	68-110	1310	710	180	545	290	1369	769	47	182.5	314
HL-HD/EHQ	1220	610	68-110	1310	710	180	630	290	1369	769	47	225	399
HL-HD/EHL	1220	610	150	1310	710	220	670	330	1369	769	47	225	399
HL-HD/CCE-FP	457	457	68-110	560	560	180	430	290	595	595	35	125	199
HL-HD/CCQ-FP	457	457	68-110	560	560	180	480	290	595	595	35	150	249
HL-HD/CCL-FP	457	457	150	560	560	220	585	314	595	595	35	150	314
HL-HD/CQE-FP	1057	457	68-110	1160	560	180	545	290	1195	595	35	182.5	314
HL-HD/CQQ-FP	1057	457	68-110	1160	560	180	630	290	1195	595	35	225	399
HL-HD/CQL-FP	1057	457	150	1160	560	220	670	330	1195	595	35	225	399

HL-HD S
Side connection



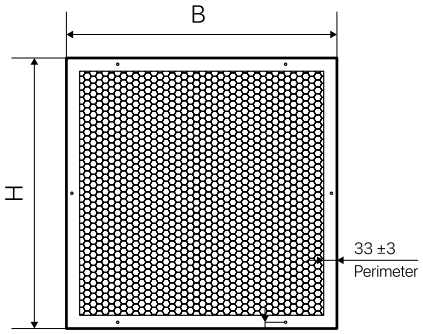
HL-HD T
Top connection



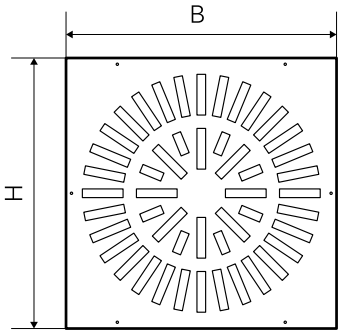
Terminal hoods HL-HD

HL-HD Diffusion grids

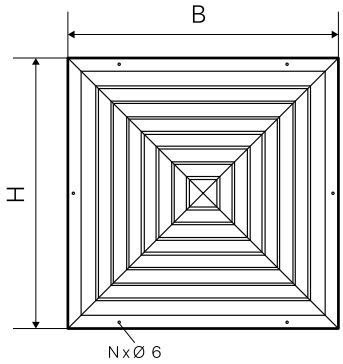
P



S



4W



Size	Total (WxH)	Perforated grid Max. flow rate (m³/h)		Helicoid grid Max. flow rate (m³/h)		4-way grid Max. flow rate (m³/h)	
		Filter E10	Filter H14*	Filter E10	Filter H14	Filter E10	Filter H14
GR-HD/BBE	373x373	240	150	200	150	240	150
GR-HD/BBQ	373x373	350	300	200	200	350	300
GR-HD/BBL	373x373	480	300	200	200	480	300
GR-HD/BEE	373x673	480	300	480	300	480	300
GR-HD/BEQ	373x673	700	600	480	400	700	600
GR-HD/BEL	373x673	700	600	480	400	800	650
GR-HD/CCE	523x523	500	335	500	335	600	335
GR-HD/CCQ	523x523	700	700	500	500	750	750
GR-HD/CCL	523x523	700	700	500	500	950	950
GR-HD/EEE	673x673	700	600	700	600	700	600
GR-HD/EEQ	673x673	1000	1000	1000	1000	1200	1200
GR-HD/EEL	673x673	1400	1200	800	800	1500	1500
GR-HD/EGE	673x973	1200	900	1200	900	1200	900
GR-HD/EGQ	673x973	1300	1300	1350	1350	1550	1550
GR-HD/EGL	673x973	1300	1550	1350	1350	1550	1550
GR-HD/EHE	673x1273	1200	1200	1200	1200	1200	1200
GR-HD/EHQ	673x1273	1800	1800	1800	1800	1850	1850
GR-HD/EHL	673x1273	1800	1800	1800	1800	1850	1850
GR-HD/CCE-FP	523x523	500	335	500	335	600	350
GR-HD/CCQ-FP	523x523	700	700	500	500	750	750
GR-HD/CCL-FP	523x523	700	700	500	500	950	950
GR-HD/CQE-FP	1123x523	1100	780	1150	780	1200	780
GR-HD/CQQ-FP	1123x523	1500	1500	1500	1500	1500	1500
GR-HD/CQL-FP	1123x523	1500	1500	1500	1500	1600	1600

* Adjustable according to the installation height of the grids. Perforated grids are generally used with 68mm filters.

Options

- Set of mounting feet
- HL-HD-S version available with cleanroom adjustable register

HL-HD Terminal hood

Example of a configuration: HL-HD/ BB Q T B P T G -
1 2 3 4 5 6 7 8

1-Dimensions	
BB	305x305
CC	457x457
BE	305x610
EE	610x610
EG	610x915
EH	610x1220
CQ	457x1057

2-Filter depth	
E	68/110 mm
Q	68/110 mm
L	150 mm

3-Connection type	
T	Top connection
S	Side connection

4-Connection diameter	
A	160 mm
B	200 mm
C	250 mm
D	315 mm
E	355 mm
F	400 mm

5-Used filter seal	
P	Polyurethane

6-Locking system	
S	Screwed
T	Quarter turn closures

7-Equipment	
G	Steel RAL 9010
S	AISI 304L
SS	AISI 316L

8 -Option	
R	Register
F	Modular - or tile ceiling

Diffusion grids GR-HD

Example of a configuration: GR-HD/BB P V G

1 2 3 4 5

1-Group	
GR-HD	HL-HD

2-Dimensions	
BB	305x305
BE	305x610
CC	457x457
EE	610x610
EG	610x915
EH	610x1220
CC-FP	457x457
CQ-FP	457x1057

