

PRODUCT BROCHURE

**SMARTEMP**<sup>®</sup>  
IN COMFORT



Ceiling Active Chilled Beam  
**CACB**

CACB : 072017

[smartemp.com](http://smartemp.com)

## DESCRIPTION

The SMARTEMP® Ceiling Active Chilled Beam, type CACB (figure 1), is well suited to cooling and ventilating spaces in which high levels of indoor air quality are desired. The heat exchanger of the CACB provides sensible cooling and/or heating only. Latent loads are removed by the dehumidified ventilation air supplied to the CACB, which typically is via a dedicated outdoor air system. For this reason, the CACB is suitable for applications with low to moderate latent loads only. As primary cooling and heating by the CACB is through an air-to-water heat exchanger contained in the CACB, ducting and associated air handling equipment sizing is reduced. Due to the elevated heat exchanger supply water temperature, typically of 15°C, chiller COP is typically enhanced. The slim height of the CACB makes it well suited to applications with limited ceiling void height.

### System Overview

Primary air, typically supplied from a dedicated outdoor air unit, is ducted into the insulated primary air plenum of the CACB, to be discharged by a multitude of induction nozzles into two mixing chambers. This induces secondary air to be drawn from the space across the heat exchanger, where it is cooled or heated, to mix into the air jets discharged by the induction nozzles. The mixed air is then discharged from the CACB as supply air via two discharge slots into the space.

### Beam Placement

The two discharge slots direct the supply air to spread across the ceiling in opposite directions. The discharge velocity is sufficient to create stable Coanda-effect attachment of the supply air to the ceiling to spread the air before it mixes into the space. The ceiling needs to be flat and solid, without obstacles in the air path, to ensure proper



Figure 1

Coanda-effect attachment and to prevent the air streams from being deflected into the space. Where no ceiling is available, optional wings may be attached to the CACB to ensure effective horizontal supply air spread prior to mixing into the space. Low velocity, draught-free room air motion is achieved when the airflow rate per linear metre is low, which, for higher heat loads, is achieved by increasing the CACB length.

### Optional Accessories

Air pattern vanes (figure 3):

Optional air pattern vanes may be used to adjust the direction and spread of the supply air streams, to fine-tune the airflow pattern in the space, and to cater for refurbishment.

Flexible hoses:

Flexible hoses, each of 600 mm length, complete with stainless steel protective braiding and threaded

connections on both ends, are used to connect the heat exchanger to the reticulated water systems of the building. If flexible hoses are ordered then the copper connections of the heat exchanger are fitted with ½ inch flat face tapered male brass fittings suitable for the flexible hoses, which are supplied in pairs.

