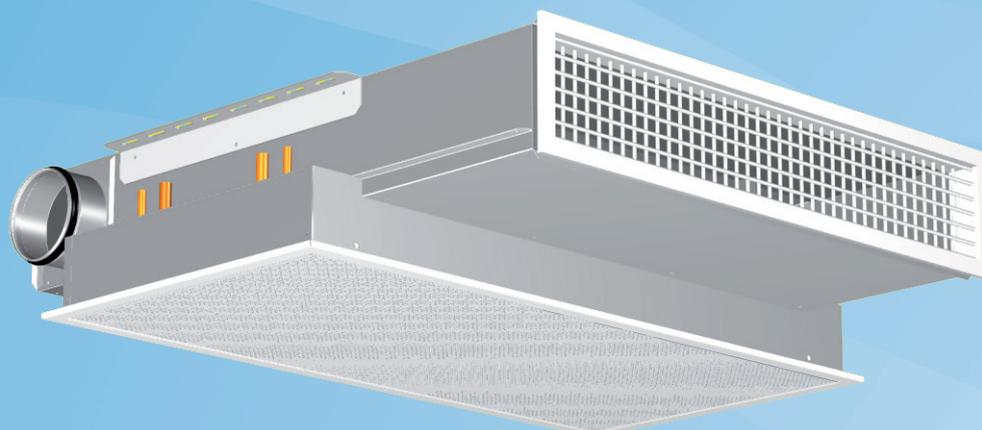


Halton CHH

Active Chilled Beam



- Combined cooling, heating, and supply air unit for suspended ceiling / bulkhead installation
- Excellent suitability for hotel guest rooms with high requirements for thermal comfort and silent conditions. Ideal also for other buildings where high indoor environmental quality and individual room control are appreciated.
- Enhanced life-cycle performance:
 - Energy-efficient solution with low air and water flow rates in both cooling and heating modes.
 - Suitable system for use with free energy sources and heat pumps.
 - Low-cost maintenance due to simple and hygienic principle of operation. Operates as a non-condensating dry system with minimal use of mechanical parts: no fan, no mechanical filters, no condensation tray, and no drainage tubing.
- Efficient ordering and installation:
 - Ability to change the position of the primary air inlet spigot and waterside pipe connections on-site to match the installation conditions.
 - Compact design, from 1000 mm (width) x 925 mm (length) x 250 mm (height), suitable for both renovation projects and new construction.

Product Options and Accessories

- Model with combined cooling and heating coil
- Option for different supply air grilles
- Integrated control valves and actuators

QUICK SELECTION

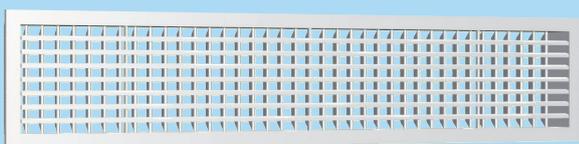
qv	Pa	143	191	239	287	334	382
	l/s	15	20	25	30	35	40
	m ³ /h	54	72	90	108	126	144
Leff							
800	Pw	425	602	576	700	649	745
	NZ/ Δ Ptot	A/50	A/89	B/71	B/102	C/79	C/103
	Ld	4,4	6,0	6,2	7,4	7,2	8,0

Leff	Effective length, length of cooling coil, mm	Room temperature (Tr)	= 24 °C
Pa	Supply air capacity, W	Chilled water inlet temperature (Twin)	= 14 °C
Pw	Coil capacity, W	Chilled water outlet temperature (Twout)	= 17 °C
NZ	Nozzle type	Supply air temperature (Ta)	= 16 °C
Δ Ptot	Chilled beam chamber pressure, Pa	A-weighted sound pressure level, reduced by total equivalent absorption surface of 10m ² , dB(A) red 10m ² sab	< 30 dB(A)
Ld	Distance where supply air jet detaches from the ceiling, m		

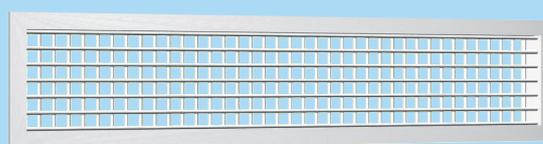
MATERIAL AND FINISHING

PART	MATERIAL	FINISHING	NOTE
Return air grille	Pre-painted galvanised steel	Polyester-painted White RAL 9010/ 20 % gloss	Special colours available Polyester-epoxy-painted
Supply air grille G = A	Aluminium	Polyester-epoxy-painted White RAL 9010 / 50% gloss	Special colours available Polyester-epoxy-painted
Supply air grille G = B	Steel	Polyester-epoxy-painted White RAL 9010 / 50% gloss	Special colours available Polyester-epoxy-painted
Casing	Galvanised steel		
Supply air plenum	Galvanised steel		
Brackets	Galvanised steel		
Coil pipes	Copper		
Coil fins	Aluminium		

Cooling / heating water pipe connections are Cu15/
Cu12 with wall thickness of 1.0 mm, fulfilling European
standard EN 1057:1996. The maximum operating
pressure for chilled/hot water pipework is 1.0 MPa. The
supply air duct connection diameter is 125 mm.



