

## Halton Vita Patient Rex

VPR - Adaptable active chilled beam



### Halton Vita Patient Rex active chilled beam provides:

- Silent, Comfortable and stable indoor environment
- Combined Ventilation, Heating and Cooling for flush installation within a suspended ceiling
- High Energy-Efficiency
- Easy upgrade to old facilities

### The Halton Vita Patient Rex unit has

- Hygienic and openable construction with smooth surfaces that is easy to clean thoroughly
- Coil with anti-bacterial finishing to prevent eventual microbial growth
- Hinged coil to enable access to both sides of the coil and internal beam surfaces for cleaning
- Cleaning guidance is provided to enable successful maintenance
- Reduced amount of dust accumulation and less need for specialist cleaning compared to other chilled beams
- Integral adjustment for operational modes and exhaust air outlet

Typical applications: Hospital patient rooms and other spaces with hygienic requirements.

The Halton Vita Patient Rex chilled beam is especially designed for hygienic and performance needs of hospitals and other environments with higher hygienic needs. The Halton Vita Patient Rex operation can be easily adapted to changed operation conditions and requirements from the design to the end of the building life cycle.

- Easy and fast selection with Halton HIT Design tool
- Individually adjustable velocity conditions with Halton Velocity Control (HVC)
- In-built flexibility of operation for partition wall relocations with Halton Velocity Control
- Individually adjustable supply air flow rate for changes in space layout using Halton Air Quality (HAQ) control
- Demand based control of supply air flow rate for efficient use of energy in constant-pressure ductwork zone applications; when the air flow rate changes have no effect on the coil cooling/heating capacities of the chilled beam.
- Effective site logistics
- Enhanced life cycle performance with optimized low air and water flow rates

## Product models

- Model with combined cooling and heating exchanger
- Model with manual or motorised Halton Air Quality (HAQ)
- Model with removable, cleanable coil, shut-off valves

## Material

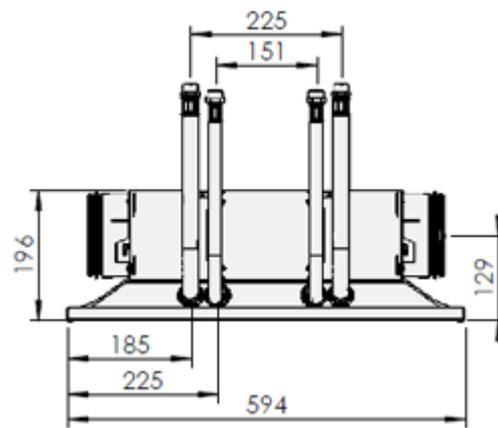
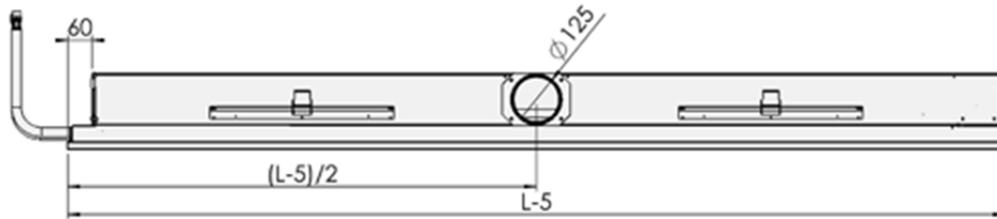
Part	Material	Finishing
Front panel	Pre-painted galvanised steel	Polyester-painted, white (RAL 9010 / 20% gloss)
Side plates	Pre-painted galvanised steel	Polyester-painted, white (RAL 9010 / 20% gloss)
End plates	Galvanised steel	Polyester-epoxy-painted, white (RAL 9010 /20% gloss)
Supply air plenum	Galvanised steel	
Brackets	Galvanised steel	
Coil pipes	Copper	<sup>a)</sup> Antibacterial coating, white (RAL 9010)
Coil fins	Aluminium	<sup>a)</sup> Antibacterial coating, white (RAL 9010)

<sup>a)</sup> The antibacterial performance of coil coating used in Halton Vita Patient Rex has been tested in independent microbiological laboratory (in reference to standards ISO 22196 ja JIS Z 2801) with following result:

*>99%(24hours) Reduction of many common bacterias\**

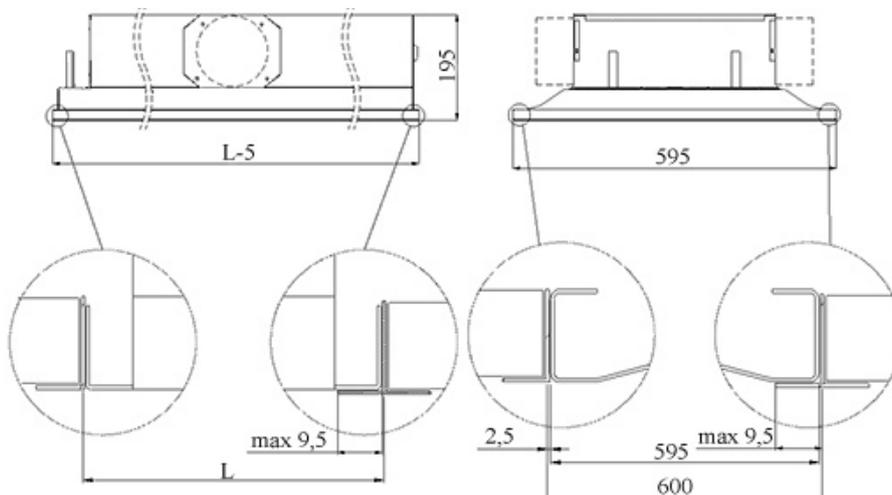
\* (Acinetobacter baumannii, Pseudomonas Aeruginosa, Methicillin Resistant Staphylococcus Aureus (MRSA), Salmonella Enteritidis, Vibrio Parahaemolyticus, Enterobacter Faecalis, Enterobacter Aerogenes, Escherichia Coli, Listeria Monocytogenes, Salmonella Enterica, Legionella Pneumophila)

## Dimensions and weight



<b>Coil length</b>	1300, 1900, 2500, 3100
<b>L- 5</b>	1795, 2395, 2995, 3595

### Integration with suspended ceiling (standard T-profile 600)



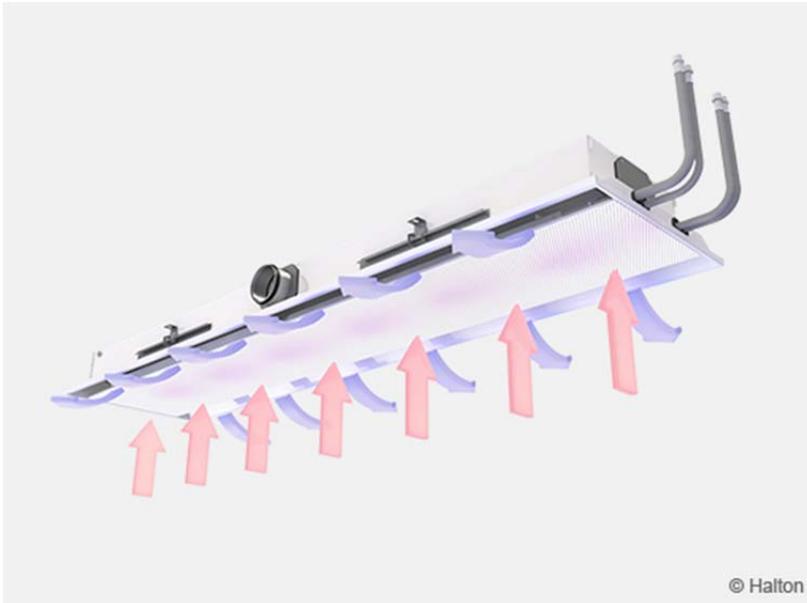
## Weight

	kg / m
<b>Without water</b>	15
<b>With water</b>	16

## Accessories and product options

Accessory / option	Code	Description	Note
Combined cooling and heating coil	TC = H	Coil with hot water circulation	Cooling/heating copper water pipe connections are Ø 15/10 mm
Halton Air Quality control (HAQ damper)	AQ = A	Manual operation	Coil length: L - 500 mm
	AQ = B	Motorised operation. <ul style="list-style-type: none"> <li>• Power supply: 24 VAC</li> <li>• Control signal: 0...10 VDC</li> </ul>	Coil length: L - 500 mm
Quick release valves	QV = A	Quick release of the coil for servicing and cleaning	