3-Grid type	
4W	4-way
P	Perforated
S	Vertebra

4-Locking system	
V	Screwed
T*	Quarter turn closures

* Version not available for 4D grids

5-Equipment	
G	Steel RAL 9010
S	AISI 304L
SS	AISI 316L

Air Return grid

HL-RB

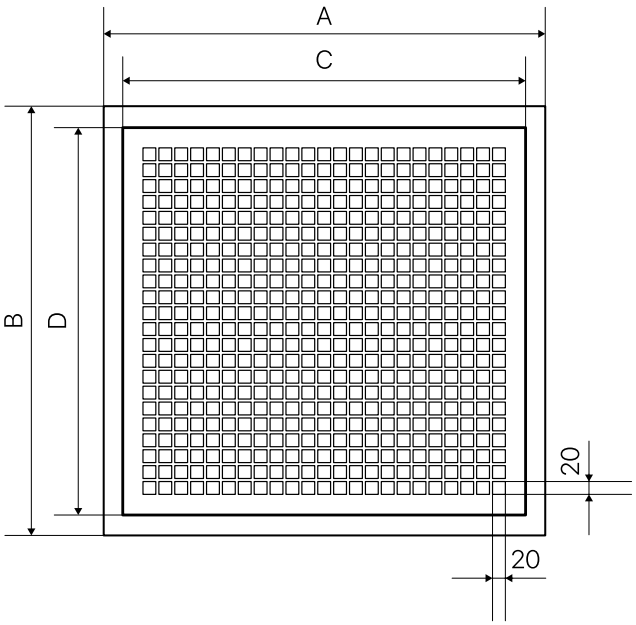
Characteristics

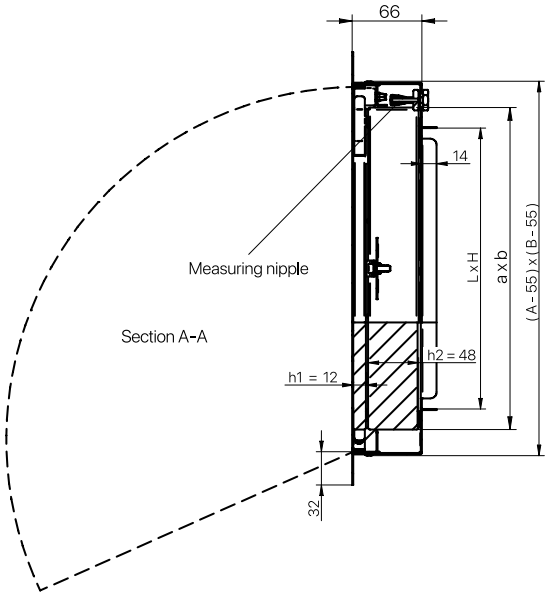
- Application: extraction with filter(s), coarse and/or fine, for cleanrooms with turbulent airflow
- Galvanized steel RAL 9010 powder coating
- Top or side connection
- Factory pre-assembled plenum and filter support
- Disassembly on site possible
- Sealable on site
- For 48mm thick filters
- Measuring nipples mounted
- Perforated grid
- Grate can be opened/closed without tools
- Wall and ceiling installation
- A square mesh perforated grid 20 x 20 mm

Option

- Installation of a 12 mm thick pre-filter on grid

Size	Filter dimensions (mm)			Grid dimensions		Connection opening plenum	Nominal flow rate
	axb	H1	H2	AxB	CxD	LxH	(m³/h)
3.1	305×150	12	48	410x255	350x195	266x116	200
4.1	395×150	12	48	500x255	440x195	366x116	320
3.3	305×305	12	48	410x410	350x350	266x266	500
3.4	305×395	12	48	410x500	350x440	266x366	540
3.5	305×490	12	48	410x595	350x535	266x466	800
5.3	490×305	12	48	595x410	535x350	466x266	800
4.4	395×395	12	48	500x500	440x440	366x366	840
3.6	305×610	12	48	410x715	350x655	266x571	970
6.3	610×305	12	48	715x410	655x350	571x266	970
4.5	395×490	12	48	500x595	440x535	366x466	1 000
4.6	395×610	12	48	500x715	440x655	366x566	1220
5.5	490×490	12	48	595x595	535x535	466x466	1220
5.6	490×610	12	48	595x715	535x655	466x566	1560
6.6	610×610	12	48	715x715	655x655	566x566	1 950
5.9	490×915	12	48	595x1020	535x960	466x866	2340
7.4	762×395	12	48	867x500	807x440	716x366	1570
7.7	762×762	12	48	867x867	807x807	717x731	3030



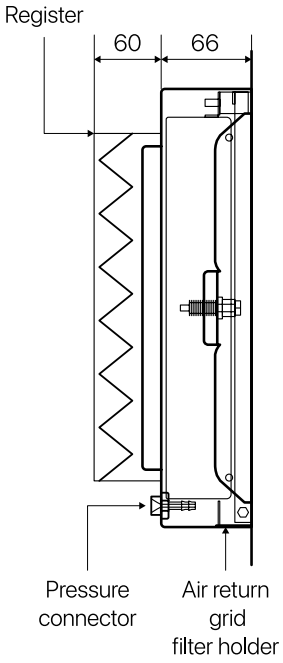


Air Return grid

HL-RB

HL-RB + Register

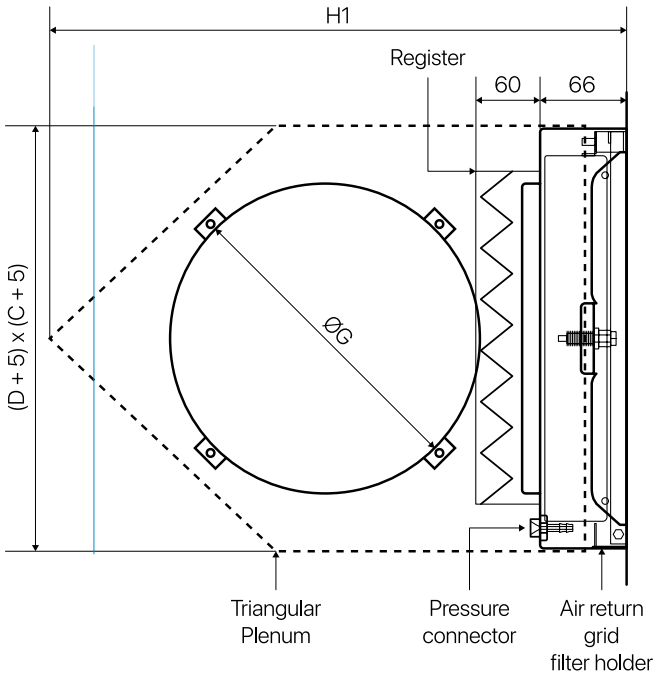
Size	Filter Dimensions (mm)
3.1	305×150
4.1	395×150
3.3	305×305
3.4	305×395
3.5	305×490
5.3	490×305
4.4	395×395
3.6	305×610
6.3	610×305
4.5	395×490
4.6	395×610
5.5	490×490
5.6	490×610
6.6	610×610
5.9	490×915
7.4	762×395
7.7	762×762



