CBC

Active Chilled Beam

20/CBC/3500/1207/EN

- Combined cooling, heating, and supply air unit for flush installation within a suspended ceiling
- Well suited for spaces with high cooling loads and low humidity load
- Ideal solution for applications where high-quality environmental conditions and individual room control are appreciated
- Typical applications: office rooms, landscape offices, team rooms, patient care rooms, etc.
- Enhanced life-cycle performance with low air and water flow rates

In-built flexibility for easy and fast adaptation of operation during space layout and usage changes

- Individually adjustable velocity conditions with Halton Velocity Control (HVC)
- In-built flexibility of partition wall relocations with Halton Velocity Control
- Rapid adjustment of operation in situations of change without the need to change or plug nozzles

Product Models and accessories

- Model with combined cooling and heating coil, or model with electric heating foil
- Model with air flow adjustment damper
- Model with integrated exhaust valve
- Model with direct light fittings
- Model adapted to Dampa ceiling installation

QUICK SELECTION

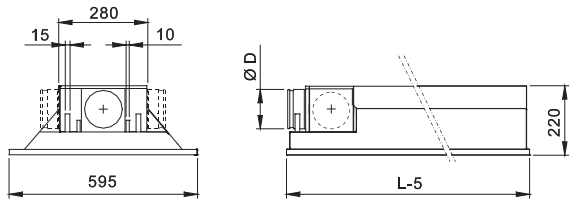
	Pa	72	108	144	180	216	252	288	324
qv	l/s	10	15	20	25	30	35	40	45
	m³/h	36	54	72	90	108	126	144	162
Leff									
900	Pw		252	315					
	NZ/ΔPtot		D/71	D/126					
	Lmin		6,6	8,6					
	Ld		3	4,2					
1200	Pw	258	317	360	437				
	NZ/ΔPtot	B/61	C/76	D/72	D/113				
	Lmin	2,6	5,6	5,6	7,6				
	Ld	2,4	3,2	3	3,8				
1500	Pw	370	405	445	484	564			
	NZ/ΔPtot	A/100	B/90	C/88	D/74	D/107			
	Lmin	1,6	1,6	6,6	5,6	6,6			
	Ld	2,6	2,6	3,2	3	3,6			
1800	Pw	401	439	566	578	613	700		
	NZ/ΔPtot	A/70	B/64	B/113	C/97	D/76	D/103		
	Lmin	1,6	1,6	1,6	6,6	5,6	6,6		
	Ld	2	2,2	3	3,4	3	3,2		
2100	Pw		611	604	645	721	753	843	
	NZ/ΔPtot		A/115	B/85	C/73	C/105	D/78	D/101	
	Lmin		1,6	1,6	5,6	6,6	5,6	6,6	
	Ld		2,6	2,4	3	3,6	3	3,2	
2400	Pw		651	641	780	792	872	896	
	NZ/ΔPtot		A/88	B/66	B/103	C/82	C/111	D/80	
	Lmin		1,6	1,6	1,6	5,6	6,6	5,6	
	Ld		2,4	2,2	2,6	3	3,6	2,8	
2700	Pw		686	880	821	965	945	1027	
	NZ/ΔPtot		A/70	A/124	B/83	B/119	C/89	C/117	
	Lmin		1,6	1,6	1,6	1,6	5,6	6,8	
	Ld		2	2,6	2,4	2,8	3	3,6	
3000	Pw			921	859	1008	1018	1104	
	NZ/ΔPtot			A/100	B/68	B/98	C/74	C/96	
	Lmin			1,6	1,6	1,6	5,6	5,6	
	Ld			2,4	2	2,4	2,6	3	
3300	Pw			963	1169	1051	1204	1181	1255
	NZ/ΔPtot			A/83	A/130	B/82	B/112	C/81	C/103
	Lmin			1,6	1,6	1,6	1,6	4,6	5,6
	Ld			2	2,6	2,4	2,6	2,8	3,2

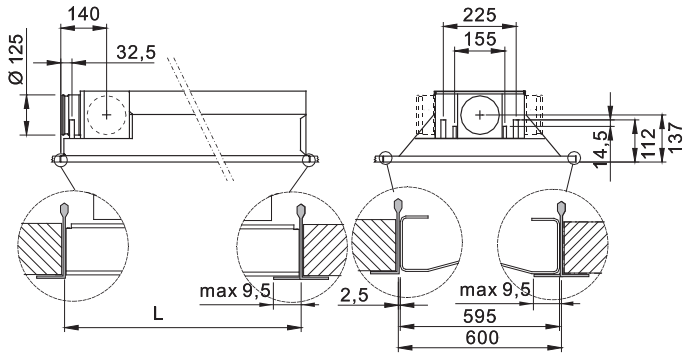
Performance values are presented for operation with HVC in position 3.
If Lmin will be > 5 m then use HVC
The impact of HVC compared to presented values in average:
position 2: -15% of Pw and Position 1: -35 % of Pw