## Function



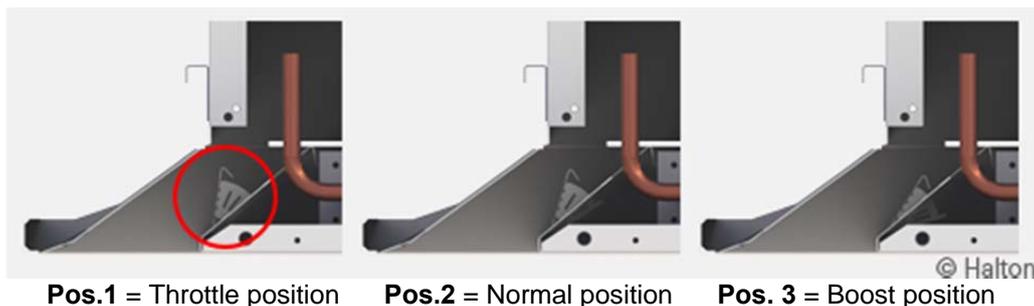
The Halton Vita Patient Rex chilled beam is designed to be installed flush with a suspended ceiling.

The primary supply air enters the plenum of the active chilled beam. From there it is diffused into the room through nozzles and the diffuser of the HAQ- control. Supply slots located at the bottom of the beam.

The supply air nozzle jets efficiently induce ambient room air. The induced air flows through the heat exchanger, where it is either cooled or heated. The supply air jet is directed horizontally along the ceiling surface.

## Velocity control in the occupied zone

Halton Velocity Control (HVC) is used for adjusting room air velocity conditions either when room layout is changed (e.g., in cases where the partition wall is located near the chilled beam) or when local, individual velocity conditions need to be altered. HVC adjustment has an impact on the induced room air flow through the heat exchanger, and therefore it either increases or decreases both the velocities in the occupied zone and the cooling/heating capacity of the chilled beam.



The HVC damper is divided into sections (Pos.1-3) to enable the adjustment of conditions in different parts of the occupied zone.

It is recommended to design the chilled beam in the normal position in order to allow both throttle and boost functions during the building's life cycle.

## Airflow rate control

The supply air flow of the chilled beam nozzle jets are dependent on effective length and static chamber pressure, which can be adjusted e.g. using separate airflow adjustment damper.

Optional Halton Air Quality control (HAQ) is used for adjusting and/or controlling the outdoor air flow rate in a room space. The airflow rate is dependent on the opening position of the control damper and the static chamber pressure.

Air flow rate adjustment is needed when the use of the space is changed and there is need to adapt the supply airflows. Air flow rate can be adjusted either manually or automatically, on the basis of demand, with a motorized control damper.

A chilled beam equipped with HAQ manual air flow rate adjustment can be retrofitted to motorized version for demand based ventilation .

**It is recommended that chilled beams for demand based airflows should be connected to constant pressure ductwork zone, when**

- The HAQ adjustment has no impact on nozzle jet airflow.
- The HAQ adjustment has no impact on either the coil cooling or heating capacities.
- The HAQ airflow control has not significant impact to ductwork pressure conditions and respectively to airflow rates of other chilled beams in the same ductwork zone.

The appearance of different units with constant, adjustable, or variable air flow - is identical.



The Halton Air Quality (HAQ) control unit's position and the selection of chilled beam nozzle size allow adjustment of the primary air flow rate in the space. The separate air flow adjustment damper installed in the duct branch is used for balancing the air flows in the ductwork.

When a motorised air quality control (HAQ) unit is used, the maximum and minimum air flow rates are adjusted with the stroke limiters of the damper.

The primary air flow rate of each beam is adjusted using the Halton Air Quality control unit during the installation and commissioning. here is no need to change or plug nozzles of the chilled beam.

## Air quality and temperature controls

The cooling and heating capacities of the chilled beam are controlled by regulating the water flow rate according to the control signal of the room temperature controller.