HL-RB + Triangular Plenum

Size	1 pipe connection H1	1 pipe connection G	2 pipe connections H1	2 pipe connections G
3.1	260	125	340	200
4.1	300	160	410	250
3.3	340	200	450	250
3.4	350	200	350	200
3.5	420	250	420	250
5.3	-	-	560	355
4.4	410	250	490	315
3.6	450	250	-	-
6.3	-	-	600	400
4.5	490	315	-	-
4.6	490	315	-	-
5.5	490	315	600	400
5.6	560	355	-	-
6.6	600	400	-	-
5.9	600	400	-	-
7.4	-	-	710	500
7.7	710	500	-	-

Note: The connection is by definition at the length C



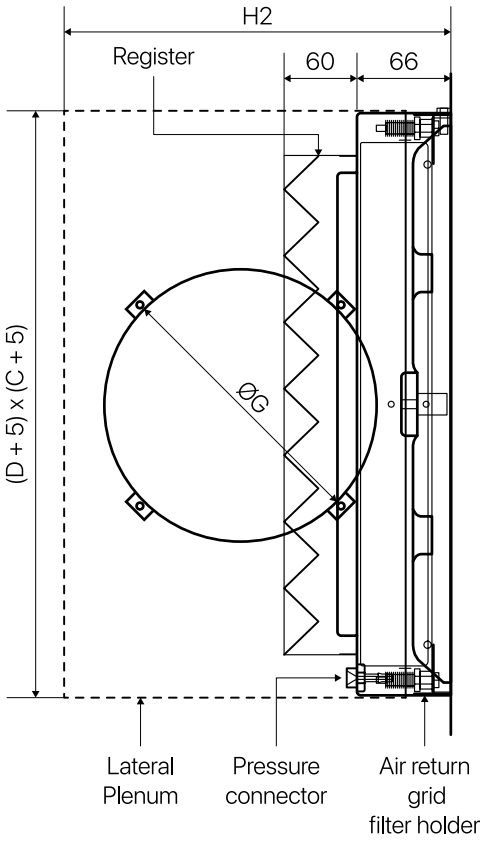
Air Return grid

HL-RB

HL-RB + Lateral Plenum

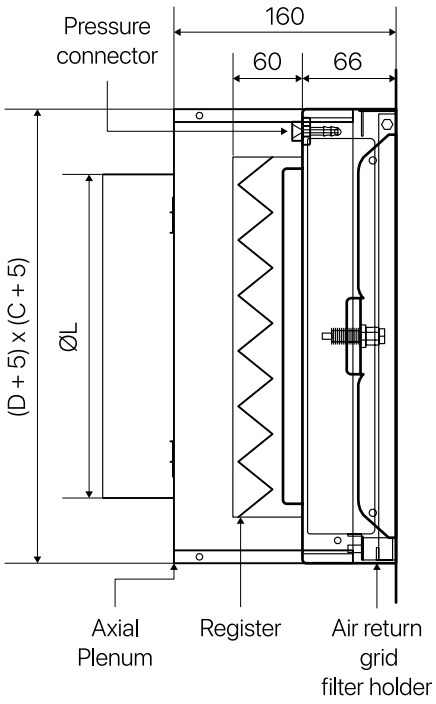
Size	H2	Ø
3.1	230	125
4.1	270	160
3.3	310	200
3.4	310	200
3.5	370	250
5.3	-	-
4.4	370	250
3.6	370	250
6.3	-	-
4.5	450	315
4.6	450	315
5.5	450	315
5.6	480	355
6.6	510	400
5.9	510	400
7.4	-	-
7.7	610	500

Note: The connection is by definition at the length C



HL-RB + Axial Plenum

Size	ØL
3.1	125
4.1	160
3.3	200
3.4	200
3.5	250
5.3	-
4.4	250
3.6	250
6.3	-
4.5	315
4.6	315
5.5	315
5.6	355
6.6	400
5.9	400
7.4	-
7.7	500



Air Return grid HL-RB

Example of a configuration: HL-RB/6.6 T1 G M G R

1 2 3 4 5 6

1-Dimensions	
3.1	305x150
4.1	395x150
3.3	305x305
3.4	305x395
3.5	305x490
5.3	490x305
4.4	395x395
3.6	305x610
6.3	610x305
4.5	395x490
4.6	395x610
5.5	490x490
5.6	490x610
6.6	610x610
5.9	490x915
7.4	762x395
7.7	762x762

2-Plenum	
A	Without plenum
T1	Corner plenum - 1P
T2	Corner plenum - 2P
S	Plenum lateral
T	Plenum top

3-Connection diameter	
A	125 mm
B	160 mm
C	200 mm
D	250 mm
E	315 mm
F	355 mm
G	400 mm
H	500 mm
N	-

4-Locking system	
M	Magnetic - Hinged Grid

5-Equipment	
G	Galvanized steel RAL 9010
S	AISI 304L

6-Register	
R	With register
N	Without register

Corner plenum

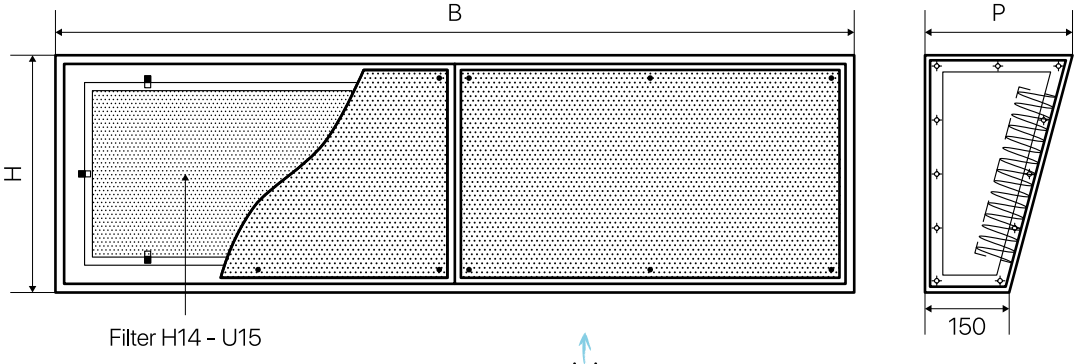
PF

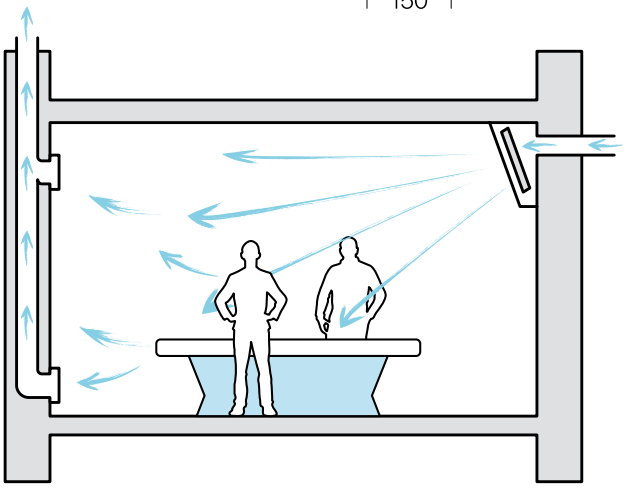
Characteristics

High-efficiency modular corner plenum for risk-3 operating rooms conforming to standard NFS90:351