Leff Effective length, length of cooling coil, mm
Pa Supply air capacity, W
Pw Coil capacity, W
NZ Nozzle type
ΔPtot Chilled beam chamber pressure, Pa
Lmin Minimum distance between central lines of two supply units, m
Ld Distance where supply air jet detaches from the ceiling, m

Room temperature (Tr)	= 24 °C
Chilled water inlet temperature (Twin)	= 15 °C
Chilled water outlet temperature (Twout)	= 18 °C
Supply air temperature (Ta)	= 18 °C
A-weighted sound pressure level, reduced by total equivalent absorption surface of 10m² , dB(A) red 10m² sab	< 35 dB(A)

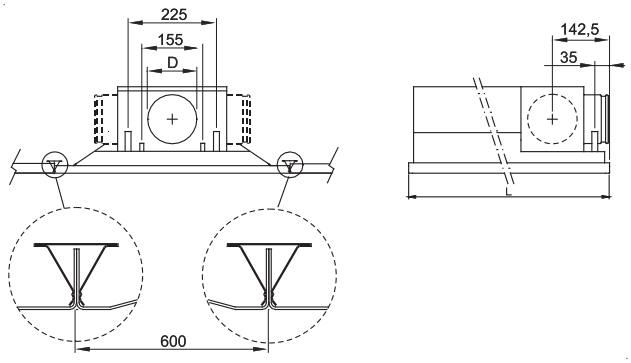
DIMENSIONS AND WEIGHT





Location of the pipe connections and integration to suspended ceiling

ØD	125
Coil length	900,+100,...,3000
L-5	1195,+100,...,3595
kg/m	14



Dampa ceiling – installation adapters

MATERIAL AND FINISHING

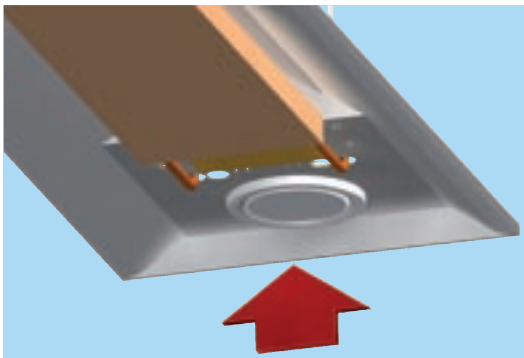
PART	MATERIAL	FINISHING	NOTE
Bottom panel	Pre-painted galvanised steel	Polyester-painted White RAL 9010/ 20 % gloss	Special colours available Polyester-epoxy-painted
Side plates	Pre-painted galvanised steel	Polyester-painted White RAL 9010/ 20 % gloss	Special colours available Polyester-epoxy-painted
End plates	Galvanised steel	Polyester-epoxy-painted White RAL 9010/ 20 % gloss	Special colours available
Supply air plenum	Galvanised steel		
Brackets	Galvanised steel		
Coil pipes	Copper		
Coil fins	Aluminium		
Electric heating foil	Polyester laminate with aluminium conductor		
Exhaust valve	Galvanised steel	Polyester-epoxy-painted White RAL 9010/	See Halton URH valve

Cooling/heating water pipe connections are Cu15/ Cu10 with wall thickness of 1.0 mm fulfilling European Standard EN 1057:1996.
The maximum chilled/hot water circuit operating pressure is 1.0 MPa.

The supply air duct connection is 125 mm.

The electric heating foil system fulfils EN 60335-1 Class I standards.

