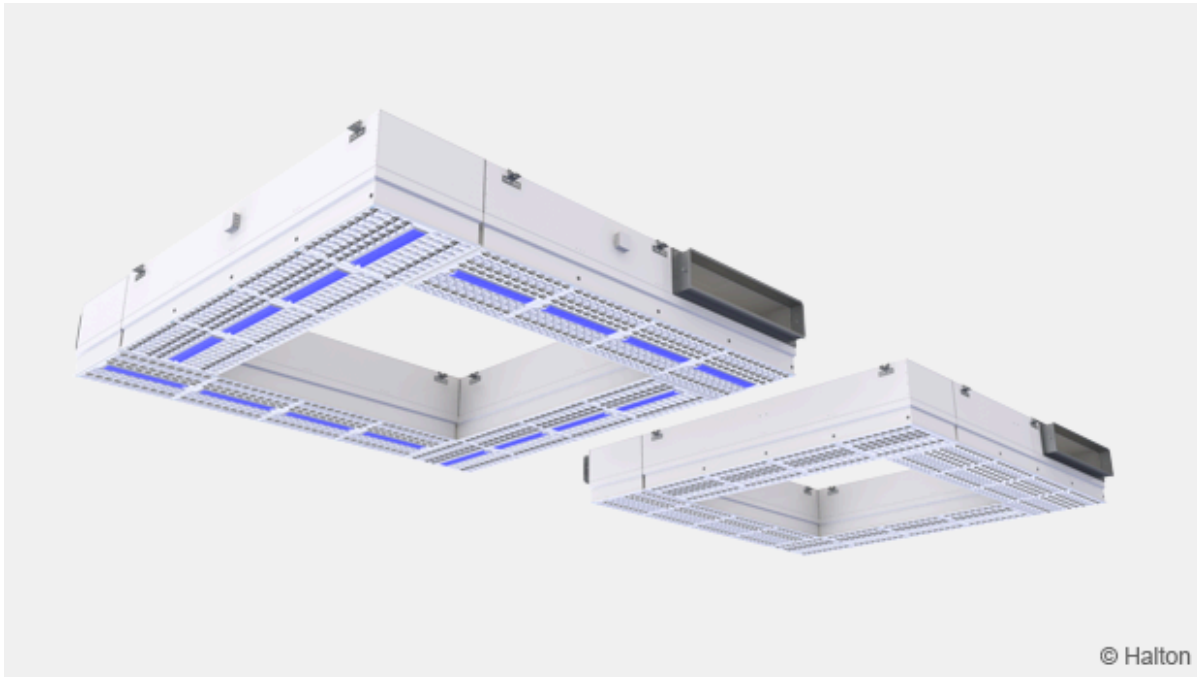


Halton Vita VSR – Supply air unit with blue light disinfection



Overview

Halton Vita VSR is a HEPA supply air unit for the Halton Vita OR Space 5 and Space 7 solutions, available with or without blue light disinfection. Integrated blue light technology provides a chemical-free disinfection method for surfaces to ensure a safer operating environment. Disinfection units also include white light LEDs for general lighting.

Applications

- Operating rooms in hospitals
- Other spaces with high cleanliness requirements

Key features

- Air supply through adjustable nozzles.
- Installed flush to the ceiling.
- Modular structure with several size configurations.
- Two heights available. The higher model reduces the space required for the ductwork.
- Antibacterial epoxy-polyester powder paint finishing to prevent microbial growth.
- Blue light disinfection system for improved room hygiene (optional).
 - Optimised surface irradiation and disinfection performance due to integrated blue light LEDs.
 - High-quality white light LEDs for general room lighting.

- Integrated units allow more space in the false ceiling for other installations.
- Faster installation time due to pre-manufactured units.
- Depending on the used lighting control system, there are two alternative product models available (DALI and On/Off). The product model selection has to be done at latest when ordering the product.
- Used with low-pressure-drop Halton H14 HEPA filters with a gel gasket.
- Test probes for measuring the filter pressure loss and the particle concentration before the filter. Differential pressure transmitter (optional).

Operating principle

Airflow

Air is filtered inside the modules by HEPA filters and supplied into the room through the air nozzles located in the front panel of the unit.

The circumferential supply airflow from the supply air unit is directed partly towards the operating area and partly towards the room periphery. The inward supply airflow displaces the contamination generated in the operating area and prevents the intrusion of the outward supply airflow into the centre.

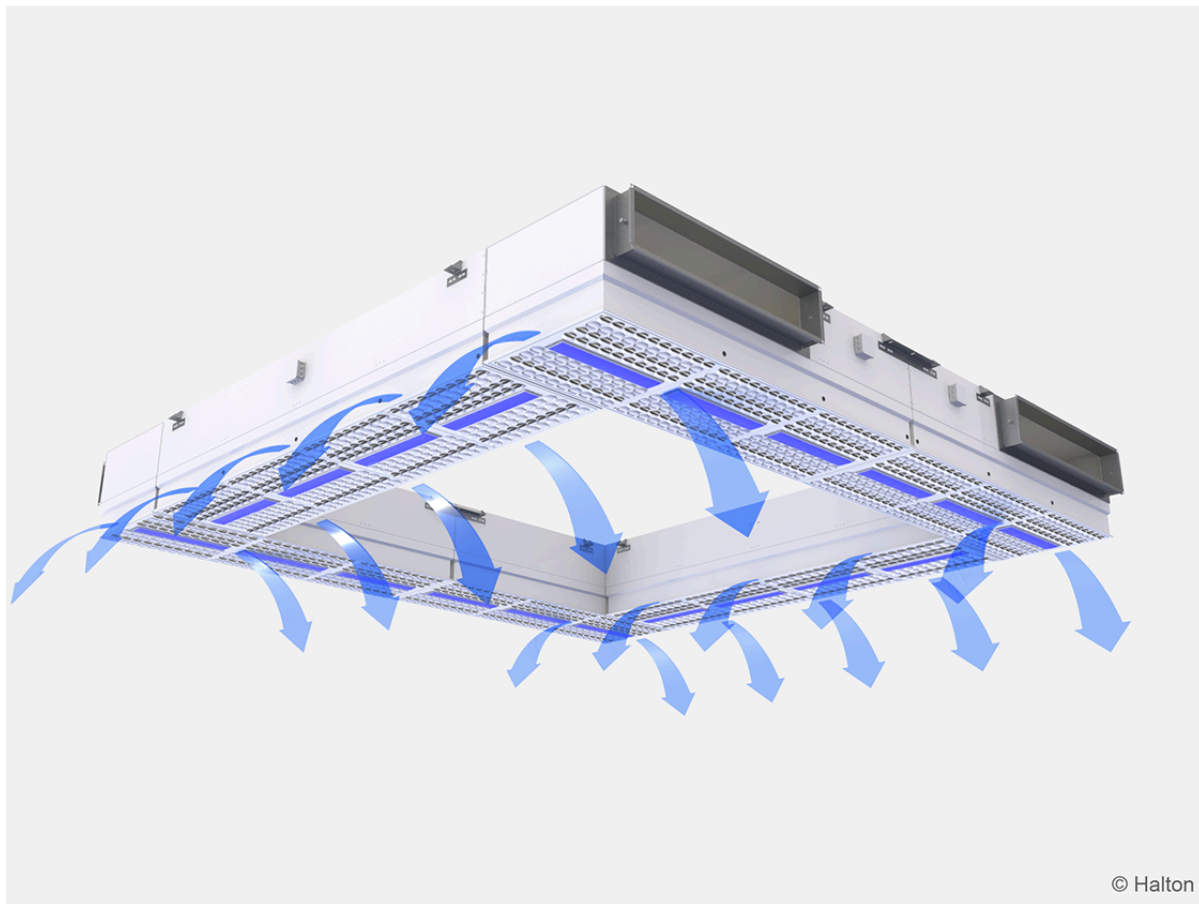


Fig.1. Halton Vita VSR for Space 5

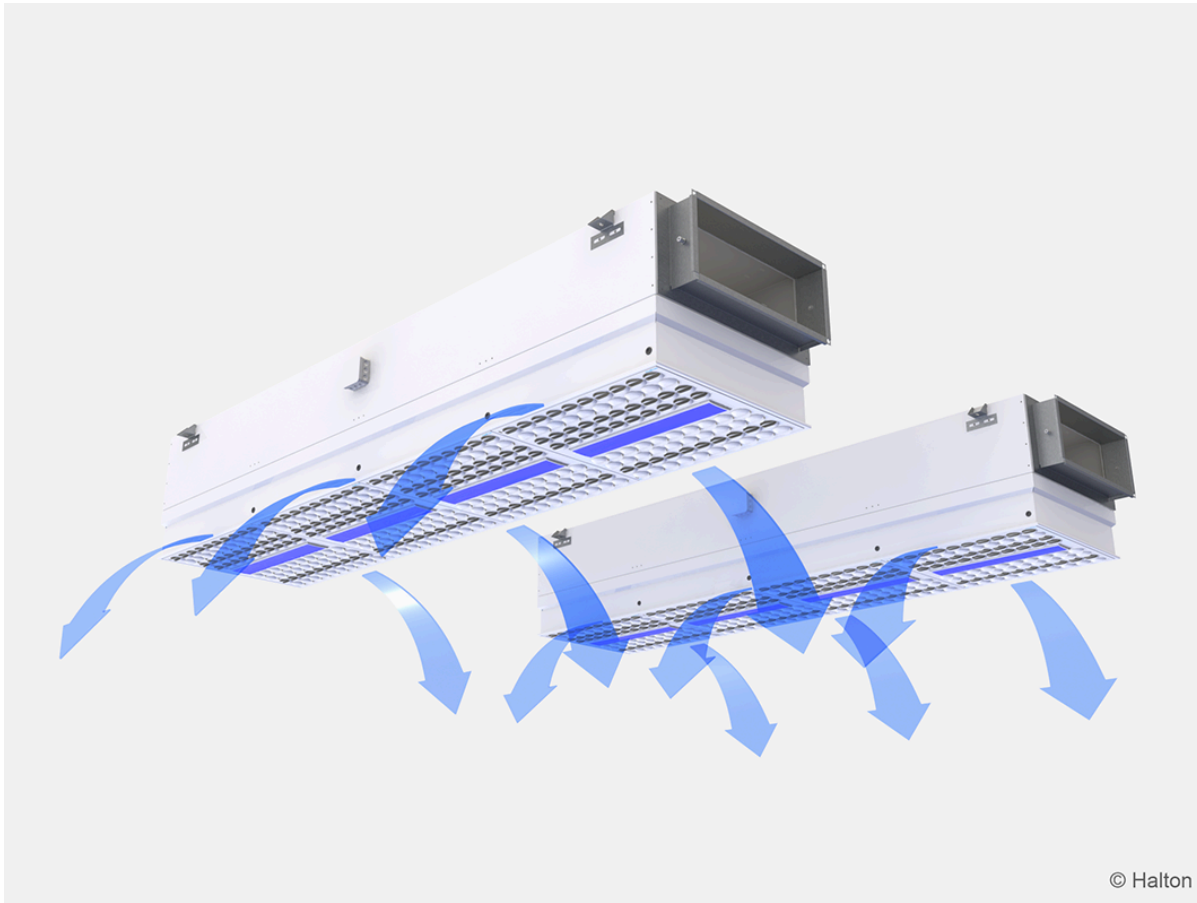


Fig.2. Halton Vita VSR for Space 7

Blue light disinfection system

Disinfection units can be integrated into the product. Each unit has both blue light and white light LED elements. The blue light LEDs are used for surface disinfection and the white light LEDs for general lighting.