- Airtight version in AISI 304 l
- Available in 1 or multiple module versions, depending on airflow and installation constraints
- Rear or top air supply (dimensions and position to be confirmed before starting manufacturing process)
- Measuring nipples for differential pressure measurement filters
- 100% collection point for the integrity tests filters
- One-piece seals for optimum airtightness
- Modified clamping system for dry seal filters
- Air diffusion over the entire surface by means of perforated grids fitted with a quarter turn screw closure

Type	Air flow (m³/u)	WxHxP (mm)	Filters
1248	600	1440 x 430 x 265	2 x 305x610x68
1260	750	1744 x 430 x 265	2 x 305x762x68
1272	900	2050 x 430 x 265	2 x 305x915x68
2448	1200	1400 x 725 x 340	1 x 610x1220x68
2460	1500	1744 x 725 x 340	2 x 610x762x68
2472	1800	2050 x 725 x 340	2 x 610x915x68
2496	2400	2660 x 725 x 340	2 x 610x1220x68
2430	2250	2546 x 725 x 340	3 x 610x762x68
2436	2700	3005 x 725 x 340	3 x 610x915x68





DUCT HOUSING

About ISO 16890

In order to guarantee the quality of a service or product, most companies work according to ISO standards. An ISO standard means that a service or product meets general expectations regarding safety, durability and effectiveness.

The classification of air filters based on the minimum efficiency of a filter is currently determined by the ISO 16890 standard. This means that our products are tested for particles that vary in size between 0.3 and 10 m (microns or micrometers). The new standard replaces the old standard EN779, which only tested for particles down to 0.4 m. Thanks to the ISO 16890 standard, we can provide insight into which filters offer protection against solid particles.

How are the filters tested?

To determine what a filter does and does not block, we place the filter in a test bench. In this test bench we determine the efficiency (Ei) of the filter with the standardized test substance. We measure efficiency with:

ePM1 0,3 - 1 micron
ePM2.5 0,3 - 2,5 micron
ePM10 0,3 - 10 micron

The filter is then placed in a special cabinet for 24 hours where IPA (isopropyl alcohol) is nebulized. In this way we eliminate the effect of any electrostatic charge. We put the filter back in the test bench and measure the efficiency again ($E_{D,i}$).

The average efficiency then becomes:
$E_{A,i} = 0{,}5 \cdot (E_i + E_{D,i})$

Classification according to ISO 16890

ISO 16890 classifies air filters into four groups. To fall into a certain group, a filter must capture at least 50% of the relevant particle size. If a filter captures more than 50% of PM1 particles, it is an ISO ePM1 filter. If a filter captures less than 50% of PM10 particles, it falls under the ISO Coarse filters.

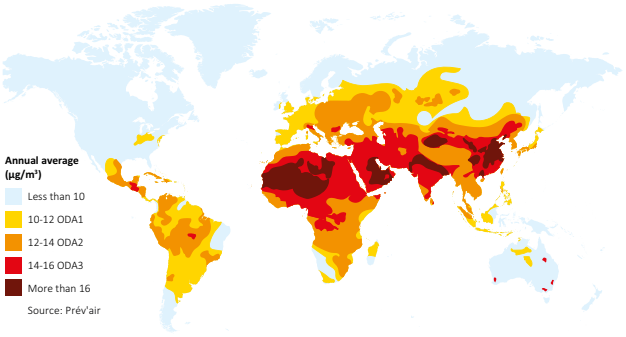
ISO ePM1	ePM1, min ≥ 50%
ISO ePM2,5	ePM2,5, min ≥ 50%
ISO ePM10	ePM10 ≥ 50%
ISO Coarse	ePM10 ≤ 50%, classification based on initial gravimetric yield

Within the various groups, a distinction is made on the basis of the percentage efficiency. We round this percentage down to 5%. If you are looking for a filter that captures 60% of all particles smaller than 1 micron, then choose an ePM1 60% filter. If 80% of those particles have to be stopped, then an ePM1 80% filter is the right option.

How do I choose the right filter?

Based on ISO 16890, Eurovent has drawn up a guideline for selecting air filters; the directive 4/23-2020. The table below shows how the different filter classes relate to the quality of the outdoor air and the desired classification of the supply air. For every public space or workplace there is a filter that meets the specific needs.

ISO ePM1	ISO ePM2,5	ISO ePM10
ISO ePM1 50%	ISO ePM2,5 50%	ISO ePM10 50%
ISO ePM1 55%	ISO ePM2,5 55%	ISO ePM10 55%
ISO ePM1 60%	ISO ePM2,5 60%	ISO ePM10 60%
ISO ePM1 65%	ISO ePM2,5 65%	ISO ePM10 65%
ISO ePM1 70%	ISO ePM2,5 70%	ISO ePM10 70%
ISO ePM1 75%	ISO ePM2,5 75%	ISO ePM10 75%
ISO ePM1 80%	ISO ePM2,5 80%	ISO ePM10 80%
ISO ePM1 85%	ISO ePM2,5 85%	ISO ePM10 85%
ISO ePM1 90%	ISO ePM2,5 90%	ISO ePM10 90%
ISO ePM1 95%	ISO ePM2,5 95%	ISO ePM10 95%



Outdoor air quality	ePM2.5	ePM10	ePM1
ODA1	≤ 5µg/m³	≤ 15µg/m³	70%
ODA2	≤ 7,5µg/m³	≤ 22,5µg/m³	80%
ODA3	> 7,5µg/m³	> 22,5µg/m³	90%