Model with direct light fittings

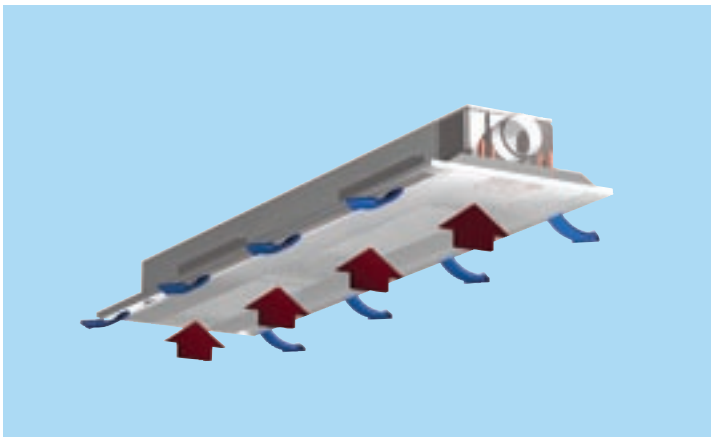


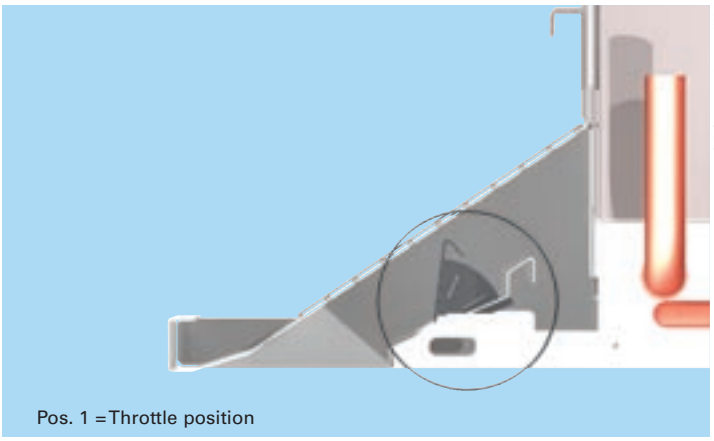
Exhaust valve integration

PRODUCT MODELS AND ACCESSORIES

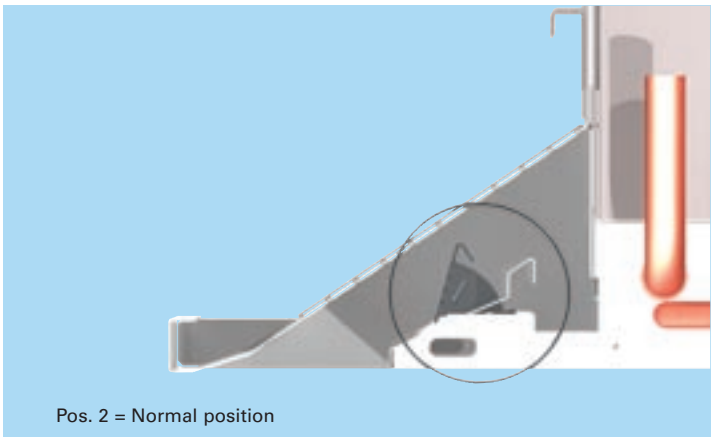
ACCESSORY MODEL	CODE	DESCRIPTION	NOTE
Combined cooling and heating coil	TC = H	Coil with hot water circulation	Cooling/heating copper water pipe connections are Ø 15/10 mm
Electric heating	TC = E	Electric foil for heating	
Airflow adjustment damper	FD = Y	MSM damper	Removable through access panel
Exhaust valve integration	EX = Y	Valve integrated into the chilled beam	Integrated exhaust valve uses 300 mm of the total beam length, decreasing the effective beam length. The valve is located in the front end of the chilled beam.
Adapters for Dampa ceiling installation	IO = A	Installation within Dampa ceiling	
Luminaire	LV = See product code	Wattage: 28 W, 35 W, 2 x 21 W	Standard or dimmable
Cables for luminaire	CL = See product code	Cable length: 1000 mm, 2000 mm, or 3000 mm	Plug type options: without plug, standard plug, Enstonet plug, Wieland plug

The chilled beam can be equipped with an integrated exhaust valve, providing air supply and exhaust in the same unit. The integrated exhaust valve, at the front of the unit, uses 300 mm of the total length, decreasing the effective length accordingly.

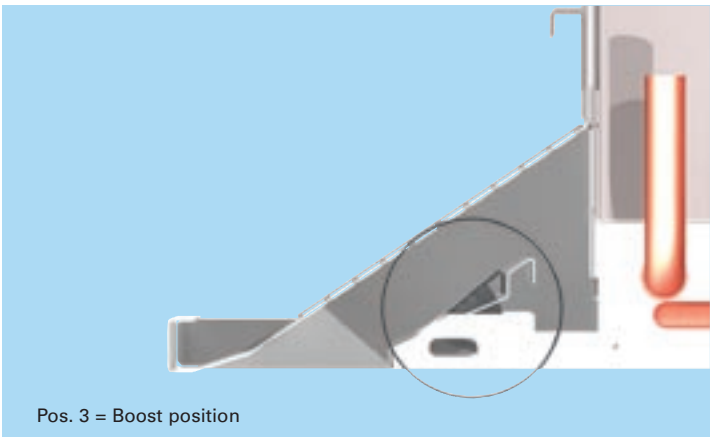




Pos. 1 =Throttle position



Pos. 2 = Normal position



Pos. 3 = Boost position

Function

The primary supply air enters the plenum of the active chilled beam. From there it is diffused into the room through nozzles and 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.
Four nozzle sizes are available, to enable different supply air flow rates.