The ability of blue light to destroy microbes is based on its ability to energise naturally light-sensitive compounds found in all bacteria, yeast, and mold cells. When these compounds are exposed to high-intensity blue light, a natural chemical reaction starts where free oxygen radicals are formed inside cells. These free radicals are highly reactive molecules that start destroying the cells from within by damaging their internal structures. When continued long enough, the reaction destroys the microbes.

The integrated design of disinfection units provides optimised disinfection over the whole operating room with a special emphasis to the critical operating area. Together with the normal, daily cleaning of operating rooms, blue light disinfection makes it easier to keep the operating room surfaces clean and safe.

Benefits:

- Safer operating environment
 - Blue light destroys microbes on surfaces.
 - Reduced number of microbes in the space.

- Blue light does not develop antimicrobial resistance.
- Disinfection light integrated into the product
 - More space in the false ceiling for other installations.
 - Faster installation time due to pre-manufactured units.
- Fully automatic system
 - The blue light disinfection system can be configured so that it is automatically switched on when the room is not occupied.
 - Ensures disinfection and saves time for the staff.

Laboratory tests on the effectiveness of the blue light disinfection system have been carried out in an accredited laboratory. The results show that the blue light photon disinfection produces relevant bacteria reductions. When combined with photocatalytic coating, relevant reductions are achieved already before 30 minutes.

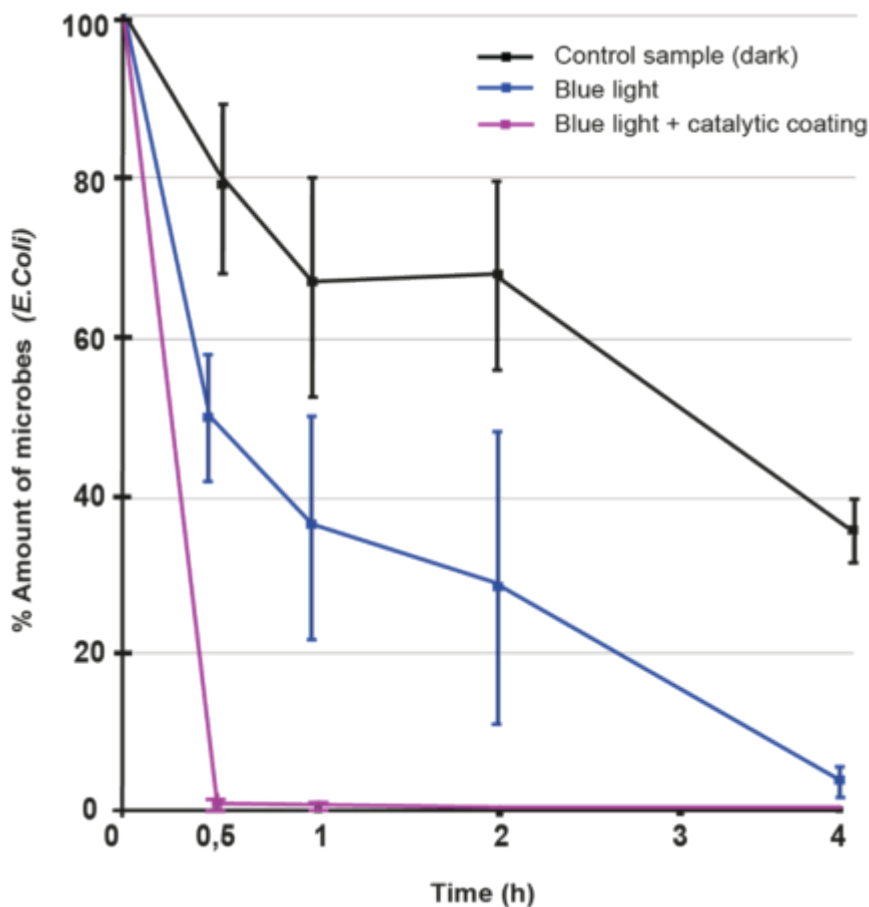


Fig. 3. Bacteria reductions with the blue light disinfection system (LED Taylor Oy)

High quality general room lighting

Blue light disinfection units also include integrated white light LED elements, which enables high-quality general room lighting. This also leads to additional savings in lighting installation and leaves ceiling space free for other installations.

Key technical data

Feature	Description
Airflow rate	Up to 3000 l/s. For performance data, see Halton HIT Design tool.
Dimensions	<p>Space 5:</p> <ul style="list-style-type: none"> • 3000×3000 mm • 3600×3000 mm • 3600×3600 mm • 4200×3600 mm • 4200×4200 mm <p>Space 7:</p> <ul style="list-style-type: none"> • 2400×600 mm • 3600×600 mm <p>Single:</p> <ul style="list-style-type: none"> • 1250×600 mm • 1800×600 mm • 2400×600 mm
Height of unit	<ul style="list-style-type: none"> • 455 mm • 605 mm (available for Space 5 sizes 3600×3000 mm, 3600×3600 mm, and 4200×3600 mm)
Weight (with disinfection units and filters)	<ul style="list-style-type: none"> • Space 5: 301–481 kg • Space 7: 152–230 kg • Single: 37–76 kg
HEPA filter class	H14

Depth of HEPA filter	102 mm
Blue light LEDs	Power consumption: 90 W per disinfection unit. For information on the number of units in different product models, see section Features and options.
White light LEDs	<ul style="list-style-type: none"> • Colour rendering index: $R_a > 90$ • Colour temperature: 4000 K • IP class 44 • Power consumption: 25 W per disinfection unit. <p>For information on the number of units in different product models, see section Features and options.</p>
Light controller type	<ul style="list-style-type: none"> • DALI • Relay (On/Off)

Features and options

The Halton Vita VSR supply air unit is available in three product models and in several size configurations, each with or without disinfection units.

Space 5

A supply air unit for Halton Vita OR Space 5 ultraclean operating rooms (< 10 CFU/m³). The supply- air unit consists of 4-8 modules forming a square or rectangular ring.

- VSR/A: with disinfection units (16-24 units depending on the size of the supply air unit)
- VSR/D: without disinfection units, with option to add disinfection units later

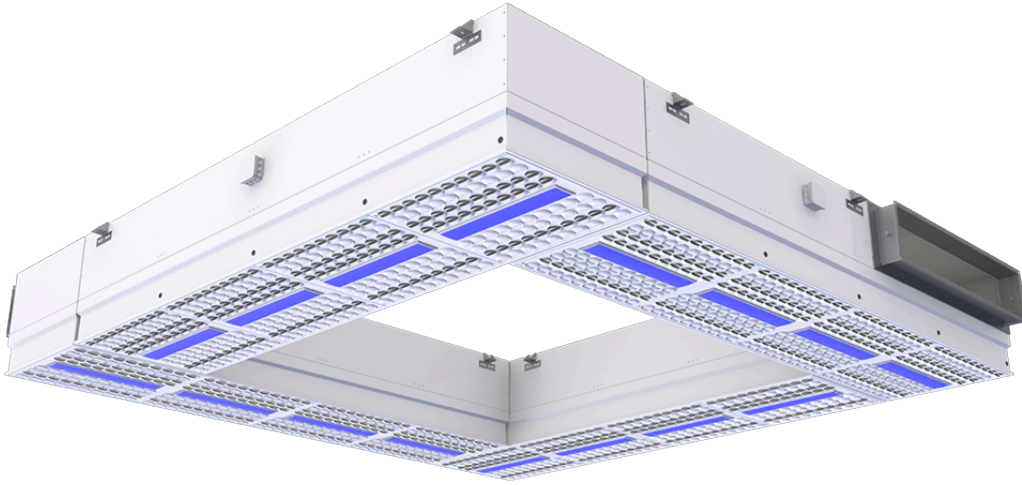


Fig. 5. Halton Vita VSR/A (Space 5)

Space 7

A supply air unit for Halton Vita OR Space 7 clean operating rooms ($< 100 \text{ CFU/m}^3$). The supply air unit consists of 2 parallel modules.

- VSR/B: with disinfection units (8 or 12 units depending on the size of the supply air unit)
- VSR/E: without disinfection units, with option to add disinfection units later

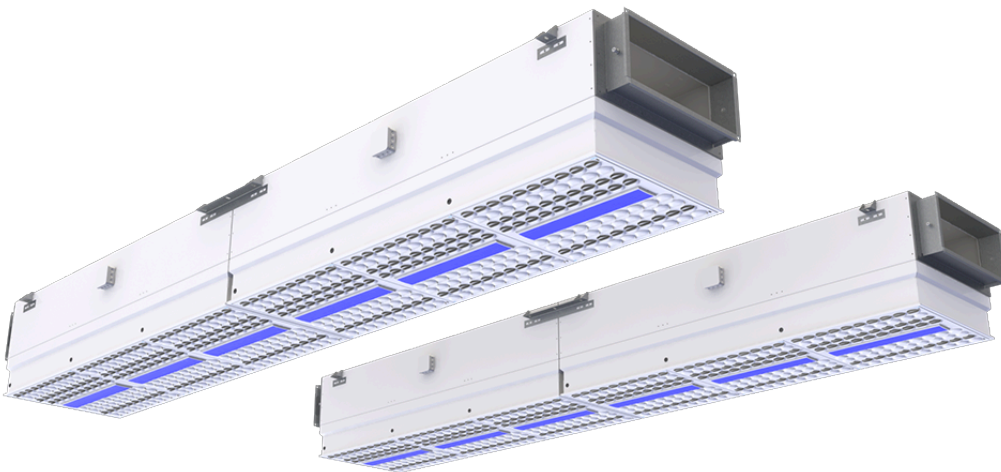


Fig. 6. Halton Vita VSR/B

Single module

- VSR/C: with disinfection units (2-4 units depending on the size of the supply air unit)
- VSR/F: without disinfection units, with option to add disinfection units later

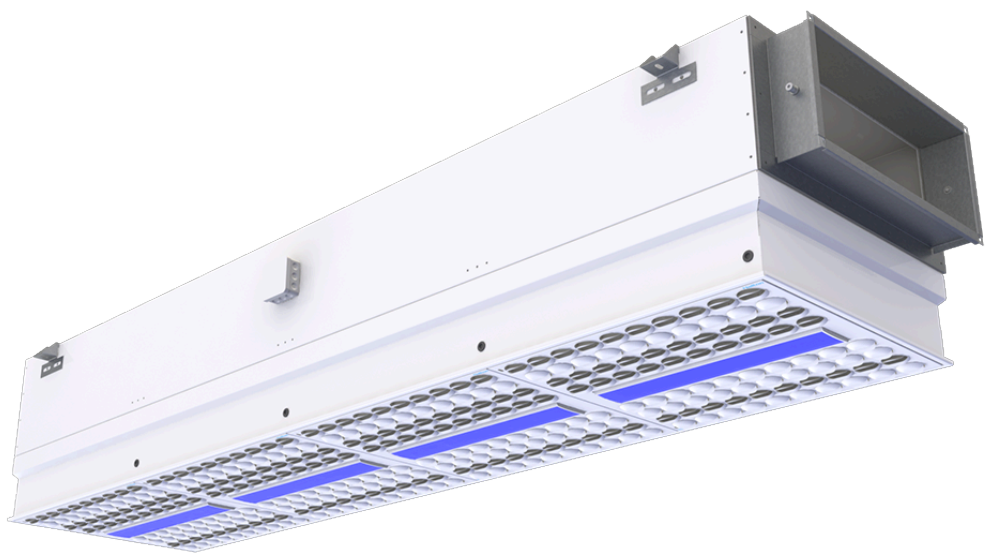


Fig. 7. Halton Vita VSR/C

Feature	Options
Colour	<ul style="list-style-type: none">• White antibacterial epoxy polyester powder paint (RAL 9003).• Normal white powder paint (RAL 9003) as option.
Differential pressure transmitter	<ul style="list-style-type: none">• Not assigned• HDP-PE differential pressure transmitter with display



Fig. 8. Halton HDP-PE differential pressure transmitter

- For information on the pressure transmitter, see Accessories.
- For information on the order code, see Order code.
- For information on filters, see Filters.