Aluminium air supply air grille

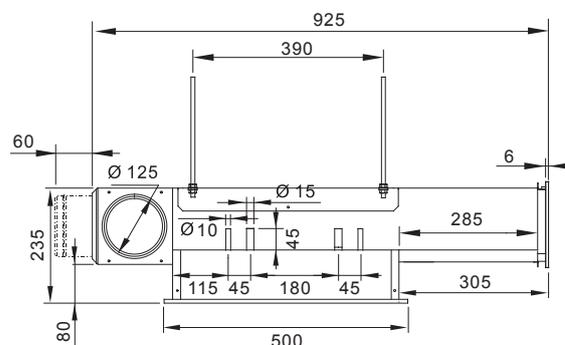
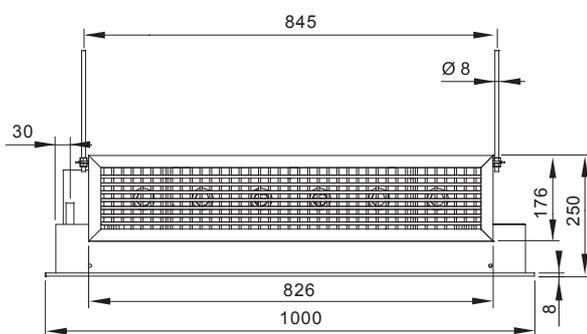


Steel air supply air grille

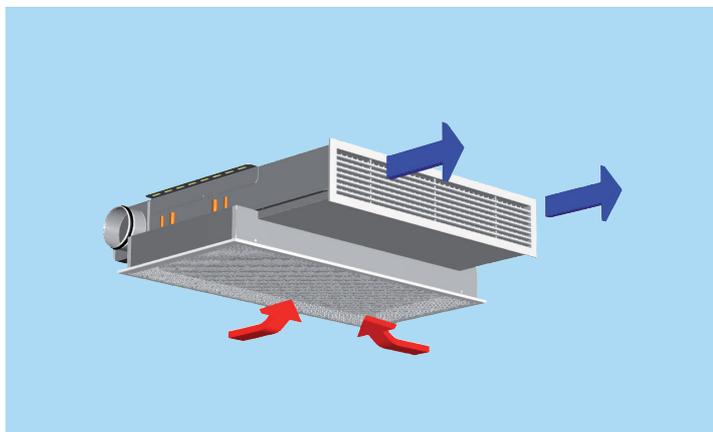
PRODUCT OPTIONS AND ACCESSORIES

ACCESSORY	CODE	DESCRIPTION	NOTE
Supply air grille	G = A	Aluminium grille with 7 fixed horizontal front vanes for horizontal air supply. Fixed front vanes, stable throw pattern with vertical 15° deflection. Aluminium construction with elegant look.	As standard, supply and return air grilles are supplied in the same colour. Grilles also can be delivered in different colours on request. If another grille is needed for the space, Halton recommends to use Halton AWE that has similar outlook.
Supply air grille	G = B	Steel grille with 9 horizontal front vanes for horizontal air supply. Adjustable horizontal front vanes max 15°. Robust steel construction.	As standard, supply and return air grilles are supplied in the same colour. Grilles also can be delivered in different colours on request. If another grille is needed for the space, Halton recommends to use Halton WTS that has similar outlook.
Combined cooling and heating coil	TC = H	H = coil with hot water circulation.	Copper water pipe connections are Ø 15 mm (cooling) and Ø 10 mm (heating)
Control valve	CV = see product code	Valves with adjustable kvs value (Danfoss RA-C dn15) or with max flow limit function (Danfoss AB-QM dn 10 in heating and Danfoss AB-QM dn 15 in cooling).	Delivered factory fitted or loose. If control valves are factory fitted in the factory, the location of the pipe connections cannot be changed on the site.
Valve actuator	VM = see product code	Thermal on/off actuators (230 VAC NC or 24 VAC NC for both valve types).	Delivered factory-fitted or loose. Cable length 1.2m.

DIMENSIONS AND WEIGHT



Weight of the beam: 30 kg (excluding water)



Function

The CHH unit is an active chilled beam for bulkhead installation.

The primary supply air enters the plenum of the active chilled beam, from where it is diffused into the room through nozzles and a supply grille on the front side of the beam. The supply air nozzle jets efficiently induce ambient room air through the lower return air grille and the heat exchanger, where it is either cooled or heated. The combined air jet is directed along the ceiling surface.