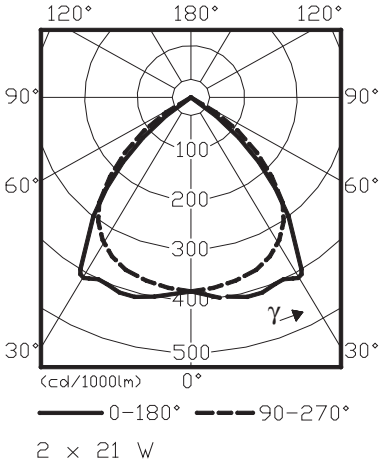
In heating mode, it is recommended for the temperature difference between the jet outlet and room air to be no more than 3 °C. The temperature of the inlet water to the heat exchanger should not be higher than 35 °C. Optimal heating performance requires operation using the designed primary air flow rate. Thus, the air handling unit shall be in operation during heating periods to guarantee proper heating performance.

Velocity control in occupied zone

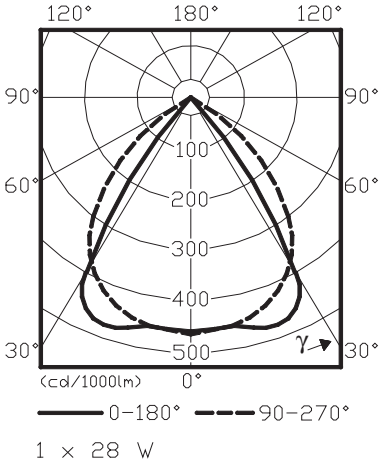
Halton Velocity Control (HVC) is used for adjusting room air velocity conditions either when room layout is changed (e.g., in cases where the partition wall is located near the chilled beam) or when local, individual velocity conditions need to be altered. HVC adjustment has an impact on the induced 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.

Halton Velocity Control uses manual velocity adjustment with three settings: 1 = throttle position, 2 = normal position, and 3 = Boost position. The HVC damper is divided into sections 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.



2 × 21 W



1 × 28 W
1 × 35 W

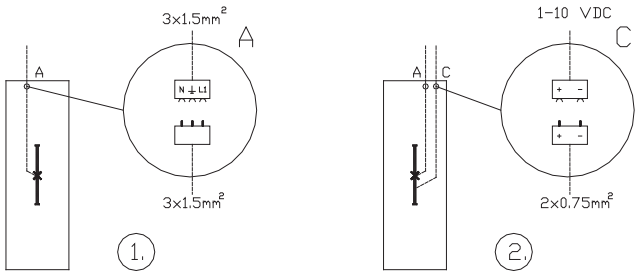
Light distribution curves

The chilled beams with luminaires are equipped with optics suitable for working with monitors. Delivery includes the luminaires with fluorescent lamps installed. The connecting cable with a plug can be delivered factory-installed upon request. The luminaires are delivered with either standard or dimmable electronic ballasts.

Luminaire properties

Lamp T5	W	21	28	35
Lamps/ luminaire	pcs	1	1	1
Light flux	lm	1900	2600	3300
Light output ratio		0.74	0.70	0.72
Ballast		electronic	electronic	electronic