Note: Filters need to be ordered separately.

Structure and materials

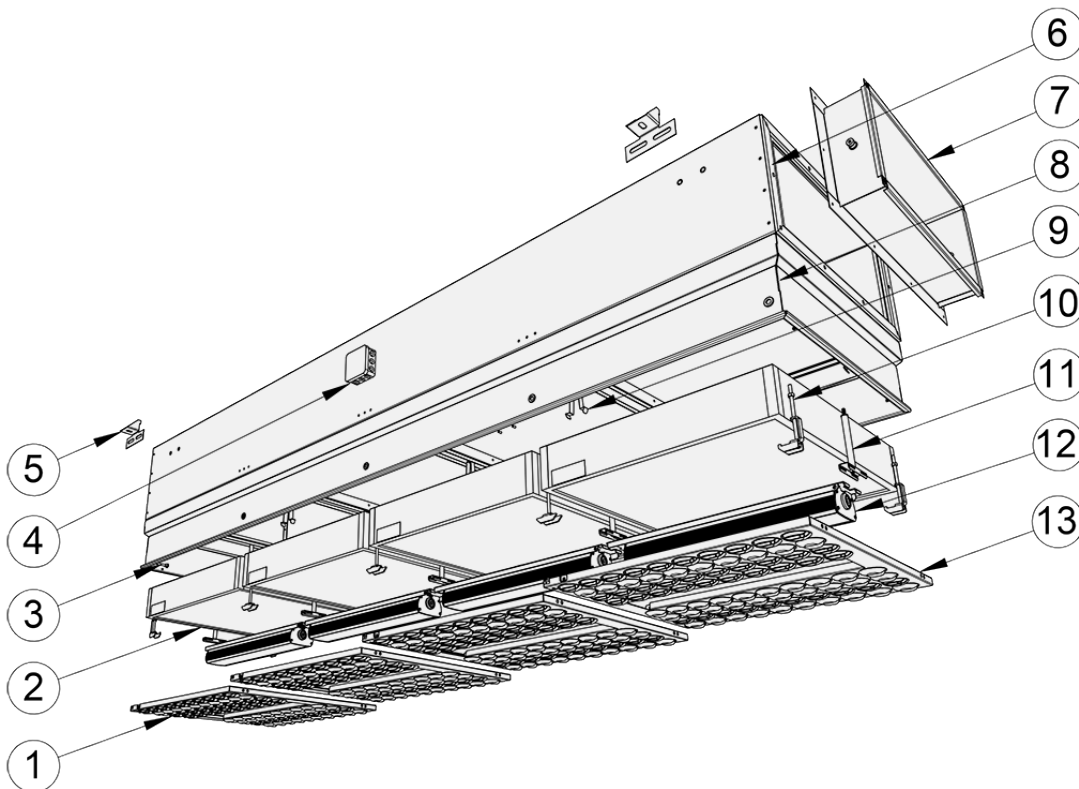


Fig. 9. Structure of Halton Vita VSR with disinfections units

No.	Part	Description
1	Nozzles	Plastic (polyacetal)
2	Filters	Fibreglass paper, aluminium frame, and a gel gasket (H14) Note: Filters need to be ordered separately.
3	Pressure measurement port	Polyurethane
4	Junction box	Plastic (polypropylene). IP65.
5	Fixing brackets	Galvanised steel
6	Duct seal gasket	Cellular polyethylene foam
7	Duct connection	Galvanised steel
8	Casing	Pre-painted aluminium. White antibacterial epoxy polyester powder paint (RAL 9003). Normal white powder paint (RAL 9003) as option.
9	Filter springs	Stainless steel
10	Filter brackets	Acid-proof steel
11	Disinfection unit brackets	Acid-proof steel and copper pipe. White antibacterial epoxy polyester powder paint (RAL 9003).

12	Disinfection unit	Aluminium, glass. IP44.
13	Front panels	Galvannealed steel. White antibacterial epoxy polyester powder paint (RAL 9003). Normal white powder paint (RAL 9003) as option.

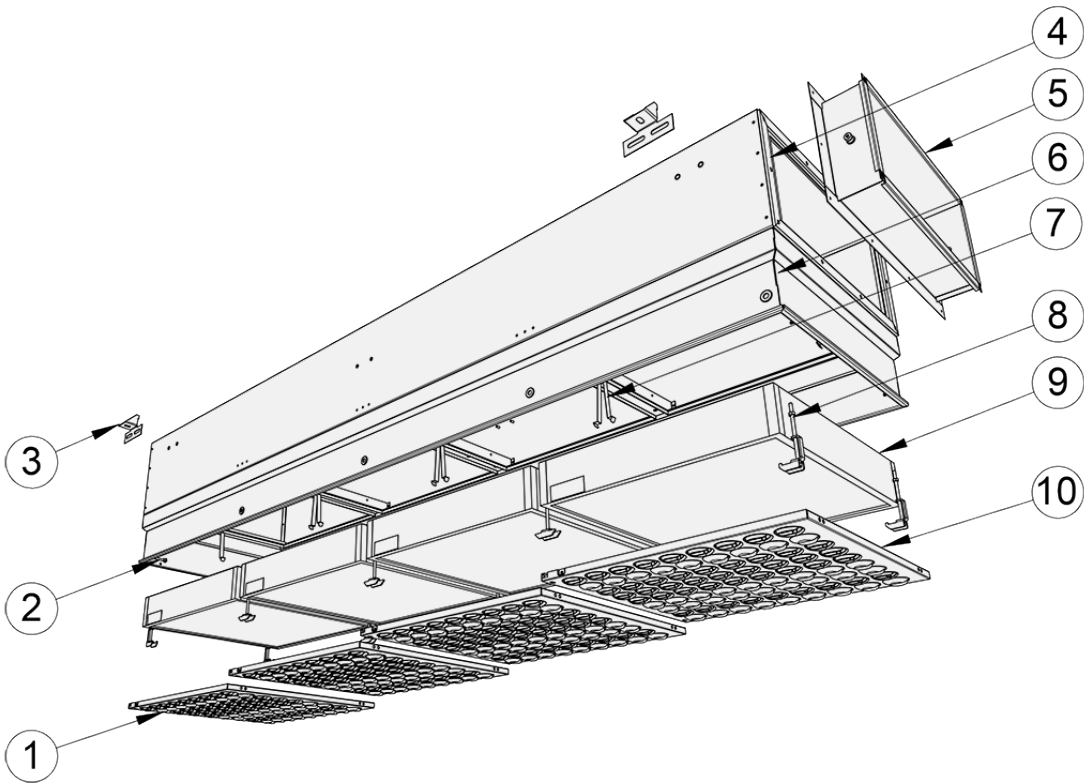


Fig. 10. Structure of Halton Vita VSR without disinfections units

No.	Part	Description
1	Nozzles	Plastic (polyacetal)
2	Pressure measurement port	Polyurethane
3	Fixing brackets	Galvanised steel
4	Duct seal gasket	Cellular polyethylene foam
5	Duct connection	Galvanised steel
6	Casing	Pre-painted aluminium. White antibacterial epoxy polyester powder paint (RAL 9003). Normal white powder paint (RAL 9003) as option.
7	Filter springs	Stainless steel
8	Filter brackets	Acid-proof steel
9	Filters	Fibreglass paper, aluminium frame, and a gel gasket (H14) Note: Filters need to be ordered separately.
10	Front panels	Galvannealed steel. White antibacterial epoxy polyester powder paint (RAL 9003). Normal white powder paint (RAL 9003) as option.

Dimensions and weight

Halton Vita VSR/A or VSR/D (Halton Vita OR Space 5)

Halton Vita VSR/A or VSR/D for Halton Vita OR Space 5 consists of 4-8 modules forming a square or rectangular ring.