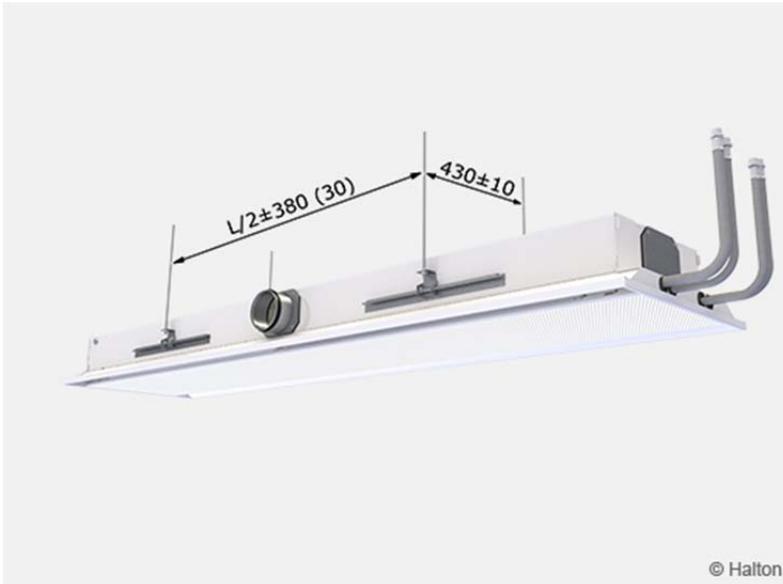
Air quality control for a room space can be arranged using, e.g., a CO<sub>2</sub> sensor when room air temperature is controlled separately by regulating the water flow rate. Alternatively, a temperature sensor can be used for air quality control, with the airflow rate modulated in the first sequence and, if the temperature exceeds the set point, the water valve starting to open in the second sequence.

In heating mode, it is recommended that the temperature difference between the jet outlet and room air would not be greater than 3 °C. The inlet water temperature of the heat exchanger should not be higher than 35 °C. Optimal heating performance requires an appropriate primary air flow rate. Thus, the air handling unit shall operate during heating periods to ensure proper heating performance.

## Installation

The Halton Vita Patient Rex adaptable chilled beam is especially suitable for ceiling mounting running parallel to exterior wall of the room. When selecting of the chilled beam orientation, the location of the supply air and water circuit connections are taken into account.

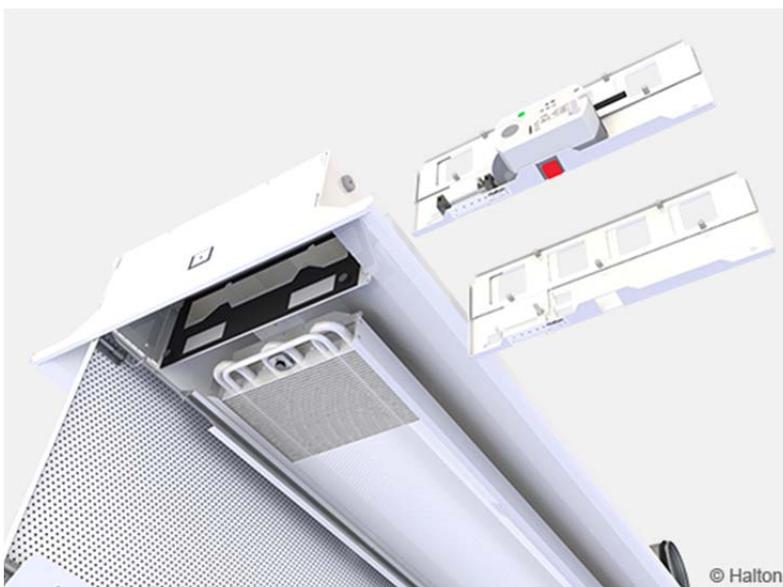
The chilled beam can be attached directly to the ceiling surface ( $H1 = 195 \text{ mm}$ ) or suspended using threaded drop rods (8 mm). Each beam is equipped with movable brackets fixed to both sides of the beam. It is recommended that the brackets be positioned one quarter of the unit length ( $L/4$ ) away from the end of the beam.



Install the main pipelines of the cooling and heating water circuits above the level of the chilled beam in order to enable venting of the pipework.

The duct connection is at the same end of the chilled beam as the pipe connections. Relocation of the duct connection to either side of the chilled beam can be done easily on-site by using a screw driver.

### Replacing manual HAQ with motorised HAQ (Halton Air Quality control)



Power supply: 24 VAC.  
Control signal: 0 ... 10 VDC

## Adjustment

### Cooling

The recommended cooling water mass flow rate is 0.02 - 0.10 kg/s, resulting in a temperature rise of 1 - 4 °C in the heat exchanger. To avoid condensation, the recommended inlet water temperature of the heat exchanger is 14 - 16 °C.