Wiring diagram



1. Connection with standard electronic ballast (HF)
2. Connection with dimmable electronic ballast (HFR

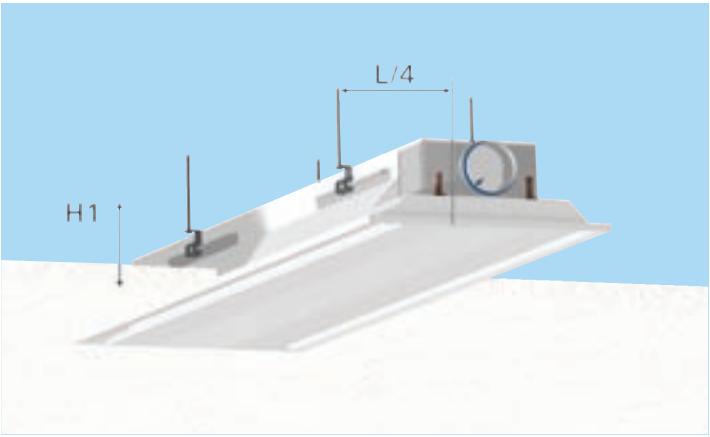
Number of luminaires in a chilled beam

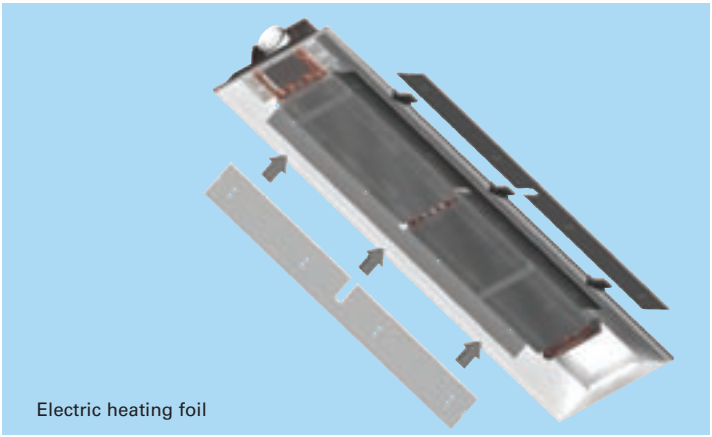
CBC

Luminaire type	W	21	28	35
Luminaire length	mm	900	1200	1500
Coil length	mm	878	1178	1478
Total beam length				
One-piece mm	1600	1	-	-
	1700	1	-	-
	1720	1	-	-
	1800	-	1	-
	1900	-	1	-
	2000	-	1	-
	2100	-	-	1
	2200	-	-	1
	2300	-	-	1
	2400	-	-	1
Two-piece mm	2500	-	-	-
	2600	-	-	-
	2700	-	-	-
	2800	-	-	-
	2900	-	-	-
	3000	-	-	-
	3100	2	-	-
	3200	2	-	-
	3300	2	-	-
	3400	2	-	-
	3500	-	2	-
	3600	-	2	-

CBC with exhaust valve

Luminaire type	W	21	28	35
Luminaire length	mm	900	1200	1500
Coil length	mm	878	1178	1478
Total beam length				
One-piece mm	1200	-	-	-
	1300	-	-	-
	1400	-	-	-
	1500	-	-	-
	1600	-	-	-
	1700	1	-	-
	1720	1	-	-
	1800	1	-	-
	1900	1	-	-
	2000	-	1	-
	2100	-	1	-
	2200	-	1	-
	2300	-	-	1
	2400	-	-	1
Two-piece mm	2500	-	-	-
	2600	-	-	-
	2700	-	-	-
	2800	-	-	-
	2900	-	-	-
	3000	-	-	-
	3100	-	-	-
	3200	-	-	-
	3300	-	-	-
	3400	2	-	-
	3500	2	-	-
	3600	2	-	-





Electric heating foil

Duct installation of the exhaust valve

Installation

The CBC active chilled beam is suitable for ceiling mounting running along the long or short side of a room. In selection of the beam orientation, the location of the supply air and water circuit connections should be taken into account.

The beam can be attached directly to the ceiling surface (H1 = 220 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 end can be done easily on-site without special tools.

An optional exhaust valve is installed in the front end before the connection plenum of the supply air duct. Only left and right supply air duct connections are possible. The exhaust valve option requires a chilled beam that is 300 mm longer.

Duct installation of the exhaust valve

Note: URH with end connection is not possible.

Electric heating installation and safety instructions

Final circuit design criteria (the more restrictive must be applied):

- The total power of a single final circuit shall not exceed 2000 W
- The total number of chilled beam units in a single final circuit shall not exceed 6 pieces

Electric connections:

- Beams shall be connected to protective earth, PE
- The final circuit shall include a fuse, max. 10 A
- The power supply shall be protected with a ground fault circuit interrupter, 30 mA

Operation:

- The electric heating power supply shall be switched off if there is no air flow through the chilled beam (for example, if the air handling unit is switched off or the fire damper is closed)

Servicing

CODE	DESCRIPTION
1	Front panel
2	Side plate
3	Supply air connection
4	Plenum box
5	Heat exchanger
6	Access panel

Open the front panel of the supply air plenum, the ductwork, and the heat exchanger. In beams longer than 2400 mm, the front panel can be opened in two sections.
Clean the supply air plenum and finned coils of the heat exchanger with a vacuum cleaner, taking care not to damage the finned coils.
Clean the front panel and, if required, the side plates, using a damp cloth.

The air flow adjustment damper also can be cleaned by opening the front panel.
Check at regular intervals that the air flow adjustment damper (if applicable) and water flow control valve are working.

The access panel (145 x 131 mm) enables access for duct cleaning. Unscrew the screws of the access panel to open it.

When opening the front panel, pay attention to the cables of units equipped with integrated light fittings.

CBC selection tables

Cooling: nozzle A

qv	l/s	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Leff	m³/h	25	29	32	36	40	43	47	50	54	58	61	65	68	72	76	79	83
1200	ΔPtot	86	112	141														
	Pw	252	276	305														
	Pt	302	333	370														
	LpA	14	16	17														
	Lmin	1,6	1,6	1,6														
	Ld	2,4	2,6	3														
1800	ΔPtot				77	93	111	131										
	Pw				401	437	470	505										
	Pt				473	516	556	599										
	LpA				15	16	17	18										
	Lmin				1,6	1,6	1,6	1,6										
	Ld				2	2,4	2,6	2,6										
2400	ΔPtot							73	85	98	111	125	141					
	Pw							574	611	651	688	725	762					
	Pt							667	712	758	803	847	891					
	LpA							16	17	17	18	18	19					
	Lmin							1,6	1,6	1,6	1,6	1,6	1,6					
	Ld							2	2	2,4	2,4	2,6	2,6					
3000	ΔPtot											80	90	100	111	123	135	147
	Pw											802	841	882	921	963	1002	1041
	Pt											924	970	1018	1065	1113	1160	1206
	LpA											17	18	18	19	19	20	21
	Lmin											1,6	0,5	0,5	0,5	0,5	0,5	1,0
	Ld											2	2	2,4	2,4	2,4	2,6	2,6

Heating: nozzle A

Recommended maximum linear meter heating capacity in 80-120 Pa pressure level is 160 W/m.