Air Supply (AS)
= The flow of air entering the treated room or air entering the system after treatment

* MIN minimum filtration requirement ISO PM1 50%

** MIN minimum filtration requirement ISO PM2.5 50%

Industrial applications that meet the maximum sanitary requirements

- Hospital
- Pharmaceutical industry
- Electronics
- Clean room

Filter box

HL-DA Unit

Characteristics

- Application: Unit with 1 or more filter levels for installation in a duct network
- One-piece galvanized steel
- Pre-drilled 30mm flanges before and after the housing
- Lateral access door for maintenance, closed airtight by means of a seal. star buttons
- Adapted clamping system: U-profile for pre-filters, eccentric cams for the HEPA filters, fully welded construction for the activated carbon cylinders
- Mounted test nipples
- Class C according to standard EN 1751, class L1 according to standard EN 1886
- Mechanical resistance +/- 1500 Pa

Configuration

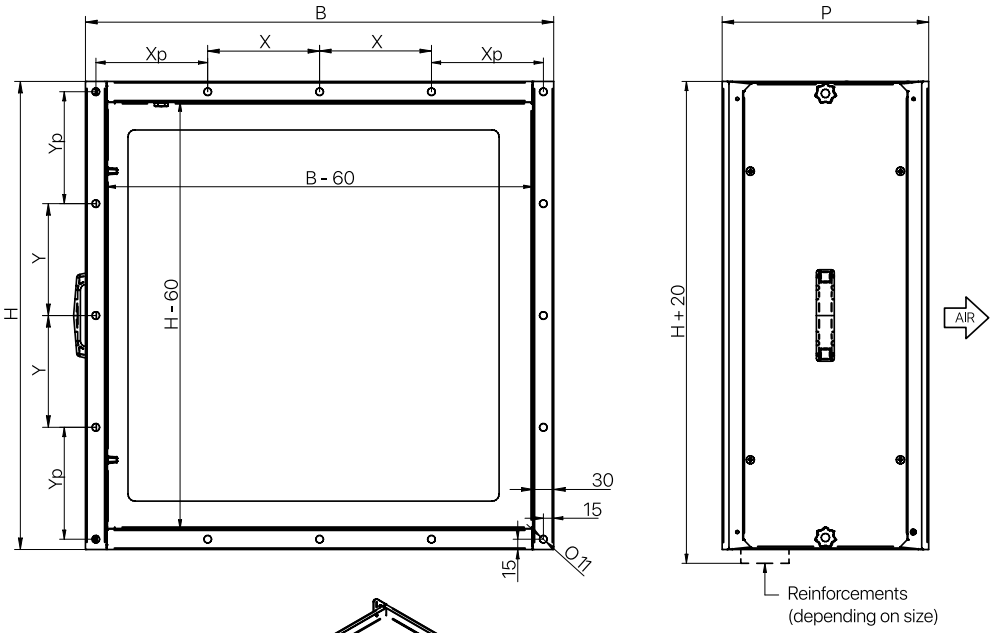
- Installation of 1 to 3 filter levels: pre-filter, high-efficiency filter, activated carbon filter and HEPA filter
- Possibility to mount 1 or more filters per filter level at higher flow rates

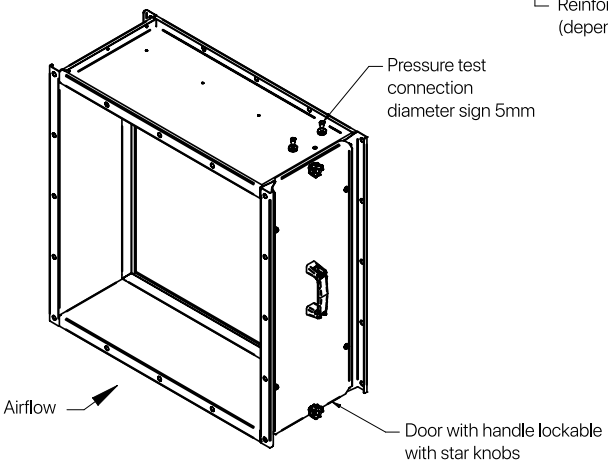
Type	Number of filters	Size filters (mm)	Width (mm)	Height (mm)	H (mm)	W (mm)	Y (mm)	Yp (mm)	X (mm)	Xp (mm)
H0.5L0.5	1	287×287	315	315	375	375	-	172.5	-	172.5
H0.5L1	1	287×592	620	315	375	680	-	172.5	162.5	162.5
H1L0.5	1	287×592	315	620	680	375	162.5	162.5	-	172.5
H1L1	1	592x592	620	620	680	680	162.5	162.5	162.5	162.5
H1L1.5	1 1	592x592 287x592	930	620	680	995	162.5	162.5	170	142.5
H1L2	2	592x592	1240	620	680	1300	162.5	162.5	170	125
H1.5L1	1 1	592x592 287x592	620	930	995	680	170	142.5	162.5	162.5
H1.5L2	2 2	592x592 287x592	1240	930	995	1300	170	142.5	170	125
H2L1	2	592x592	620	1240	1300	680	170	125	162.5	162.5
H2L1.5	2 2	592x592 287x592	930	1240	1300	995	170	125	170	142.5
H2L2	4	592x592	1240	1240	1300	1300	170	125	170	125
H2L3	6	592x592	1855	1240	1300	1920	170	125	170	95
H3L2	6	592x592	1240	1855	1920	1300	170	95	170	125
H3L3	9	592x592	1855	1855	1920	1920	170	95	170	95

Configuration	Description	Depth (mm)
A	Pre-filter with thickness 48 mm	300
B	Pre-filter with thickness 98 mm (HPQ)	300
C	Pre-filter 48 mm + Bag filter max 535 mm or compact filter 292 mm	700
D*	Pre-filter 48 mm + HEPA Filter : 610x610x292 and 305x610x292	700
E	Pre-filter 48 mm + Activated Carbon cylinder 450 mm	800
F	Type C+D	1100
G	Type C+E	1100