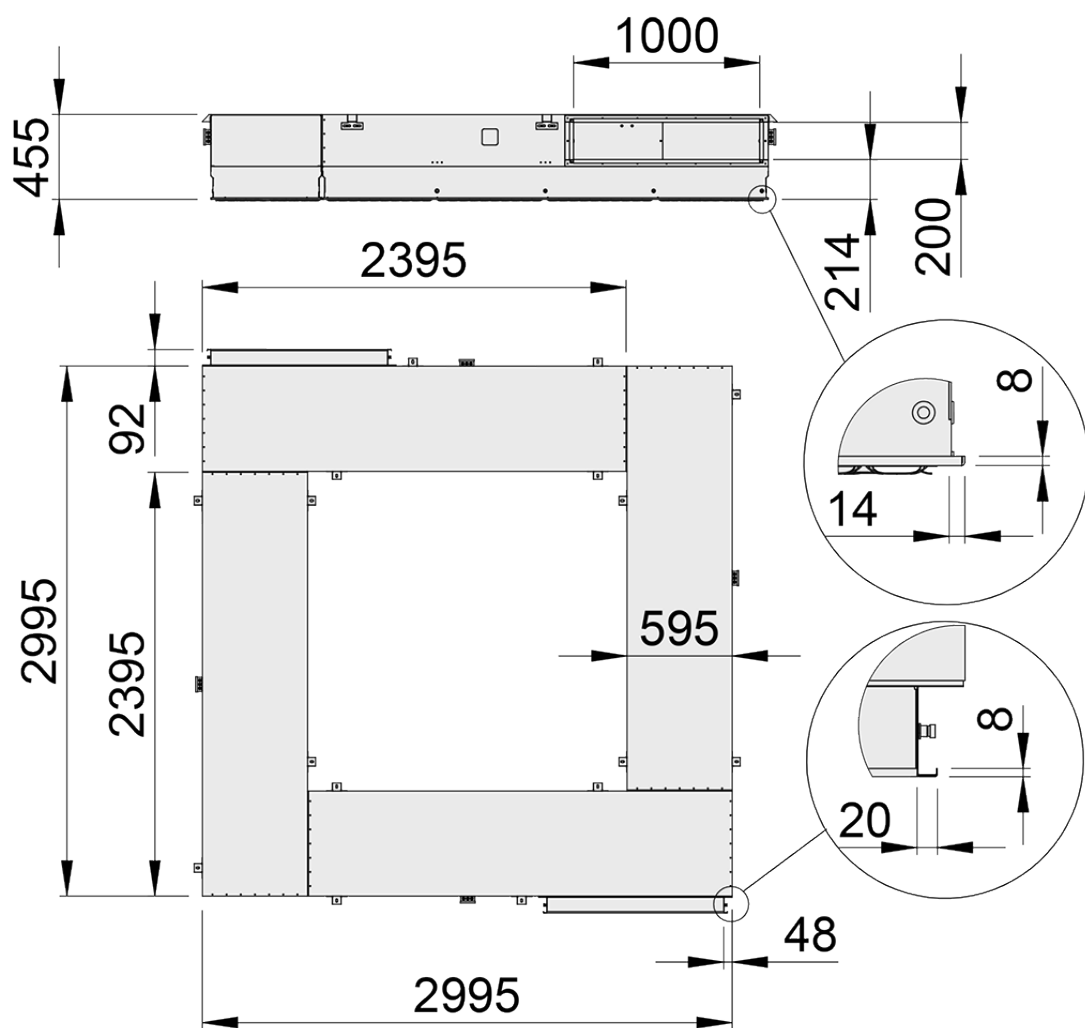


Fig.11. Halton Vita VSR/A or VSR/D, 3000×3000 mm (H=455 mm)

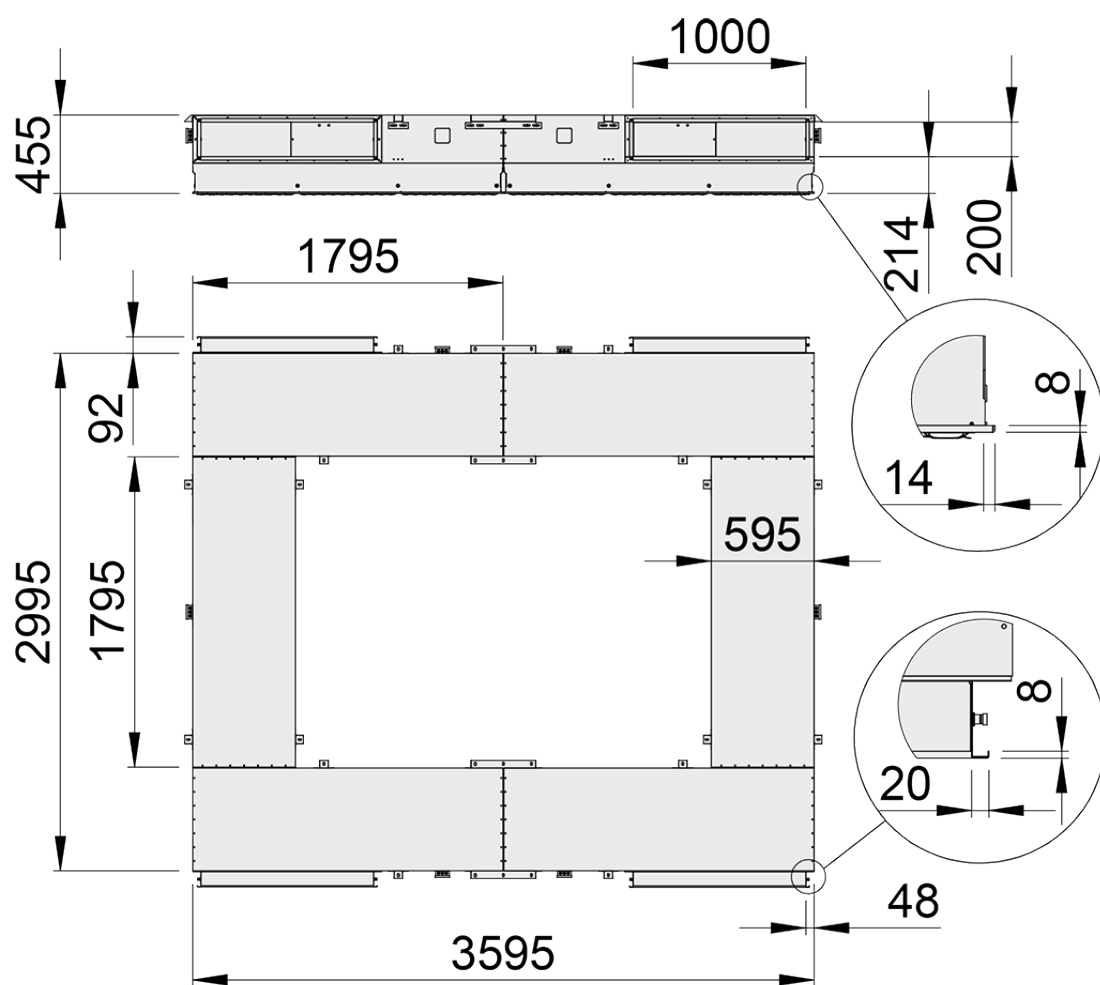


Fig.12. Halton Vita VSR/A or VSR/D, 3600×3000 mm (H=455 mm)

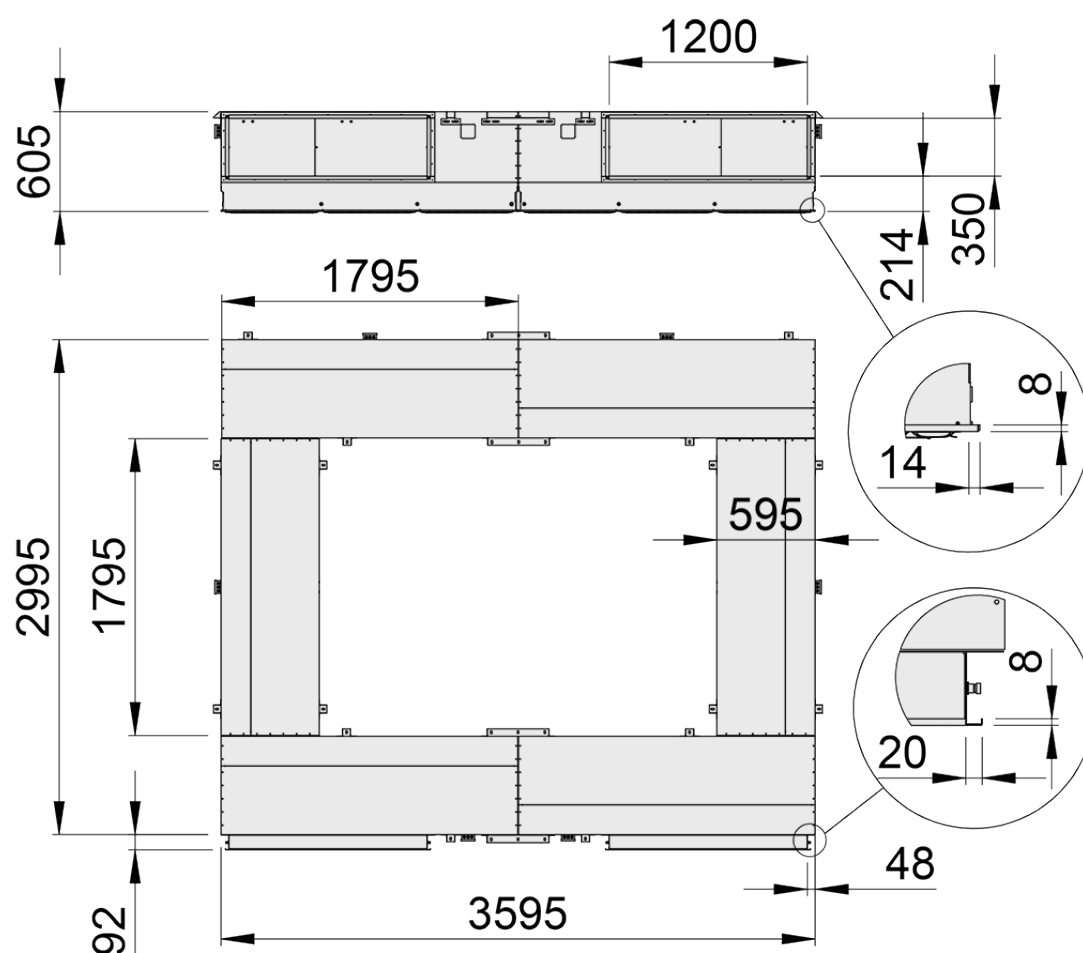


Fig. 13. Halton Vita VSR/A or VSR/D, 3600×3000 mm (H=605 mm)