Cooling: nozzle B

qv	l/s	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Leff	m³/h	36	40	43	47	50	54	58	61	65	68	72	76	79	83	86	90	94	97	101	104	108	112	115	119	122	126
1200	ΔPtot	68	82	98	115	133																					
	Pw	258	280	301	325	346																					
	Pt	330	359	387	418	447																					
	LpA	11	13	15	17	19																					
	Lmin	1,6	1,6	1,6	1,6	2,6																					
	Ld	2,4	2,6	2,8	3	3,2																					
1800	ΔPtot						71	81	91	102	114	126	139														
	Pw						439	464	490	515	541	566	590														
	Pt						546	579	612	644	677	710	740														
	LpA						13	14	15	17	18	19	20														
	Lmin						1,6	1,6	1,6	1,6	1,6	1,6	2,6														
	Ld						2,2	2,4	2,6	2,6	2,8	3	3														
2400	ΔPtot											73	81	88	97	105	114	124	133	143							
	Pw											641	668	696	725	753	780	808	835	863							
	Pt											784	819	853	890	925	959	994	1029	1063							
	LpA											16	17	18	19	20	21	22	23	24							
	Lmin											1,6	1,6	1,6	1,6	1,6	1,6	1,6	2,6	2,6							
	Ld											2,2	2,4	2,4	2,4	2,6	2,6	2,6	3	3							
3000	ΔPtot																75	82	88	95	101	109	116	123	131	139	148
	Pw																859	890	920	949	978	1008	1037	1067	1098	1128	1157
	Pt																1038	1076	1113	1150	1186	1223	1259	1296	1335	1371	1408
	LpA																19	20	21	22	22	23	24	25	26	26	27
	Lmin																1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	2,6	2,6
	Ld																2	2,2	2,4	2,4	2,4	2,4	2,6	2,6	2,6	2,8	3

Heating: nozzle B

Recommended maximum linear meter heating capacity in 80-120 Pa pressure level is 250 W/m.

CBC selection tables

Cooling: nozzle C

qv	l/s	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Leff	m³/h	50	54	58	61	65	68	72	76	79	83	86	90	94	97	101	104
1200	ΔPtot	73	84	96	108	121	135	149									
	Pw	305	317	331	344	356	370	382									
	Pt	406	424	445	466	485	506	525									
	LpA	14	15	16	18	19	21	22									
	Lmin	4,6	5,6	5,6	6,6	6,6	7,6	5,6									
	Ld	3	3,2	3,6	3,6	3,8	4,2	4,2									
1800	ΔPtot								76	83	91	99	108	117	126	135	145
	Pw								519	535	549	564	578	594	607	623	637
	Pt								670	692	713	736	757	780	801	824	845
	LpA								16	17	18	19	20	21	22	23	24
	Lmin								4,6	5,6	6,6	5,6	6,6	6,6	6,6	6,6	7,6
	Ld								3	3	3,2	3,2	3,4	3,6	3,6	3,8	3,8

qv	l/s	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
Leff	m³/h	101	104	108	112	115	119	122	126	130	133	137	140	144	148	151	155	158	162	166	169
2400	ΔPtot	79	84	90	96	103	109	116	123	130	137	145									
	Pw	759	774	792	808	823	839	855	872	888	904	920									
	Pt	959	982	1007	1030	1053	1076	1098	1123	1146	1169	1192									
	LpA	22	23	24	25	26	26	27	28	29	29	30									
	Lmin	4,6	5,6	5,6	6,6	5,6	6,6	6,6	7,6	6,6	6,6	7,6									
	Ld	2,8	3	3	3	3,2	3,2	3,2	3,6	3,6	3,6	3,8									
3000	ΔPtot								81	86	91	96	101	106	112	117	123	129	135	141	147
	Pw								1018	1035	1053	1071	1086	1104	1122	1139	1157	1173	1190	1208	1226
	Pt								1268	1293	1318	1343	1366	1391	1415	1440	1465	1488	1513	1538	1563
	LpA								27	27	28	29	29	30	30	31	32	32	33	33	34
	Lmin								4,6	5,6	5,6	6,6	6,6	5,6	6,6	6,6	6,6	7,6	6,6	6,6	6,6
	Ld								2,6	2,8	3	3	3	3	3,2	3,2	3,2	3,4	3,6	3,6	3,6

Heating: nozzle C

Recommended maximum linear meter heating capacity in 80-120 Pa pressure level is 300 W/m.