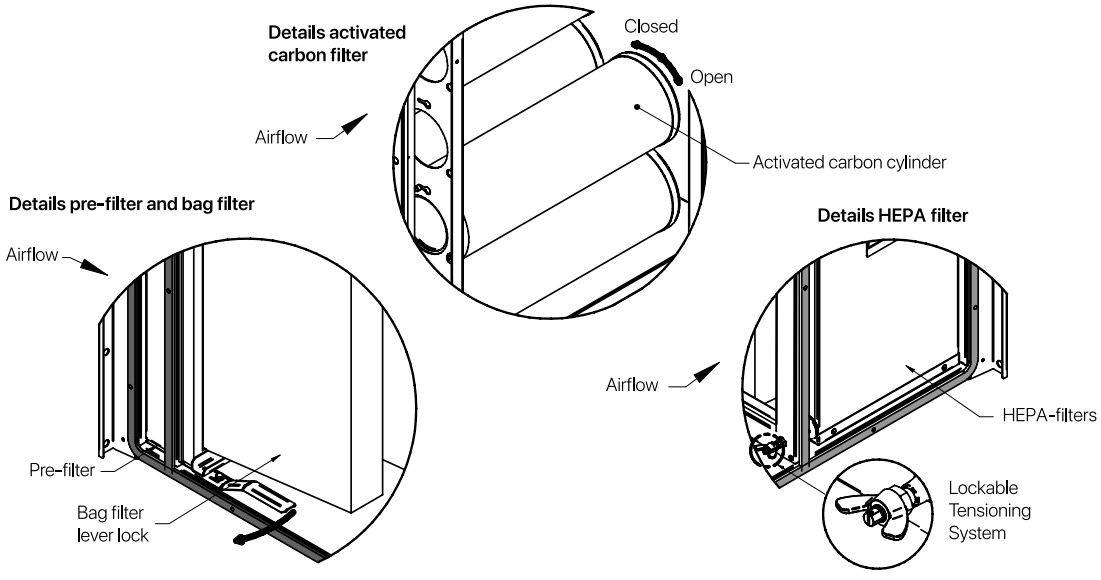
* For configuration D, filter dimensions HEPA 305x305, 305x610, 610x610 mm

Technical description



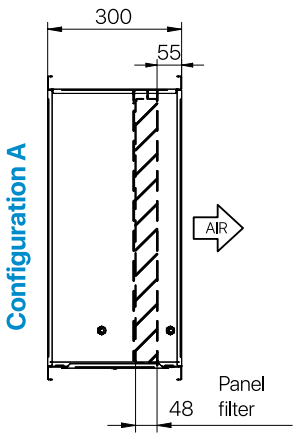


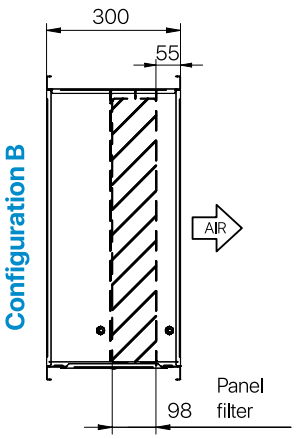
Fixing system for pre-filters, bag filters, HEPA filter, activated carbon filter