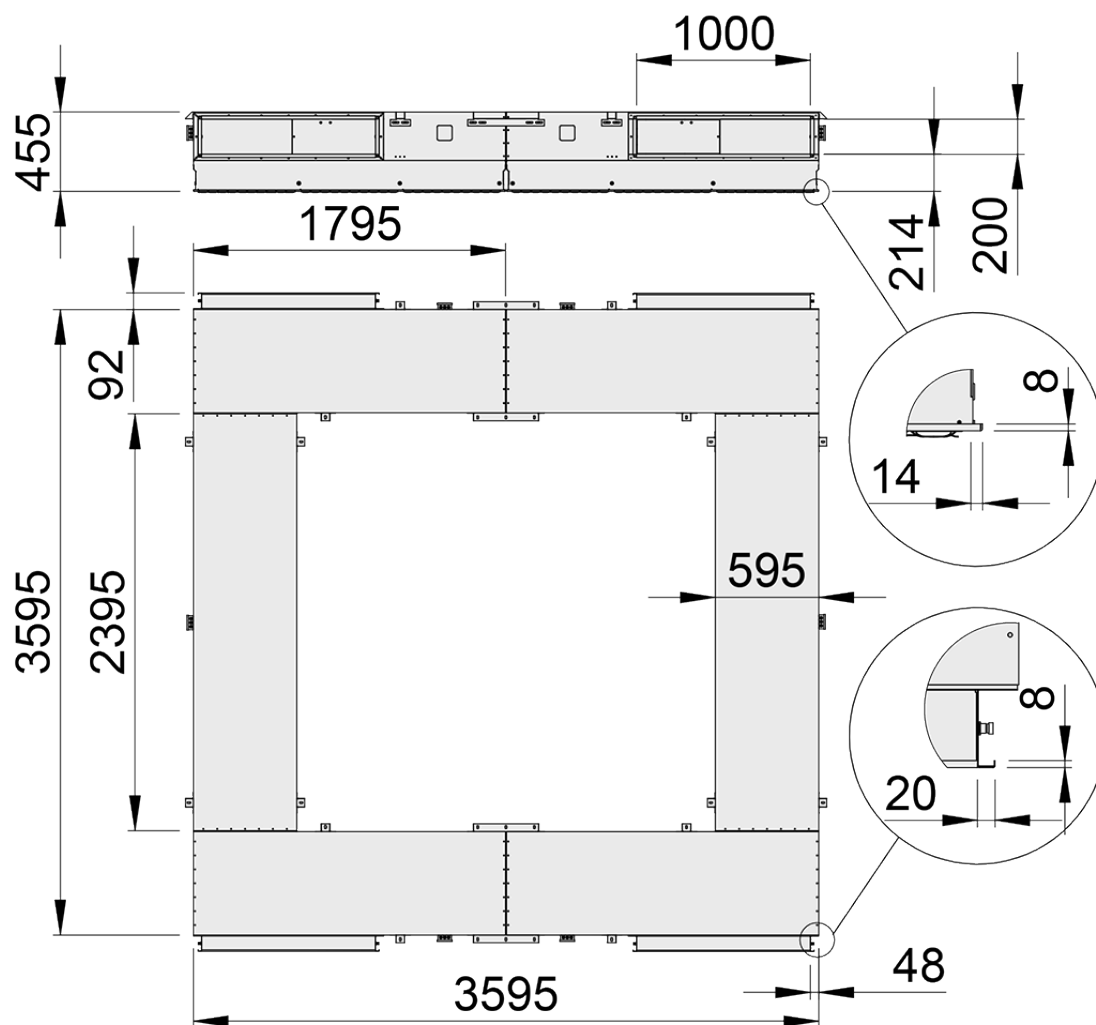


Fig. 14. Halton Vita VSR/A or VSR/D, 3600×3600 mm (H=455 mm)

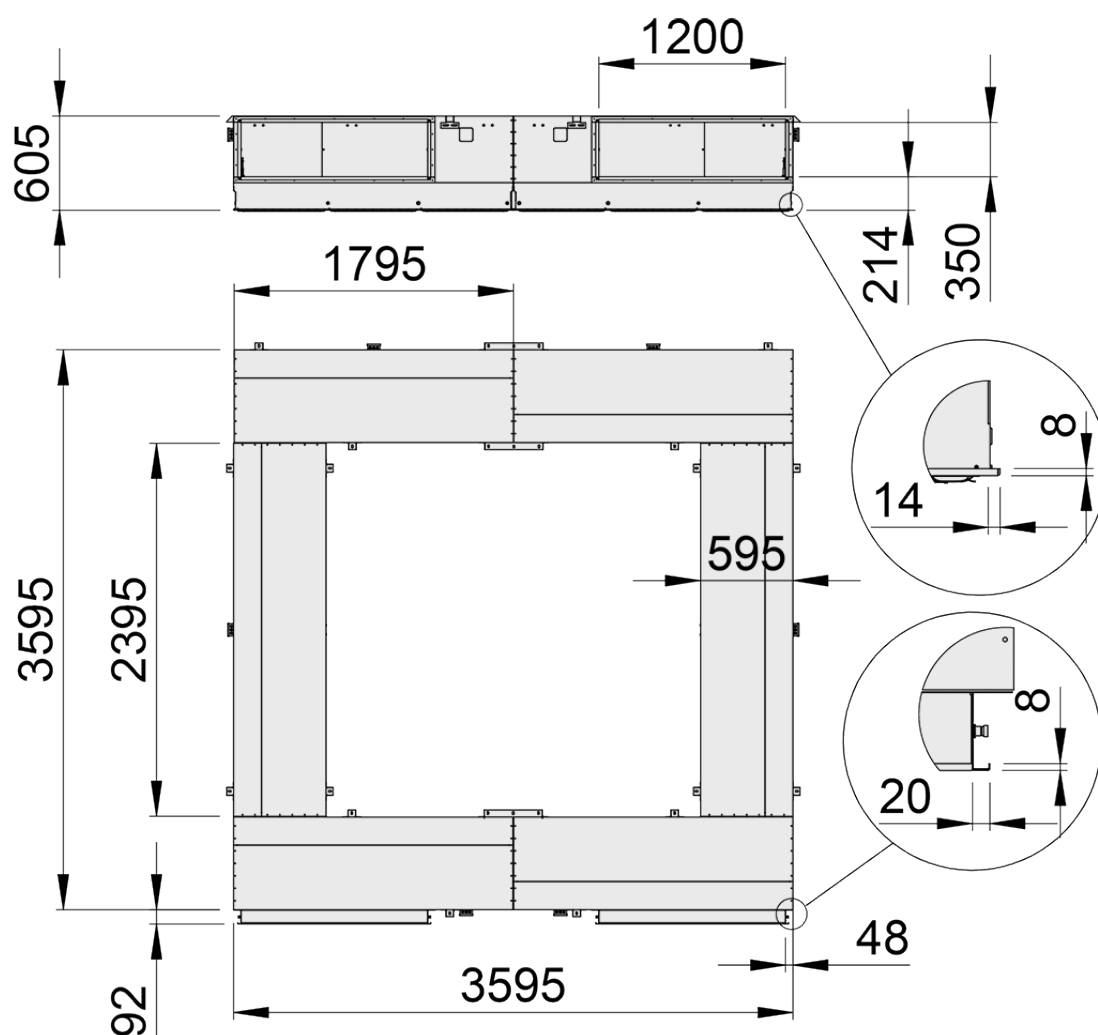


Fig. 15. Halton Vita VSR/A or VSR/D, 3600×3600 mm (H=605 mm)

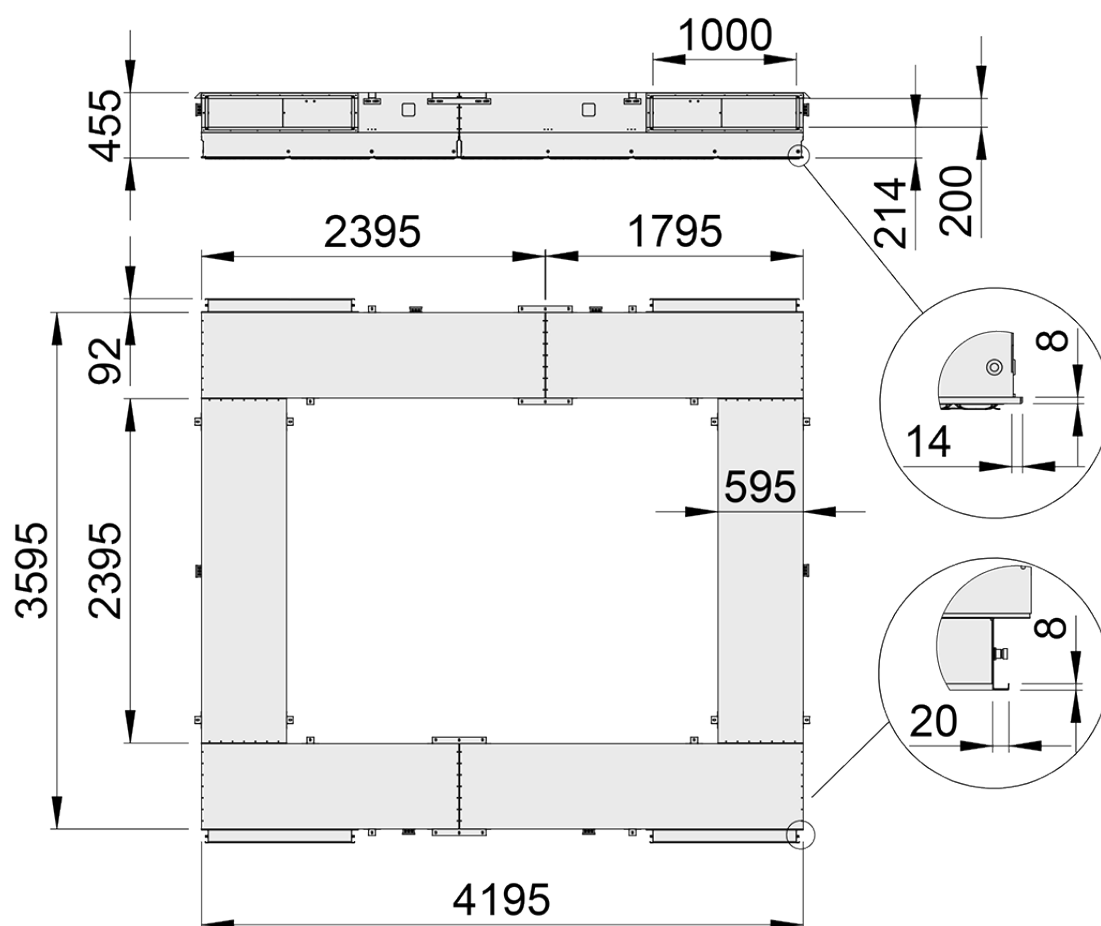


Fig. 16. Halton Vita VSR/A or VSR/D, 4200×3600 mm (H=455 mm)

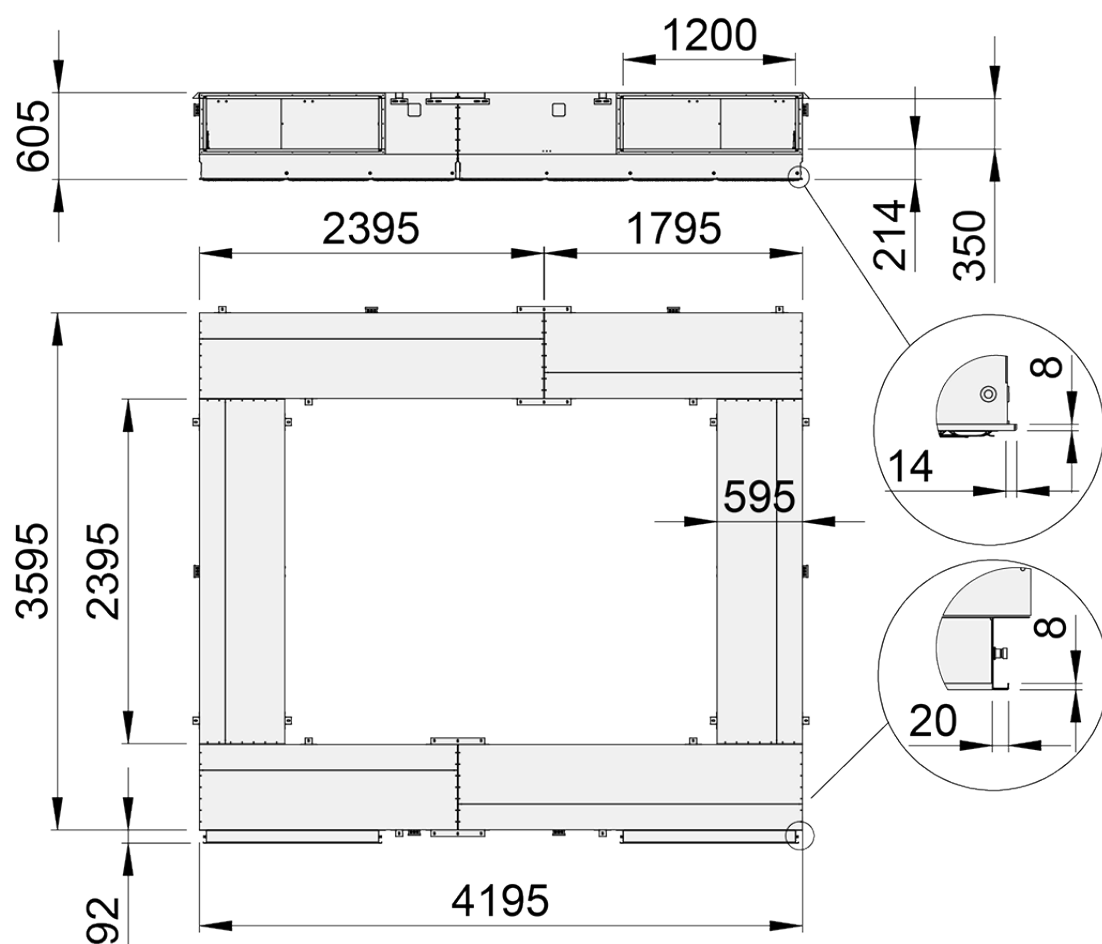


Fig. 17. Halton Vita VSR/A or VSR/D, 4200×3600 mm (H=605 mm)