Cooling: nozzle D

qv	l/s	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Leff	m³/h	68	72	76	79	83	87	90	94	97	101	104	108	112	115	119	122	126	130	133	137	140	144
1200	ΔPtot	72	80	88	97	106	115	125	136	146													
	Pw	344	360	376	392	405	421	437	450	466													
	Pt	481	503	526	549	570	593	616	637	660													
	LpA	17	18	19	20	21	23	24	25	26													
	Lmin	5,6	6,6	5,6	6,6	7,6	6,6	7,6	7,6	6,6													
	Ld	3,0	3,0	3,2	3,2	3,6	3,6	3,8	3,8	3,0													
1800	ΔPtot										73	78	84	89	95	101	108	114	121	127	134	142	149
	Pw										580	598	613	631	649	666	684	700	717	735	753	768	786
	Pt										781	805	828	853	878	903	928	951	975	1000	1025	1048	1073
	LpA										22	22	23	24	24	25	26	26	27	28	28	29	30
	Lmin										5,6	6,6	5,6	6,6	6,6	6,6	6,6	6,6	6,6	7,6	7,6	7,6	5,6
	Ld										2,6	2,8	3	3	3	3,2	3,2	3,2	3,6	3,6	3,6	3,6	3,8

CBC selection tables

Cooling: nozzle D

qv	l/s	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
Leff	m³/h	137	140	144	148	151	155	158	162	166	169	173	176	180	184	187	191	194
2400	ΔPtot	79	83	88	92	97	101	106	111	116	121	126	132	137	143	148		
	Pw	859	878	896	916	935	953	972	992	1010	1029	1047	1067	1086	1104	1124		
	Pt	1131	1158	1183	1209	1236	1261	1288	1315	1339	1366	1391	1418	1445	1469	1496		
	LpA	28	29	30	30	31	31	32	32	33	33	34	35	35	36	36		
	Lmin	5,6	5,6	6,6	6,6	5,6	6,6	6,6	6,6	7,6	6,6	6,6	6,6	7,6	7,6	7,6		
	Ld	2,6	2,6	2,8	3	3	3	3	3,2	3,2	3,2	3,2	3,4	3,6	3,6	3,6		
3000	ΔPtot													92	96	100	104	108
	Pw													1202	1224	1243	1255	1255
	Pt													1560	1589	1616	1635	1642
	LpA													36	36	37	37	38
	Lmin													6,6	6,6	5,6	5,6	6,6
	Ld													2,6	2,8	2,8	3	3

Heating: nozzle D

Recommended maximum linear meter heating capacity in 80-120 Pa pressure level is 300 W/m.

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.

Performance values are presented for operation with HVC in position 3.
If Lmin > 5 m then use HVC
The impact of HVC compared to presented values in average:
position 2: -15 % of Pw and Position 1: -35 % of Pw

Leff	Effective length, length of cooling coil, mm
ΔPtot	Chilled beam chamber pressure, Pa
Pw	Coil capacity, W
Pt	Total capasity, W
LpA	A-weighted sound pressure level, reduced by total equivalent absorption surface of 10m², dB(A) red 10m² - sab
Lmin	Minimum distance between central lines of two supply units, m
Ld	Distance from the supply unit, at which air jet detaches from ceiling, m

Room temperature (Tr)	= 24 °C
Chilled water inlet temperature (Twin)	= 15 °C
Chilled water outlet temperature (Twout)	= 18 °C
Supply air temperature (Ta)	= 18 °C

Water pressure drop

$$\Delta p_w = k_{coil} * q_{mw}z$$

$$k_{coil} = a + b * L_{eff}$$

Factor	Unit	Description
Δp_w	[kPa]	Pressure drop of water flow
q_{mw}	[kg/s]	Water flow rate
L_{eff}	[mm]	Effective length of the chilled beam
k_{coil}	[ ]	k value
a,b	[ ]	Parameters for the selected beam

Beam	Cooling b	Cooling a	Z	Heating b	Heating a	Z
CBC	0.2297	86.60	1.87	0.9252	35.59	1.87

Water flow range

Beam	Cooling	Heating
CBC	0.020 – 0.100 kg/s	0.010 – 0.040 kg/s

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 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 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 air flow rate

Each chilled beam can be equipped with an air flow adjustment damper, which enables fast and accurate adjustment of the supply air flow rate. Connect a manometer in the measurement tap and measure the static pressure in the chilled beam. The air flow rate is calculated according to the formula below.