Three different nozzle sizes are available to enable various supply air flow rates. The nozzle plates are inter-changeable to account for layout or room changes.

Waterside cooling and heating capacity control

The chilled beam can be equipped in the factory with either a standard control valve or a combination control valve.

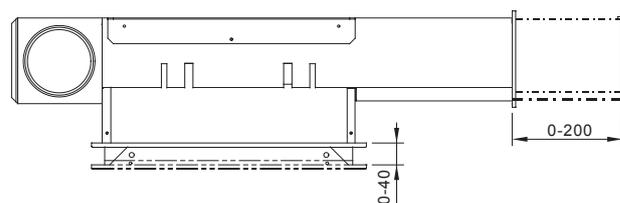
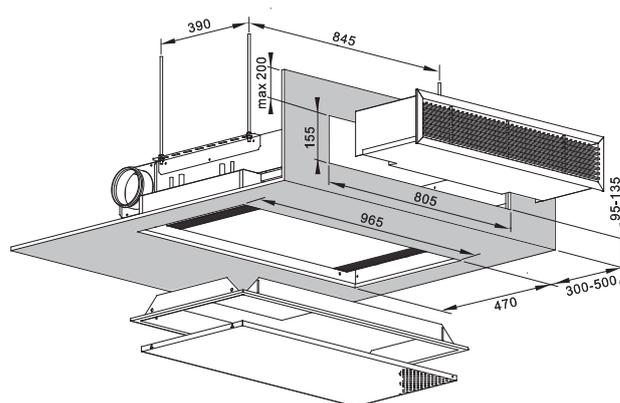
Controls may include either a standard control valve or a combination control valve. Both control valves are operated with a thermal actuator, and the water flow rate of the control valve is based on room air temperature. The standard control valve has an adjustable kvs value. The combination control valve has an adjustable nominal water flow rate and there is a pressure difference measurement across the control valve in order to ensure that enough pressure difference (min.: 16 kPa) is available to achieve the adjusted water flow rate and the automatic balancing in use. See Document-section for more information.

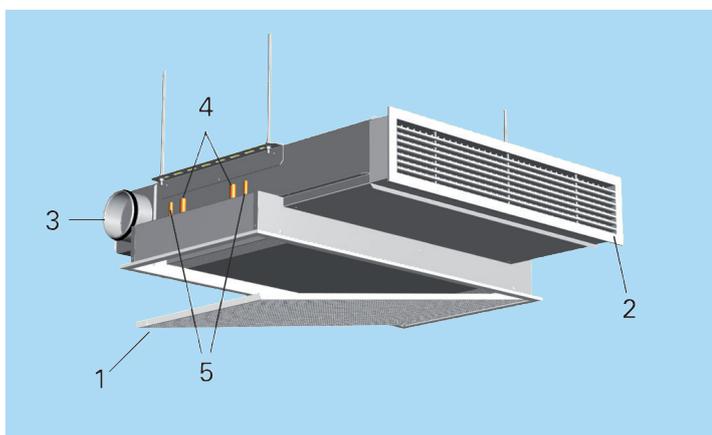
Installation

The CHH unit is suitable for bulkhead and suspended ceiling installation. The chilled beam ceiling brackets can be fixed directly to the ceiling surface or suspended using threaded drop rods (8 mm). The recommended maximum distance of the supply air grille from the ceiling is 200 mm. The return air grille has a 40-mm telescopic connection and the supply air grille a 200-mm telescopic connection.

Install the main pipelines of the cooling and heating water loops above the level of the chilled beams to allow venting of the pipework.

If unit is delivered with factory fitted valves, there must be c. 80mm space above unit.





Servicing

CODE DESCRIPTION

1	Return air grille
2	Supply air grille
3	Supply air connection
4	Chilled water pipe connections
5	Heating water pipe connections

Open the return air grille of the chilled beam. Clean the finned coils of the heat exchanger using a vacuum cleaner, taking care not to damage the finned coils. Clean the return and supply air grilles with a damp cloth.

Check at regular intervals that the actuators and water flow control valves are working.

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 temperature of the inlet water for the heat exchanger is 35–45 °C.

Balancing and control of water flow rates

Balance the water flow rates of the chilled beam with the standard control valve by selecting the design kvs value in the valve body. When using an automatically balancing combination valve, set the design water flow rate in the valve body and verify the pressure difference (min.: 16 kPa) across the valve. Regulating the water mass flow rate controls the cooling and heating capacity of the chilled beam.