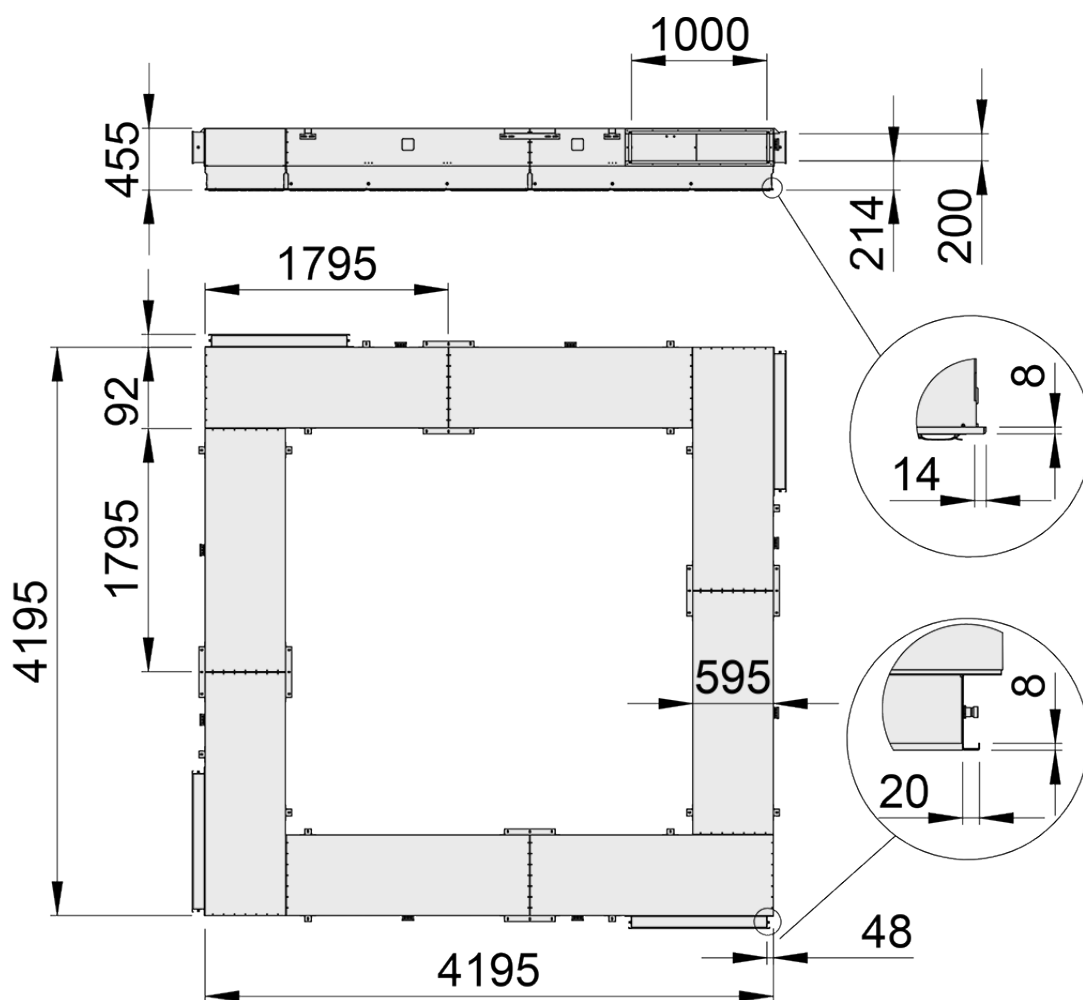


Fig. 18. Halton Vita VSR/A or VSR/D, 4200×4200 mm (H=455 mm)

NS	Weight (kg) with/without disinfection units and filters
3000×3000 mm (H=455 mm)	301 / 249
3600×3000 mm (H=455 mm)	359 / 299
3600×3000 mm (H=605 mm)	379 / 319
3600×3600 mm (H=455 mm)	392 / 326
3600×3600 mm (H=605 mm)	414 / 348
4200×3600 mm (H=455 mm)	425 / 352
4200×3600 mm (H=605 mm)	449 / 376
4200×4200 mm (H=455 mm)	481 / 399

Halton Vita VSR/B or VSR/E (Halton Vita OR Space 7)

Halton Vita VSR/B or VSR/E for Halton Vita OR Space 7 consists of 2 parallel units. The parallel units consist of 1 or 2 modules. The distance (S=1200...2400) between the parallel units is specified separately for each project.