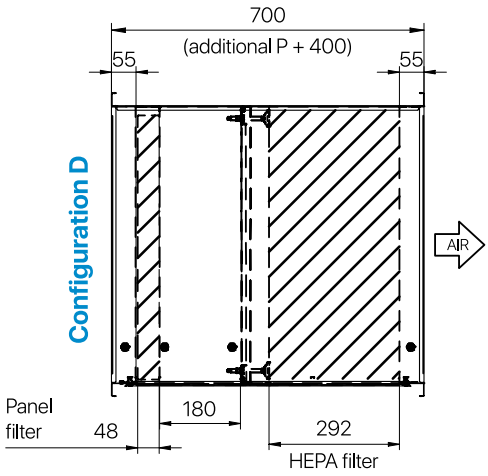


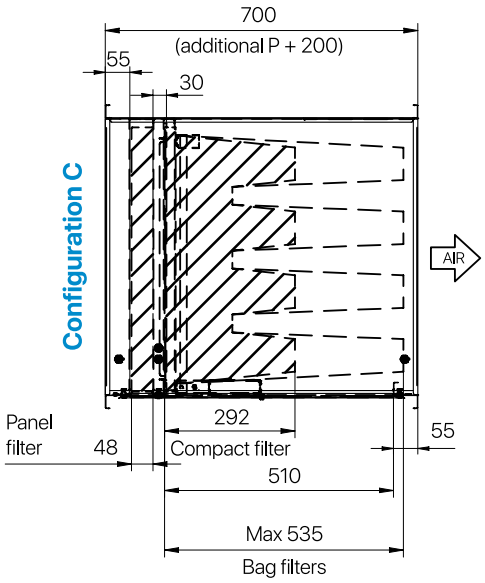
Configuration diagram

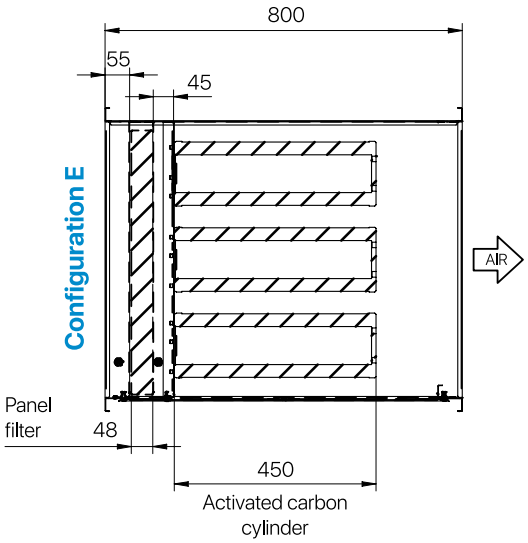
HL-DA Filter box

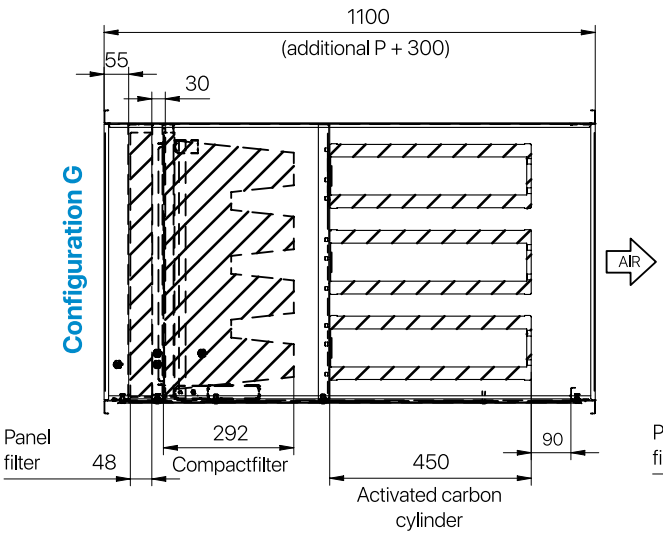


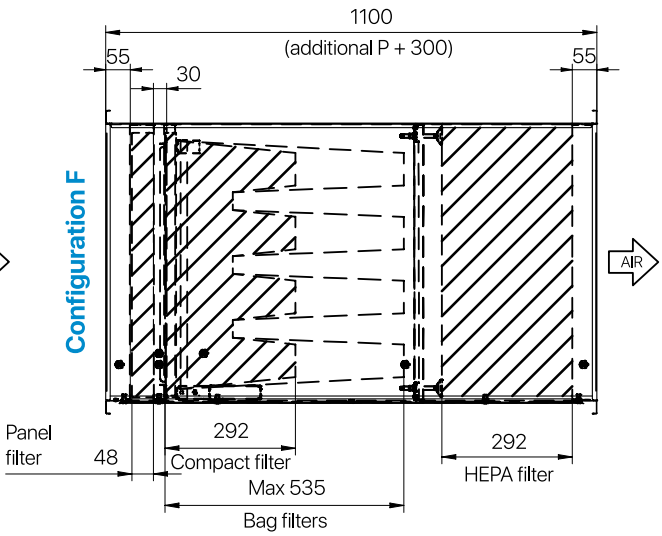






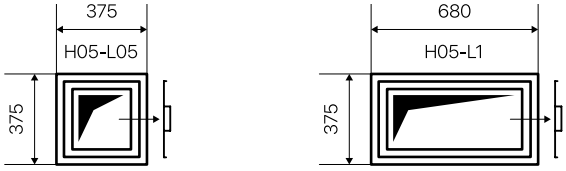




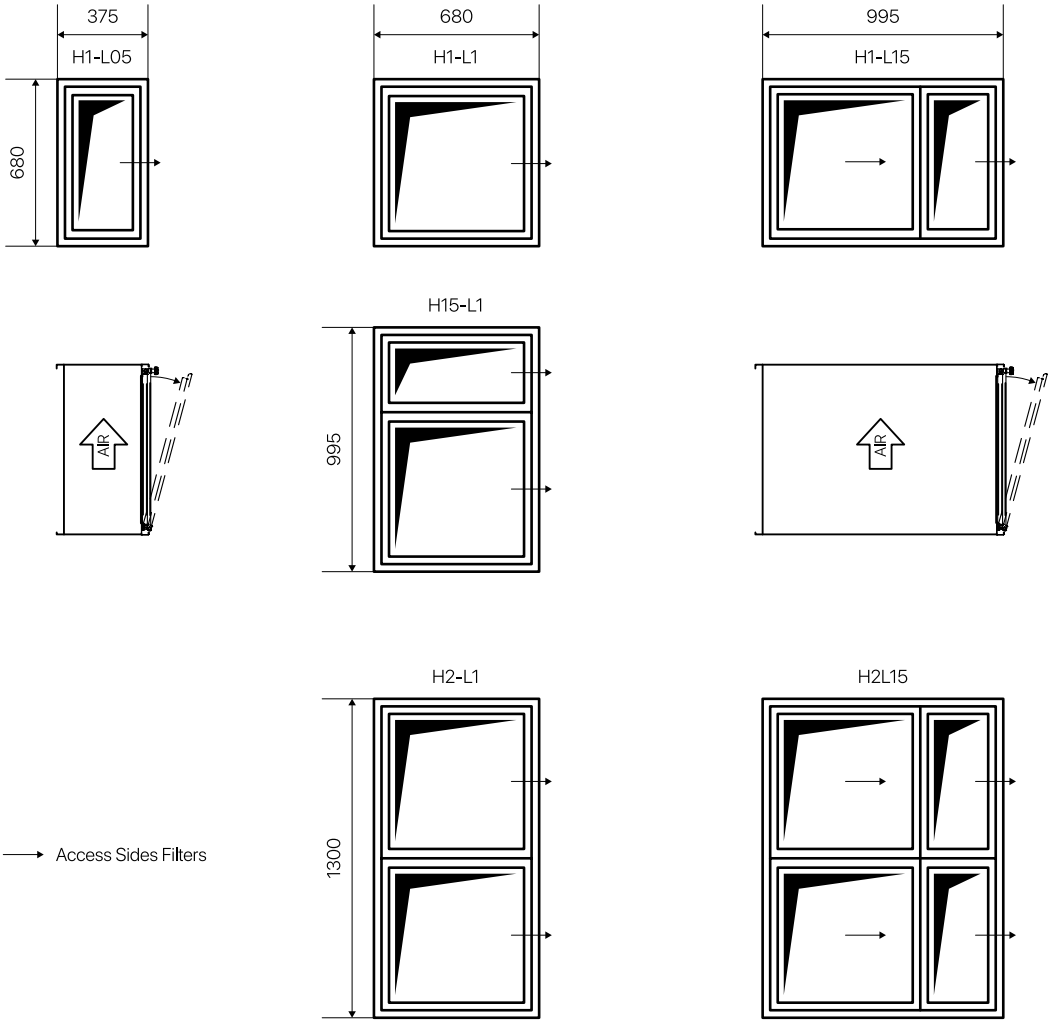


Configuration diagram

Standard door with star knobs

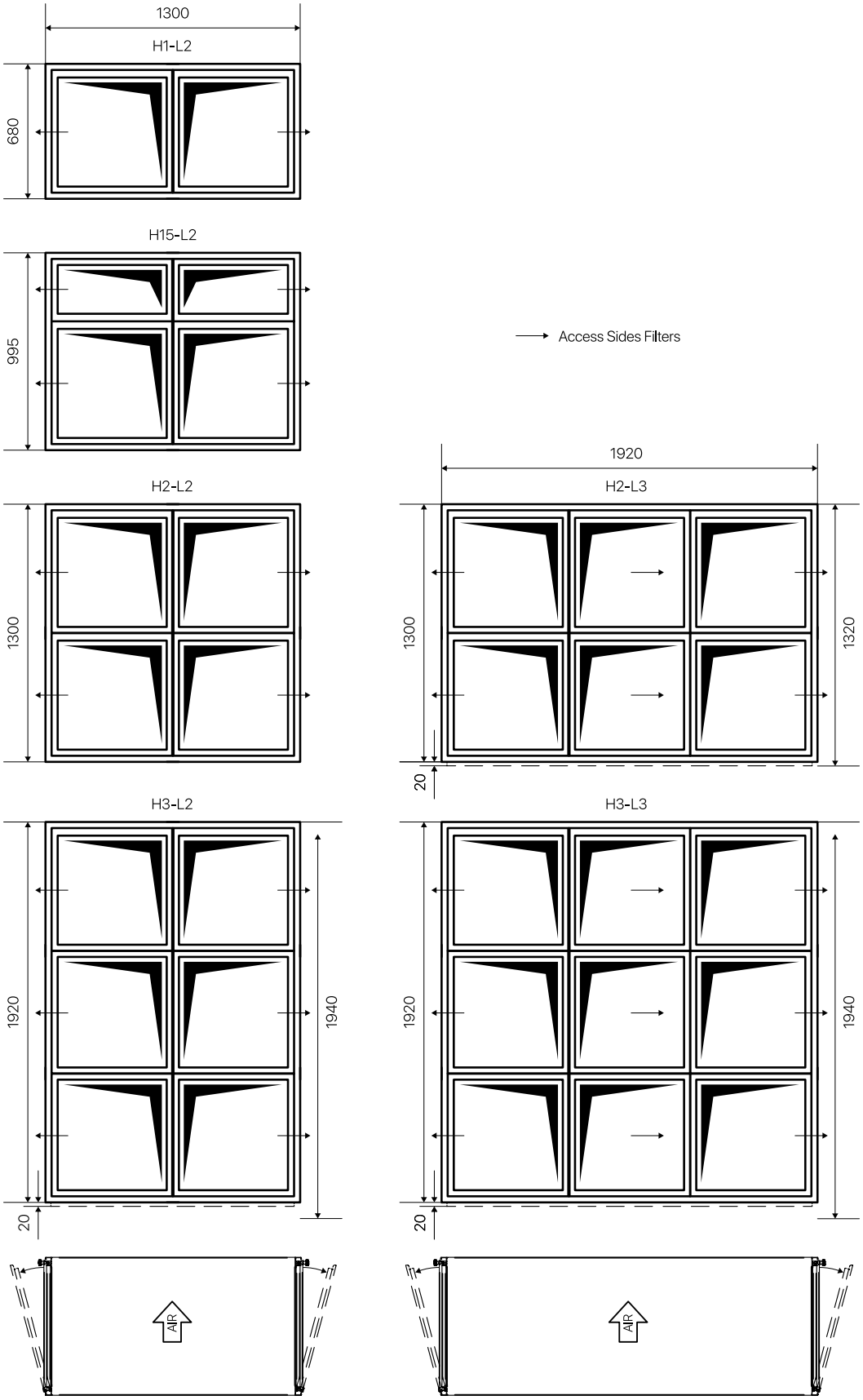


Hinged door with star knobs



Configuration diagram

Double hinged door with star knobs



Construction variations and options

Diamond-tipped roof for outdoor installation

Rain cover with anti-bird screen

Conical reducer round/square

Flat plate with standard connection diameter

Support legs

Outer grid with slats

HL-DA Duct housing

HL-DA Filter box
Configuration with pre-filter and bag filters

HL-DA Filter box
Special reinforced version for activated carbon cylinder H4L4

Construction variants and options

- Made of stainless steel 304L or 316L
- Epoxy coating, RAL color of your choice
- Flange hole pattern on plan
- Round duct connection with flat plate up to size H2L2
- Conical reducers round/square
- Control or shut-off register (class 3 or class 4 according to EN 1751)
- Rain cover with anti-bird screen
- Diamond-tipped roof for outdoor installation
- Support legs
- Equipotential connections for ATEX applications
- Larger size than H3L3
- Specific construction according to the customer's wishes

Filter box HL-DA

Example of a configuration: HL-DA 1212 C W W GS S

1 2 3 4 5 6

1-Dimensions			
Type		WXH (mm)	Standard options
H05L05	1212	375x375	Standard door
H05L1	1224	680x375	Standard door
H1L05	2412	375x680	Hinged door
H1L1	2424	680x680	Hinged door
H1L1,5	2436	995x680	Hinged door
H1L2	2448	1300x680	2 hinged doors
H1,5L1	3624	680x995	Hinged door
H1,5L2	3648	1300x995	2 hinged doors
H2L1	4824	680x1300	Hinged door