Adjustment of supply airflow rate

Each chilled beam is equipped with a measurement tap for static pressure measurement, which enables fast and accurate measurement of the supply air flow rate through the beam. The air flow rate is calculated using the formula below.

$$q_v = k * \sqrt{\Delta p_m}$$

Nozzle	k
A	2,11
B	3,03
C	4,15

CHH selection tables

Cooling: nozzle A

qv	Pa	143	162	182	201	220	239
Leff	l/s	15	17	19	21	23	25
	m ³ /h	54	61	68	76	83	90
800	ΔP_{tot}	50	65	81	99	118	140
	Pw	425	498	568	633	698	759
	Pt	568	660	750	834	918	997
	LpA	16	18	20	22	23	25
	Ld	4,4	5,0	5,6	6,2	6,8	7,4

Heating: nozzle A

Recommended maximum heating capacity in 80 - 120Pa pressure level is 500W.

Cooling: nozzle B

qv	Pa	220	239	258	277	296	315
Leff	l/s	23	25	27	29	31	33
	m ³ /h	83	90	97	104	112	119
800	ΔP_{tot}	60	71	83	96	109	124
	Pw	523	576	627	676	723	770
	Pt	743	815	885	953	1019	1086
	LpA	19	21	23	24	26	27
	Ld	5,8	6,2	6,8	7,2	7,6	8,0

Heating: nozzle B

Recommended maximum heating capacity in 80 - 120Pa pressure level is 600W.

Cooling: nozzle C

qv	Pa	296	315	334	354	373
Leff	l/s	31	33	35	37	39
	m ³ /h	112	119	126	133	140
800	ΔP_{tot}	62	70	79	88	98
	Pw	568	609	649	688	727
	Pt	864	925	983	1041	1100
	LpA	25	26	27	28	29
	Ld	6,4	7,0	7,2	7,6	8,0

Heating: nozzle C

Recommended maximum heating capacity in 80 - 120Pa pressure level is 750W.

Notations of the selection tables

LpA values presented with room attenuation 4 dB (red 10m² - sab).
When using room attenuation 8 dB (red 25m² - sab): LpA - 4dB.

Leff	Effective length, length of cooling coil, mm
Pa	Supply air cooling capacity, W
ΔP_{tot}	Chilled beam chamber pressure, Pa
Pw	Coil capacity, W
Pt	Total capacity, W
LpA	A-weighted sound pressure level, reduced by total equivalent absorption surface of 10m ² , dB(A) red 10m ² - sab
Ld	Distance from the supply unit, at which air jet detaches from ceiling, m

Room temperature (Tr)	= 24 °C
Chilled water inlet temperature (Twin)	= 14 °C
Chilled water outlet temperature (Twout)	= 17 °C
Supply air temperature (Ta)	= 16 °C

Suggested specifications

The Halton CHH unit is an active chilled beam for bulkhead and enclosed installation with return and supply air grilles.

The return air and supply air grilles shall be openable and removable for maintenance. The return air grille has a 40-mm telescopic connection and the supply air grille a 200-mm telescopic connection. The active chilled beam shall be 1000 mm wide, 925 mm in length, and 250 mm high, with an inlet duct diameter of 125 mm.

The inlet duct connection shall be changeable and able to be located at the right, left, or middle of the supply air plenum.

The heat exchanger of the beam shall be oriented such that the water connections may be located on either the right or left side of the beam.

All pipes shall be manufactured from copper, connection pipes with a wall thickness of 1.0 mm. The fins of the heat exchanger shall be manufactured from aluminium. The heat exchanger shall be factory pressure-tested. The maximum operating pressure of pipework shall be 1.0 MPa.

Each active chilled beam shall be protected by a removable plastic coating and individually packed in a plastic bag. Duct connection and pipe ends shall be sealed during transit.

Each chilled beam shall be identifiable by a serial number printed on a label attached to the active chilled beam.

Product code

CHH/S-E-K-G

S = Nozzle type

A	Nozzle 5
B	Nozzle 6
C	Nozzle 7

E = Location of supply air connection

R	Right
L	Left
M	Middle

K = Location of pipe connections

R	Right
L	Left

G = Type of air supply air grille

A	Aluminium
B	Steel

Specifics and accessories

TC = Cooling / heating functions (coil type)

C	Cooling
H	Cooling and heating

CO = Colour of grilles

W	White
X	Special colour

CV = Control valves

N	Not assigned
A1	Adjustable kvs (Danfoss RA-C dn15); factory fitted
A2	Adjustable kvs (Danfoss RA-C dn15); loose
A3	Max flow limit (Danfoss AB-QM dn 10 (heating) and dn15 (cooling); factory fitted
A4	Max flow limit (Danfoss AB-QM dn 10 (heating) and dn15 (cooling); loose

VM = Valve actuator(s)

N	Not assigned
A1	24 V
A2	230 V

Code example

CHH/A-M-R-A, TC=C, CO=W, CV=N, VM=N