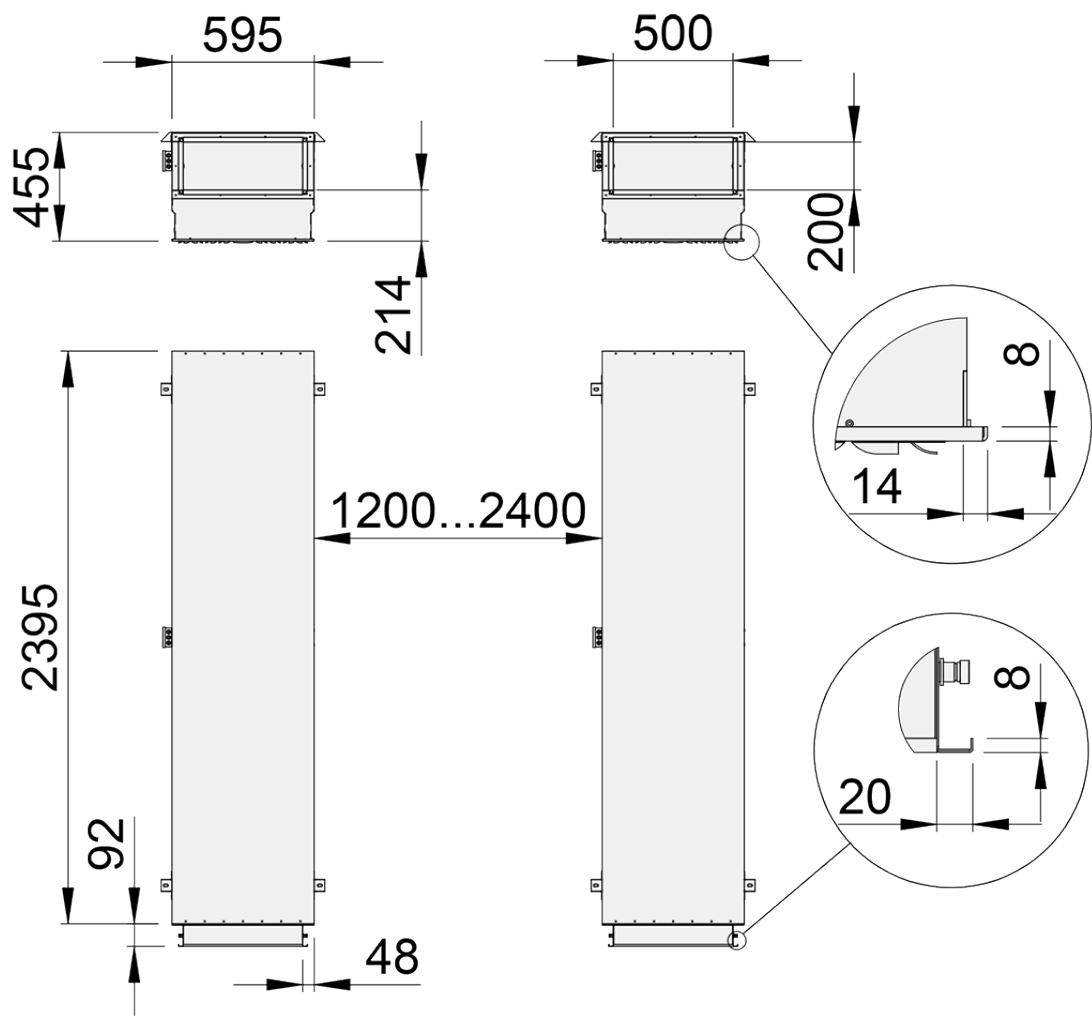


Fig. 19. Halton Vita VSR/B or VSR/E, 2400×600 mm

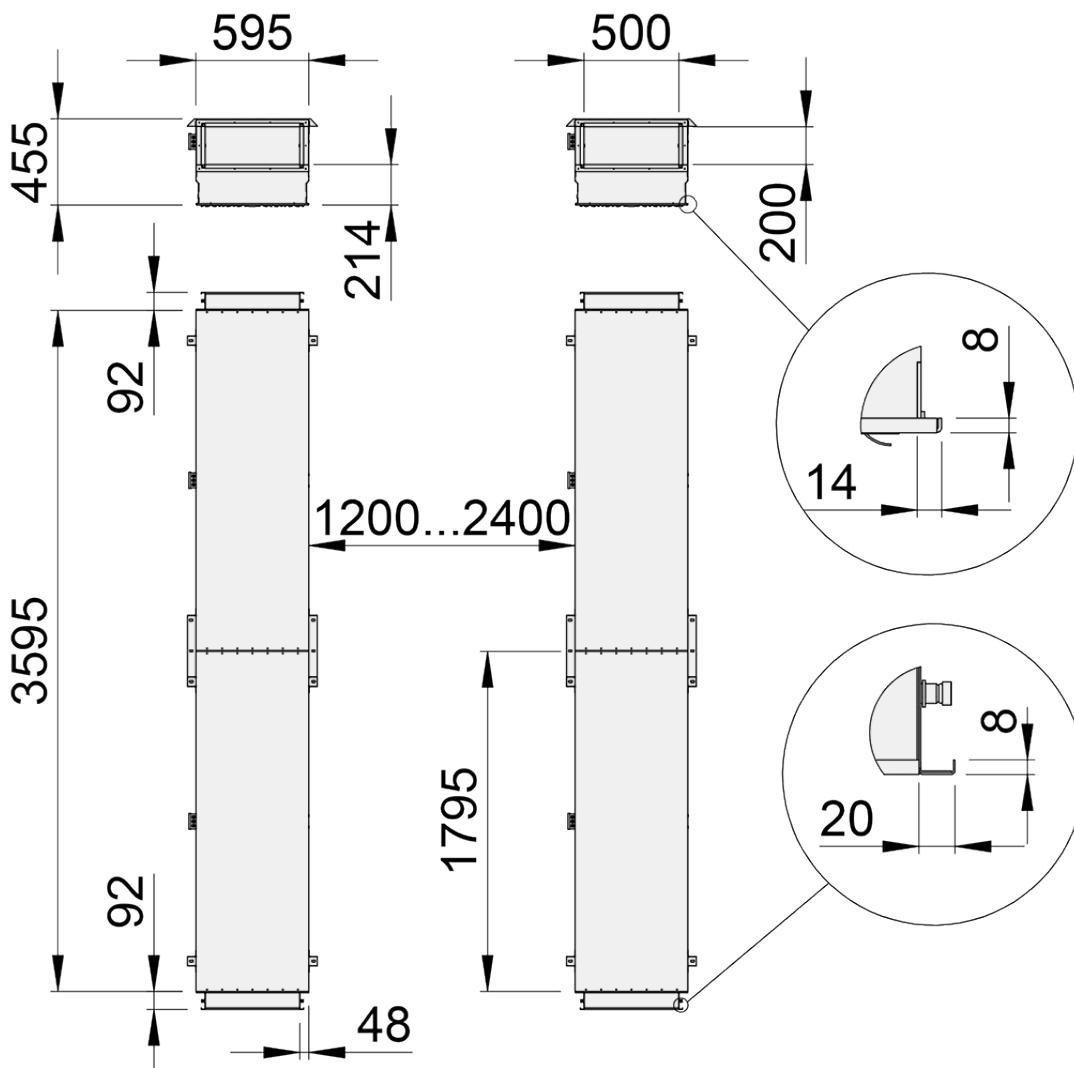


Fig. 20. Halton Vita VSR/B or VSR/E, 3600×600 mm

NS	Weight (kg) with/without disinfection units and filters
2400×600 mm	152 / 126
3600×600 mm	230 / 192

Halton Vita VSR/C or VSR/F

The Halton Vita VSR supply air module is available as a spare part (VSR/C or VSR/F) for Halton Vita OR Space supply air units.

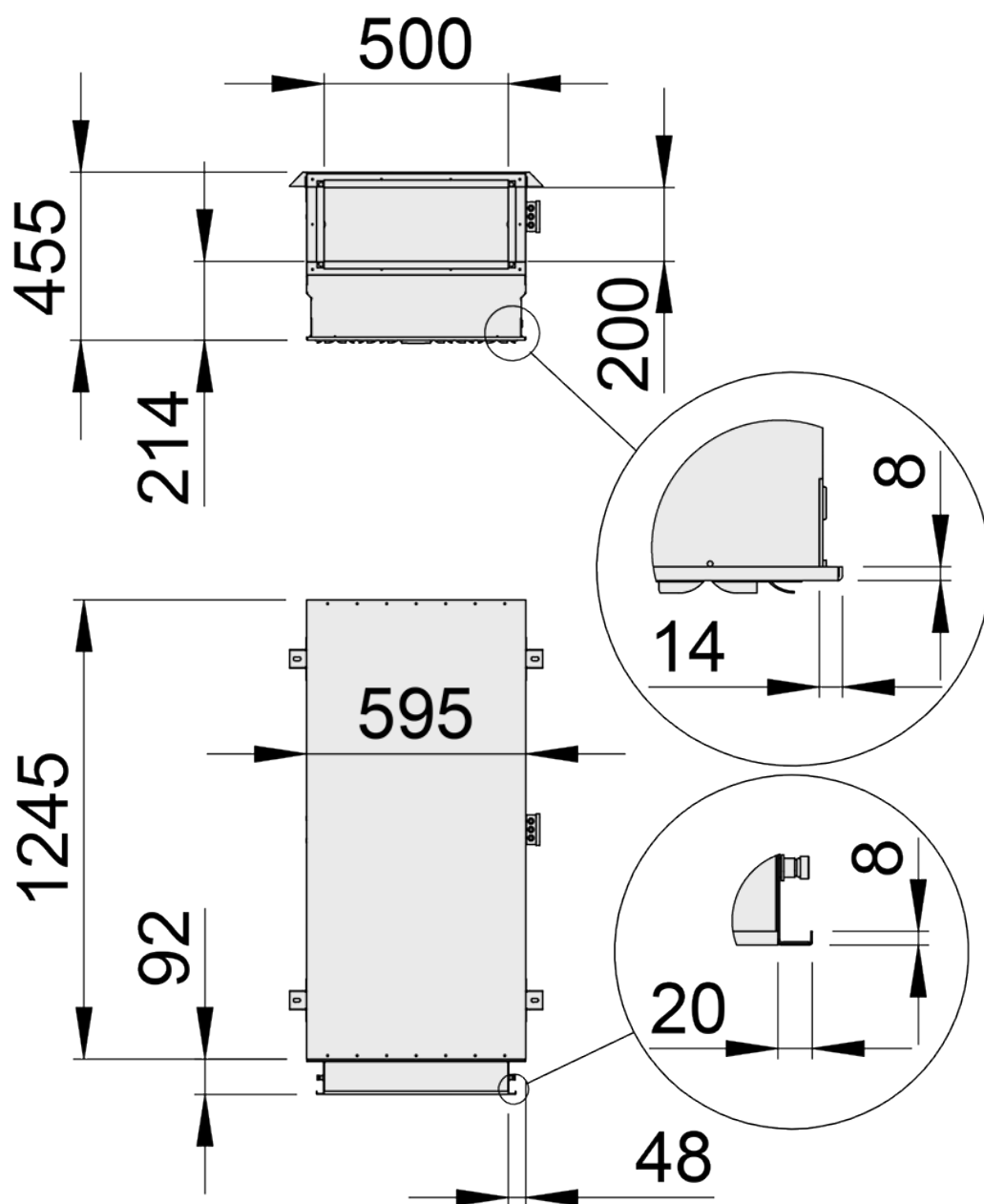


Fig. 21. Halton Vita VSR/C or VSR/F, 1250×600 mm

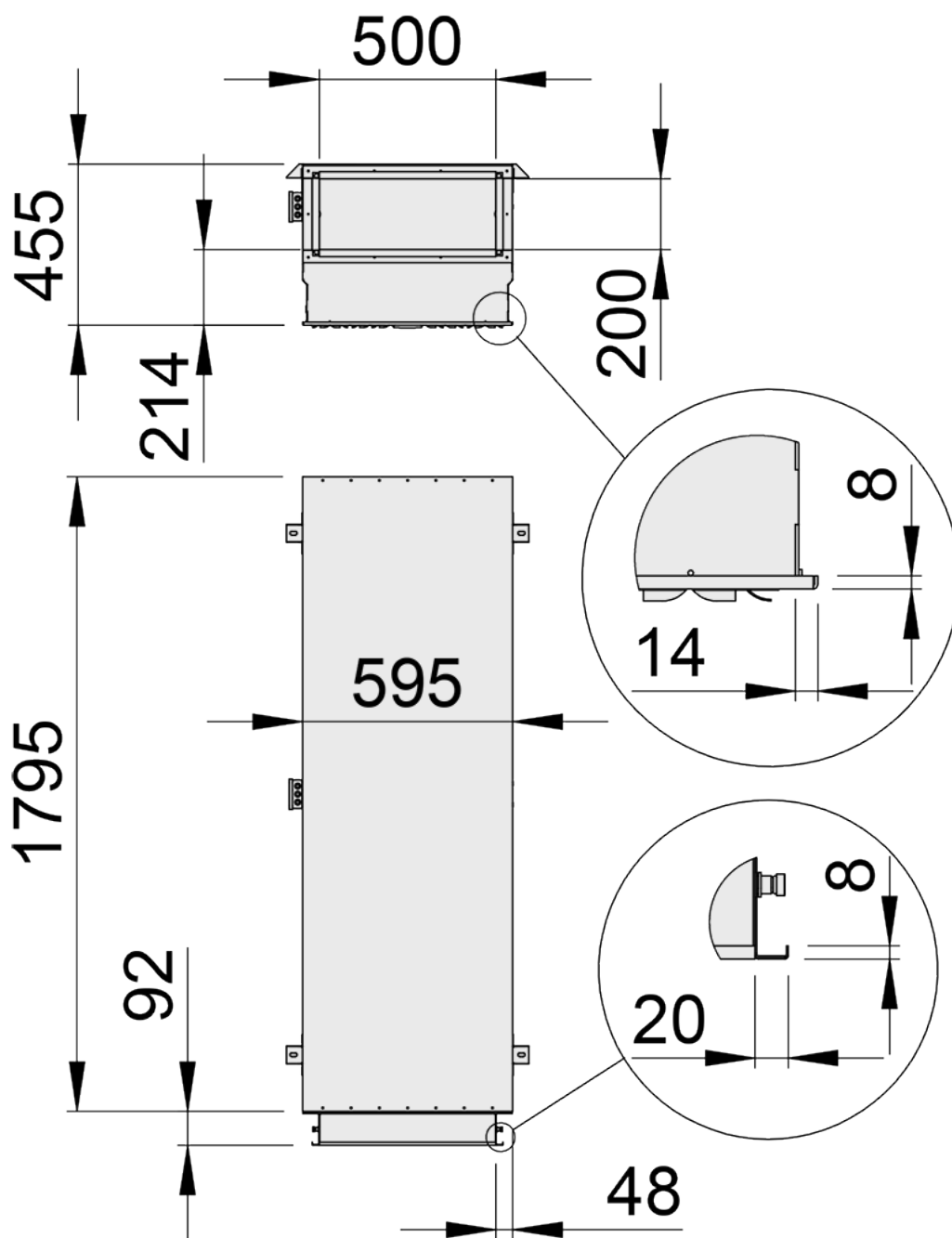
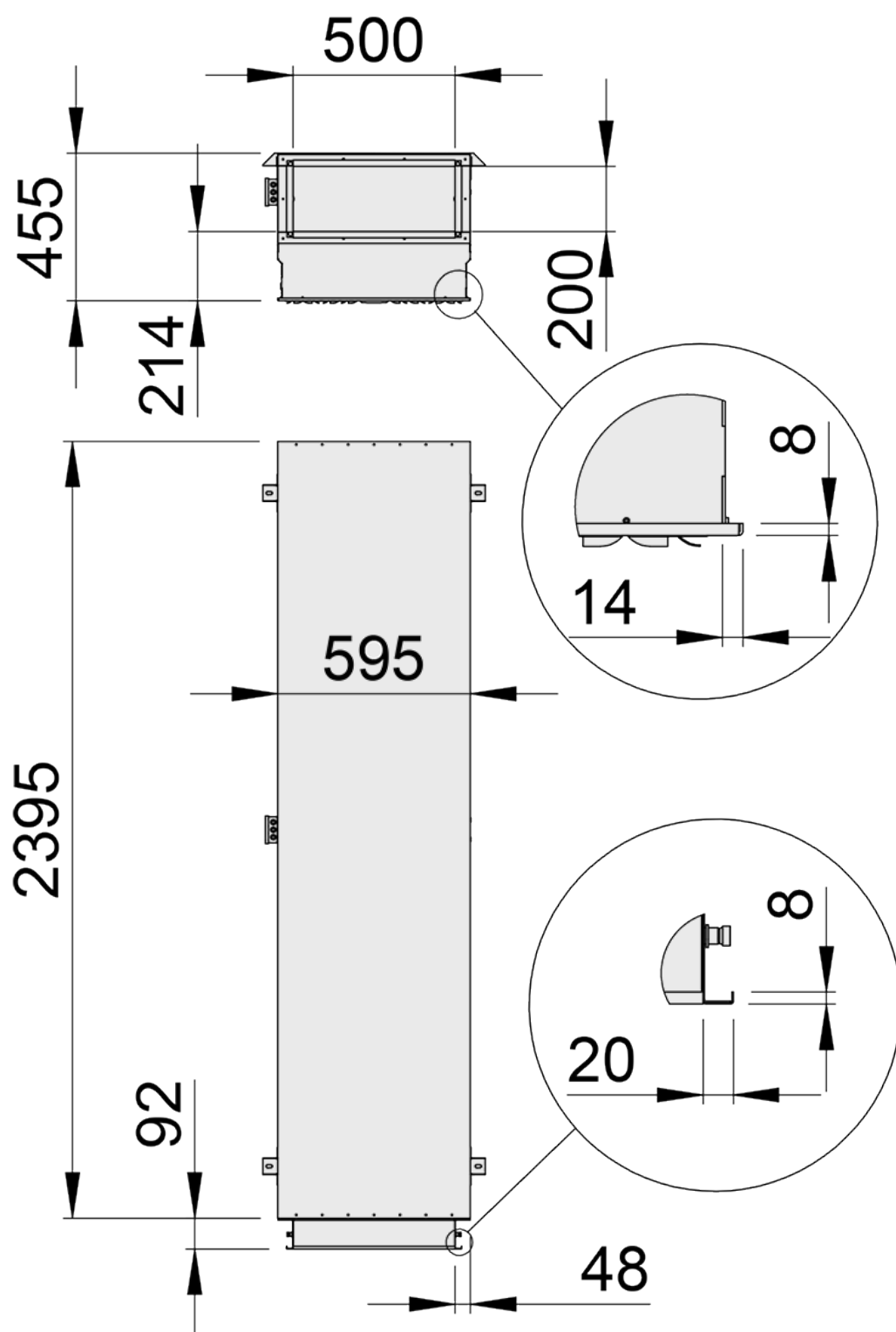