H2L1,5	4836	995x1300	Hinged door
H2L2	4848	1300x1300	2 hinged doors
H2L3	4872	1920x1300	2 hinged doors
H3L2	7248	1300x1920	2 hinged doors
H3L3	7272	1920x1920	2 hinged doors

2-Configuration		
Type		Depth housing
A	48 mm thick pre-filter mounted on a slide	300 mm
B	98 mm thick pre-filter mounted on a slide	300 mm
C	Pre-filter + bag filter max 535 mm or compact filter 292 mm Cam-operated clamping on a 25mm flange	700 mm
D	Pre-filter + HEPA filter - thickness 292 mm Tightening in corners	700 mm
E	Pre-filter + Activated carbon filter 450 mm Bayonet mounting	800 mm
F	Type C+D	1100 mm
G	Type C+E	1100 mm

3-Connection - options - inlet	
O	Connection round 100 mm
A	Connection round 160 mm
B	Connection round 200 mm
C	Connection round 250 mm
D	Connection round 315 mm
E	Connection round 355 mm
F	Connection round 400 mm
S	Connection round speciaal
CC	Connection conical
W	Without connection
GV	Rain cover with anti-bird screen
G	Slats outer grid

4-Connection - options - outlet	
O	Connection round 100 mm
A	Connection round 160 mm
B	Connection round 200 mm
C	Connection round 250 mm
D	Connection round 315 mm
E	Connection round 355 mm
F	Connection round 400 mm
S	Connection round speciaal
CC	Connection conical
W	Without connection
GV	Rain cover with anti-bird screen
G	Slats outer grid

5-Equipment	
GS	Galvanized steel
GC	Painted galvanized steel
S	AISI 304L
SS	AISI 316L

6-Option	
S	Standard door
H	Hinged door
DS	Double doors standard (two sides)
DH	Double doors hinged (two sides)
E	External construction
HE	Standard hinged door + External construction
SE	Standard door + External construction
DSE	Double doors standard + External construction
DHE	Double doors hinged + External construction

* Hinged door option not available on H05L05 and H05L1

7-Extra option	
EXP	Construction ATEX
HT	High temperature max 200°C

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