### Heating

The recommended heating water mass flow rate is 0.01 - 0.04 kg/s, resulting in a temperature drop of 5 - 15 °C in the heat exchanger.

The recommended maximum temperature of the inlet water for the heat exchanger is 35 °C.

### Balancing and control of water flow rates

Balance the water flow rates of the Halton Vita Patient Rex chilled beam with adjustment valves installed on the outlet side of the cooling and heating water loops. The cooling capacity and heating capacity of the chilled beam are controlled by regulating the water mass flow rate. The water mass flow rate can be controlled by using an ON/OFF valve or a two- or three-way proportional valve.

### Adjustment of supply airflow rate

Connect a manometer in the measurement tap and measure the static pressure in the Halton Halton Vita Rex chilled beam. The airflow rate is calculated according to the formula below.

#### Total air flow rate ( $q_v$ )

$$q_v = q_{v1} + q_{v2}$$

$q_v$  Total air flow rate, l/s or m<sup>3</sup>/h  
 $q_{v1}$  Nozzle jet airflow rate, l/s or m<sup>3</sup>/h  
 $q_{v2}$  Air quality control diffuser (HAQ) airflow rate l/s or m<sup>3</sup>/h

#### Nozzle jet air flow rate ( $q_{v1}$ )

$$q_{v1} = k * l_{eff} * \sqrt{\Delta P_m}$$

$k$  k-factor (from table below)  
 $l_{eff}$  Length of the coil [m]  
 $\Delta p_m$  Measured static chamber pressure [Pa]

Nozzle	k (l/s)	k (m <sup>3</sup> /h)
A	0.71	2.56
B	0,99	3,56
C	1,36	4,90
D	2.09	7,52
E	3,33	11,99

### Air quality control diffuser airflow rate ( $q_{v2}$ )

$$q_{v2} = a * k * \sqrt{\Delta P_m}$$

- a** HAQ position
- k** k-factor (from table below)
- $\Delta p_m$**  Measured static chamber pressure [Pa]

k (l/s)	k (m3/h)
0.17	0.61

### Adjustment of the airflow in constant airflow applications

Define the position of Halton Air Quality control (HAQ) in millimeters that correspond to airflow rate at the actual chamber pressure level.

Adjustment of HAQ is done manually with the help of position scale by adjusting the opening of the unit. It is possible to verify the opening in millimeters on the position scale.

In order to ensure accurate adjustment it is recommended to adjust HAQ-position and in the same time read the targeted chamber pressure using the manometer.

It is also possible to remove the HAQ-unit from the frame by opening two knurled-head screws (4) for the adjustment.

### Halton Air Quality control (HAQ)



**Fig.1** Motorised HAQ



**Fig.2** Manual HAQ

#### Code description:

1. Release of the actuator
2. Restriction of the max. opening
3. Restriction of the min. opening
4. Knurled - head screw (2 pcs)

## Adjustment of the air flow range in variable air flow applications

Switch-off the power supply of the actuator.  
Disengage the actuator gear into manual override position by releasing the knob (1).

Define the maximum and minimum positions, in millimeters that correspond to maximum and minimum air flow rates at the actual chamber pressure level.

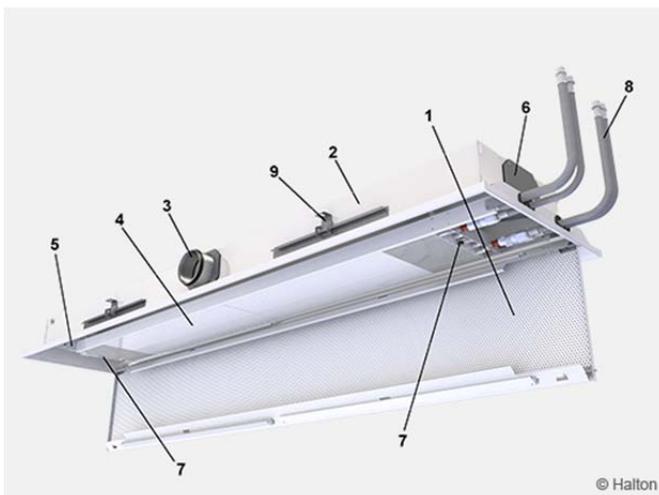
The maximum and minimum positions are adjusted with two hexagonal socket set screws (2,3). It is possible to verify the opening in millimeters on the position scale.