Fig. 22. Halton Vita VSR/C or VSR/F, 1800×600 mm



Vita VSR/C or VSR/F, 2400×600 mm

Fig. 22. Halton

NS	Weight (kg) with/without disinfection units and filters
1250×600 mm	37 / 30
1800×600 mm	59 / 48
2400×600 mm	76 / 63

Specification

- A supply air unit with HEPA filters for operating rooms.
- Installed flush to the ceiling.

Structure

- Air supply through adjustable nozzles.
- The lockable nozzles ensure that the setting of the nozzles remains unchanged during cleaning.
- A smooth internal surface that enables easy cleaning.
- Easy filter change through the front panel.
- Test probe for measuring particle concentration before the filter.
- Test probe for measuring the filter pressure loss.
- Differential pressure transmitter to indicate the filter pressure loss.
- Disinfection unit with blue light and white light LED elements. Blue light is for disinfection and white light is for general lighting.
- Used with HEPA filters that each have an aluminium frame and a gel gasket according to EN 1822, including an individual test certificate.

Material

- Casing manufactured from aluminium. Front panel manufactured from galvanized steel.
- Antibacterial epoxy-polyester powder paint finishing to prevent microbial growth.
- Nozzles manufactured from plastic (polyacetal).

Packaging and identification

- The visible surface of the product is protected by a removable plastic coating.
- The duct connection remains sealed during transport.
- The product is packed on a pallet.
- The product is identified by a serial number printed on labels attached both to the product

and the package.

Installation

The supply air units are installed to the operating room ceiling before the installation of the false ceiling. The units are hung from the ceiling with M8 drop rods using fixing brackets. The units are bolted together with M6 bolts.

Note: When installing the unit, be careful not to drill any holes into the casing. If the casing is damaged, unfiltered air may leak.

The internal cabling of disinfection units is done at the factory. The external cabling is connected to the junction box at the site.

The unit should be cleaned on the inside before filter installation.

Filter integrity testing should be performed after filter installation.

Commissioning

Airflow rate

The airflow rate for each duct connection of the Halton Vita OR Space solutions is balanced so that an equal amount of air is supplied via each connection. As a result, the airflow is distributed evenly throughout the supply air modules and no additional airflow adjustment is needed.

Airflow pattern

The nozzles are preset at the factory. If needed, the nozzles can be manually adjusted on site to create the desired airflow pattern. The nozzles can be adjusted in 15-degree intervals.

The airflow pattern should be fine-tuned during commissioning.

Maintenance

The required maintenance tasks include changing the filter and cleaning the supply air unit.

Filter

To ensure that the air quality meets the requirements, the HEPA filter must be checked frequently and, if needed, the filter must be replaced. The maintenance frequency of a filter depends on the air cleanliness of the supply air and room air.

The filter must be immediately replaced in the following cases:

- The final differential pressure has been reached.
- The filter is damaged.

- There are micro-organisms, fungal spores, or odours present in the filter.

Supply air unit

The unit can be cleaned using disinfectants. The front panel can be removed and cleaned in a washing machine (water temperature < 95°C). The lockable nozzles ensure that the setting of the nozzles remains unchanged during cleaning.

Be careful not to wet the filters. Dampening the filter media will permanently decrease the filter efficiency.

For cleaning frequency, follow the maintenance schedule of the building.

Filter



Fig.31. HEPA filter

Description

High efficiency particulate air (HEPA) filters are widely applied in cleanrooms where high air quality standards are essential.

Note: Filters need to be ordered separately.

Performance data of HEPA filters

Filter compatible with Halton Vita VSR is available in class H14 (European Standard EN 1822-1:2009) with a gel gasket.

Operating range:

- Temperature max. 70°C
- Humidity max. 90%
- Final pressure drop max. 500 Pa

Dimensions WxHxD (mm)	Weight (kg)	Filter class	Order code
557x557x102	5.3	H14	AF-H14-557*55*102-GEL

Size of diffuser (mm)	Number of filters	Solution
3000x3000	16	Space 5
3600x3000	18	Space 5
3600x3600	20	Space 5
4200x3600	22	Space 5
4200x4200	24	Space 5
2400	8	Space 7
3600	12	Space 7
1250	2	Single
1800	3	Single
2400	4	Single

Table 1. Number of filters

Accessories

Halton HDP-PE

The Halton HDP-PE differential pressure sensor is a pressure-measuring device, used to measure differential pressures in the duct.



Description

- The pressure sensor gives an accurate measurement of the airflow.
- The IP54 casing ensures that the unit can be used also in dusty and humid environments.
- The proper range of measurement can be selected at commissioning. The outputs are directly proportional to the pressure differences between the + and – inlets.
- The connections to the detected process are made by using plastic tubing (\varnothing 6/4 mm).
- The software compensates the zero-point drift for the transmitter by making automatic calibrations every 5 minutes, so that manual recalibration is not normally required.
- The influence of process disturbances can be filtered by increasing the time constant.
- The sensor can be used for measurement in polluted air.
- The PEL can be integrated in a fast system due to its standard time constant of 0.5 s.

Technical data

Feature	Description
Output signals	<ul style="list-style-type: none"> • 0...10 V DC • < 2 mA
Power supply	<ul style="list-style-type: none"> • 22...28 V AC • 22...28 V DC
Power consumption	<ul style="list-style-type: none"> • 24 V AC: < 1.0 VA • 24 V DC: < 1.5 VA
Temperature drift of range, typical	< 0.05% / K
Error at zero pressure	<ul style="list-style-type: none"> • Side (circular and rectangular) • 6Top (circular only)
Inaccuracy	< ± 0.5 Pa + $\pm 1\%$ of reading (at 25°C)
Operating temperature	0...45°C
Max. static / over pressure	25 kPa
Housing	IP54











Table 2. Technical data for Halton HDP-PE differential pressure sensor

Pa	Drift
0... 100	± 50 Pa
0... 200	± 100 Pa
0... 500	± 250 Pa
0... 1000	± 500 Pa



Table 3. Measuring ranges for Halton HDP-PE differential pressure sensor

Note: The proper measuring ranges chosen at commissioning: \pm ranges (s4 = open) 5 V / 12 mA = 0 Pa.



Measuring ranges

S2	S3	S4	
			
		0...2500 Pa	0...500 Pa
		0...2000 Pa	0...200 Pa
		0...1500 Pa	0...100 Pa
		0...1000 Pa	±100 Pa

Time constant

S1	Output delay
	0.5 s
	8 s

Output mode: pressure or flow linear

S5	Output mode
	pressure linear
	flow linear

Wiring

24 VAC/DC	▶	24V	1
0 VAC		0V	2
0...10 V output	◀	V _{OUT}	3

Order code

VSR/M-A-H, DF-FA-CO-PT-ZT

M = Model

A	Space 5 supply air unit with blue light disinfection
B	Space 7 supply air unit with blue light disinfection
C	Single supply air unit with blue light disinfection
D	Space 5 supply air unit with option to add blue light disinfection later
E	Space 7 supply air unit with option to add blue light disinfection later
F	Single supply air unit with option to add blue light disinfection later

A = Size (mm)

30×30	3000×3000 (Space 5)
36×30	3600×3000 (Space 5)
36×36	3600×3600 (Space 5)
42×36	4200×3600 (Space 5)
42×42	4200×4200 (Space 5)
24	2400×600 (Space 7)
36	3600×600 (Space 7)
12	1250×600 (Single)
18	1800×600 (Single)
24	2400×600 (Single)

H = Height (mm)

455	455
605	605

Other options and accessories

LC = Light controller type

NA	Not assigned
L5	DALI
L6	Relay, On/Off

DF = Diffuser delivered with front panel

Y	Yes
N	No

FA = Front panel attached to unit

Y	Yes
N	No

PT = Differential pressure transmitter

NA	Not assigned
P1	HDP-PE

CO = Colour

SA Signal White (antibacterial, RAL 9003)
SW Signal White (RAL 9003)
X Special colour (RAL xxxx)

ZT = Tailored product

N No (standard)
Y Yes (ETO)

Code example

VSR/A-36×36-605,DF=Y,FA=Y,CO=SA,PT=P1,ZT=N