Nozzle jet air flow rate qv1

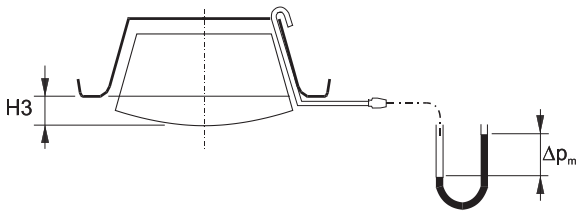
$$q_v = k * l_{eff} * \sqrt{\Delta p_m}$$

MODEL	k
A	0,76
B	1,04
C	1,38
D	2,08
E,J	0,51
F,K	0,70
G,M	1,03

Adjustment of exhaust air flow rate

The valve is adjusted by rotating the central cone. Measure (a) the opening position (in mm) of the central cone. There is a special tool available from Halton for accurate opening position measurement. Set a pressure probe inside the valve, and measure the differential pressure with a manometer. The air flow rate is calculated using the formula below, using k-factors presented in the table. After the adjustment, lock the central cone with the locking nut.

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



Suggested specifications

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 supply air flow rate shall be manually adjustable using an air flow damper.

The chilled beam shall be equipped with a recessed integrated flush-mounted luminaire as an option.
The luminaires shall be T5 HF-type (high frequency) and equipped with CAT 2 reflectors suitable for an office environment.
The luminaries are equipped with electronic ballasts, or they have dimmable ballasts.

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

The chilled beam shall be provided with an access panel to enable duct cleaning.
The air supply to the room space shall be either unidirectional or bi-directional.
The active chilled beam shall be 595 mm wide and 220 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 and painted 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 1.0 mm.
The fins shall be manufactured from aluminium.
Optionally, heating shall be incorporated within the heat exchanger by means of two 10-mm pipes, connected in series.

As an option, electric heating shall be incorporated using heating foil modules.
Electric heating shall influence both the primary supply air flow and circulated room air flow.
Electric heating elements shall be easily replaceable as complete modules from the room side by opening the beam's front plate and using common installation tools. There shall be no need to disconnect the cooling water coil.
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.
As an option, an exhaust valve shall be integrated into the chilled beam.

Active chilled beams shall be protected by a removable plastic coating and individually packed in 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

CBC/S-E-L-C

S = Direction of supply patterns & nozzle type

A	Bi-directional / Nozzle 1
B	Bi-directional / Nozzle 2
C	Bi-directional / Nozzle 3
D	Bi-directional / Nozzle 4
E	Uni-directional / Right / Nozzle 2
F	Uni-directional / Right / Nozzle 3
G	Uni-directional / Right / Nozzle 4
J	Uni-directional / Left / Nozzle 2
K	Uni-directional / Left / Nozzle 3
M	Uni-directional / Left / Nozzle 4

E = Duct connection/Duct size/Damper

S2N	Straight / 125 /Without damper
S2D	Straight / 125 /With damper
R2N	Right / 125 / Without damper
R2D	Right / 125 / With damper
L2N	Left / 125 / Without damper
L2D	Left / 125 / With damper

L = Total length

1200,+100,..,3600

C = Effective length (Cooling coil length)

900,+100,..,3000

Specifics and accessories

H = Height

220 mm

TC = Cooling / Heating functions (Coil type)

C	Cooling
H	Cooling and Heating
E	Cooling and Elect. Heating

CO = Colour

W	White
X	Special colour

EX = Exhaust

N	No
A	URH

IO = Installation option

N	None
DC	Dampa ceiling

LV = Type of direct light fitting

N	Without light
1C	1 x lamp 28 W Halton, standard
1D	1 x lamp 35 W Halton, standard
1E	1 x lamp 21 W Halton, standard
1H	1 x lamp 28 W Halton, dimmable
1J	1 x lamp 35 W Halton, dimmable
1K	1 x lamp 21 W Halton, dimmable
2C	2 x lamp 28 W Halton, standard
2E	2 x lamp 21 W Halton, standard
2H	2 x lamp 28 W Halton, dimmable
2K	2 x lamp 21 W Halton, dimmable

CL = Cable length & plug type

N	No cable
A1	1000 mm without plug
A2	2000 mm without plug
A3	3000 mm without plug
B1	1000 mm standard plug
B2	2000 mm standard plug
B3	3000 mm standard plug
C1	1000 mm Enstonet plug
C2	2000 mm Enstonet plug
C3	3000 mm Enstonet plug
D1	1000 mm Wieland plug
D2	2000 mm Wieland plug
D3	3000 mm Wieland plug

ZT = Taylored

N	No
Y	Yes

Code example

CBC/A-S2N-3000-2400,H=220,TC=C,CO=W,EX=N,
IO=N,LV=N,CL=N