Switch on the power supply (24 VAC) of the actuator. The actuator calibrates the min. and max. positions automatically according to the set limits.

The actuator can be controlled from this point on by using a 0...10VDC control signal. (0 VDC=min.position, 10 VDC = max. position)

It is also possible to remove the HAQ-unit from the frame by opening two knurled-head screws (4) for the adjustment.

## Servicing



**Fig.1** Front panel open

### Code description:

1. Front panel
2. Casing
3. Supply air connection
4. Heat exchanger
5. Halton Air Quality control (HAQ)

Open the front panel (1.) of the Halton Vita Patient Rex.

Open two knurled head screws (7.) to pull down the heat exchanger (4.) with care. Leave it hanging from the wires (10.).

Clean the supply air plenum and finned coils of the heat exchanger with a vacuum cleaner, taking care not to damage the finned coils



**Fig.2** Heat exchanger lowered

6. Duct connection cover
7. Knurled head screws (2 pcs)
8. Flexible hoses
9. Sliding bracket (4 pcs)
10. Hanging wire

Clean the front panel and, if required, the side plates, using a damp cloth.

The Halton Air Quality control unit (HAQ) is removable for chamber cleaning. Unscrew the screws for removing the HAQ.

## Technical specification

The active chilled beam shall have an integral recirculation air path through the perforated front panel. The induced room air flow rate shall be manually adjustable via three setting positions without influencing the primary air supply flow rate. The airflow rate of the chilled beam shall be adjustable without plugging or changing the nozzles.

The primary air flow rate shall be adjustable over a wide range via a supply air unit integrated into the chilled beam. Adjustment of the air flow rate shall not have any affect on induced air flow rate through the coil when static chamber pressure is kept constant (optional).

The chilled beam unit equipped with a manually adjustable air flow damper shall be able to be retrofitted with a motorised air flow control damper unit.

Outdoor air flow rate control shall not have any effect on coil cooling and heating capacities.  
The beam with adjustable air flow rate shall have only one duct connection.  
The appearance of the chilled beams with constant air flow and variable air flow rate shall be the same.

The front panel shall be openable from either side in order to allow general maintenance and cleaning.  
The front panel shall be removable without any special tools.

The air supply to the room space shall be either unidirectional or bi-directional.  
The active chilled beam shall be 595 mm wide and 195 mm high.  
The active chilled beam shall have an inlet duct diameter of 125 mm.  
The position of the duct connection shall be changeable without the use of any special tools.  
The frame, front, and side panels shall be made of galvanised steel plate.

All visible parts shall be white, painted to RAL 9010, 20% gloss.  
All pipes shall be manufactured from copper, and connection pipes with a wall thickness of 0.9-1.0 mm.  
The fins shall be manufactured from aluminium and coated with antibacterial coating.  
Optionally, heating shall be incorporated within the heat exchanger by means of two 10-mm pipes, connected in series.

All joints shall be soldered and factory pressure-tested.  
The pipework s maximum operation pressure is 1.0 MPa.  
The active chilled beam shall have an air flow adjustment damper as an option and a measurement tap to allow air flow measurement.

Active chilled beams shall be protected by a removable plastic coating and individually wrapped in a plastic.  
The duct connection and pipe ends shall remain sealed during transport.  
The active chilled beams shall be identified by labels attached to both the active chilled beam and the plastic packaging.

## Product code

VPR-S-L-C

### S = Nozzle type

A	Bi-directional / Nozzle 1
B	Bi-directional / Nozzle 2
C	Bi-directional / Nozzle 3
D	Bi-directional / Nozzle 4
E	Bi-directional / Nozzle 5

### L = Total length

1800, 2400, 3000, 3600

### C = Effective length of coil

1300, 1900, 2500, 3100 (L-500)

### E = Duct connection / Duct size / Damper

R2N	Right / 125 / Without damper
L2N	Left / 125 / Without damper
S2N	Straight / 125 / Without damper

## Other options and accessories

### TC = Cooling / Heating functions (coil type)

C	Cooling
H	Cooling and Heating

### CO = Colour

W	White (RAL 9010)
---	------------------

### AQ = Air quality control (HAQ)

A	Manual
B	Motorised

### QV = Quick release valves

N	No
Y	Yes

### ZT = Tailored product

N	No
---	----

## Code example

VPR-A-3000-2500-R2N, TC=CE, CO=W, AQ=A,QV=A, ZT=N