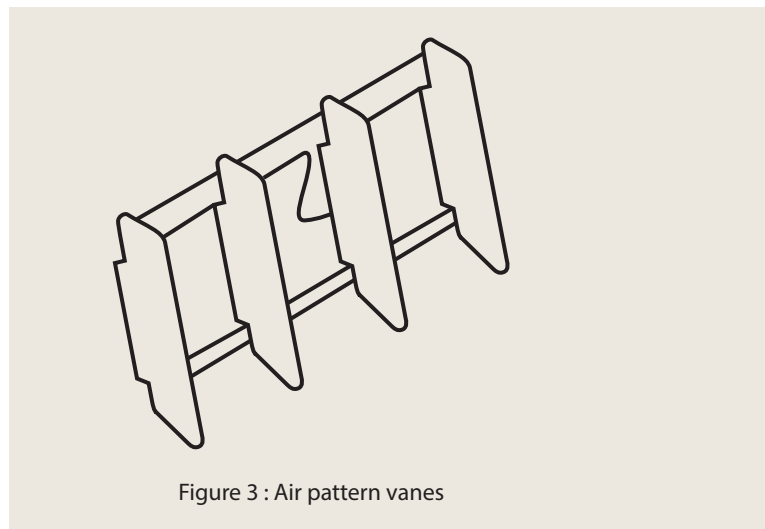


Figure 3 : Air pattern vanes

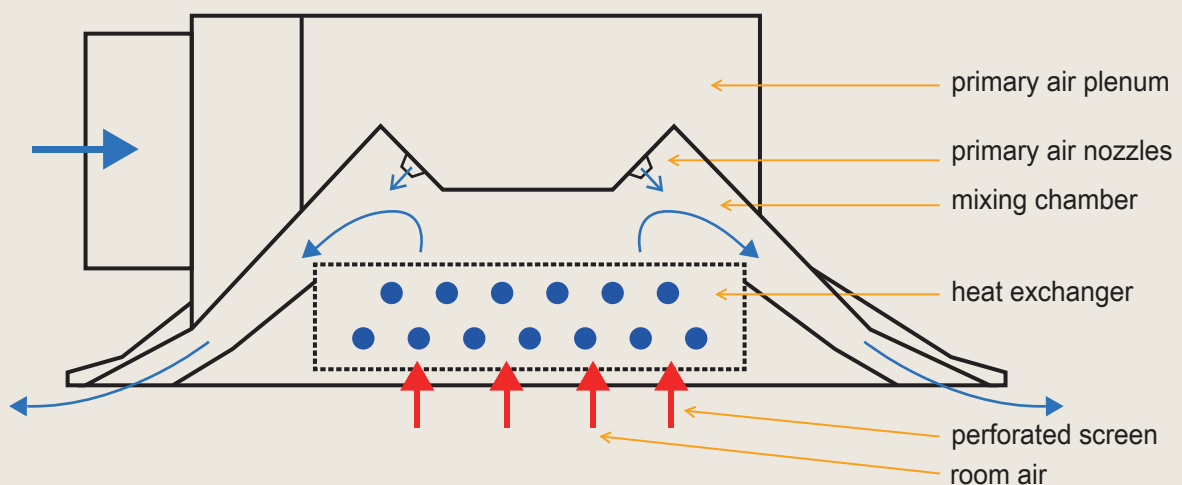


Figure 2

# TECHNICAL DATA

## CACB 600X600 2-WAY ACTIVE CHILLED BEAM WITH 2-PIPE COIL

Primary Air	Total Supply Air	Plenum Static Pressure	Nozzle Configuration	$\Delta T_{pr}$ (T <sub>primary air</sub> - T <sub>room</sub> ) [K] Primary Air Sensible Capacity [W] (Cooling)				$\Delta T_{wr}$ (T <sub>entering coil water</sub> - T <sub>room</sub> ) [K] Secondary Air Capacity [W] (Cooling) Water Flowrate [L/s] <small>Note: Water Temperature Differential <math>\Delta T_w = 3</math> K</small>				
				-8	-10	-12	-14	-8	-9	-10	-11	-12
8	32	50	B6	-80	-100	-120	-140	-110	-128	-146	-165	-183
								0.03	0.03	0.03	0.03	0.03
10	38	50	B0	-100	-125	-150	-174	-131	-153	-175	-197	-219
								0.03	0.03	0.03	0.03	0.03
14	43	50	A0	-140	-174	-209	-244	-138	-160	-183	-206	-229
								0.03	0.03	0.03	0.03	0.03
10	42	80	B6	-100	-125	-150	-174	-186	-209	-233	-256	-279
								0.03	0.03	0.03	0.03	0.03
12	46	80	B2	-120	-150	-179	-209	-162	-190	-216	-243	-270
								0.03	0.03	0.03	0.03	0.03
15	53	80	A4	-150	-187	-224	-262	-214	-241	-268	-295	-321
								0.03	0.03	0.03	0.03	0.03
17	56	80	A0	-169	-212	-254	-297	-185	-216	-247	-277	-308
								0.03	0.03	0.03	0.03	0.03
10	45	100	B8	-100	-125	-150	-174	-199	-225	-249	-275	-300
								0.03	0.03	0.03	0.03	0.03
15	57	100	B0	-150	-187	-224	-262	-230	-258	-289	-317	-345
								0.03	0.03	0.03	0.03	0.03
17	62	100	A4	-169	-212	-254	-297	-204	-239	-273	-307	-341
								0.03	0.03	0.03	0.03	0.03
19	64	100	A0	-189	-237	-284	-331	-205	-240	-274	-308	-343
								0.03	0.03	0.03	0.03	0.03
12	52	125	B6	-120	-150	-179	-209	-187	-218	-250	-281	-312
								0.03	0.03	0.03	0.03	0.03
15	59	125	B2	-150	-187	-224	-262	-239	-269	-300	-329	-358
								0.03	0.03	0.03	0.03	0.03
20	71	125	A2	-199	-249	-299	-349	-258	-292	-323	-355	-392
								0.03	0.03	0.03	0.03	0.031
22	76	125	A0	-219	-274	-329	-384	-270	-303	-337	-371	-420
								0.03	0.03	0.03	0.03	0.033
12	55	150	B8	-120	-150	-179	-209	-236	-265	-294	-324	-353
								0.03	0.03	0.03	0.03	0.03
15	63	150	B4	-150	-187	-224	-262	-253	-285	-316	-348	-380
								0.03	0.03	0.03	0.03	0.03
20	77	150	A6	-199	-249	-299	-349	-275	-309	-344	-378	-437
								0.03	0.03	0.03	0.03	0.035
24	93	150	A0	-239	-299	-359	-419	-294	-331	-367	-420	-486
								0.03	0.03	0.03	0.033	0.039

**NOTE:** 0.03 L/s is the minimum required water flow rate for the CACB.

CACB 1200X600 2-WAY ACTIVE CHILLED BEAM WITH 2-PIPE COIL

Primary Air	Total Supply Air	Plenum Static Pressure	Nozzle Configuration	$\Delta T_{pr}$ (T <sub>primary air</sub> - T <sub>room</sub> ) [K] Primary Air Sensible Capacity [W] (Cooling)				$\Delta T_{wr}$ (T <sub>entering coil water</sub> - T <sub>room</sub> ) [K] Secondary Air Capacity [W] (Cooling) Water Flowrate [L/s] Note: Water Temperature Differential $\Delta T_w = 3$ K				
				-8	-10	-12	-14	-8	-9	-10	-11	-12
20	80	50	D0	-199	-249	-299	-349	-313	-351	-395	-464	-533
								0.03	0.03	0.031	0.037	0.042
25	91	50	B8	-249	-312	-374	-436	-345	-399	-469	-544	-619
								0.03	0.032	0.037	0.043	0.049
30	100	50	A8	-299	-374	-449	-523	-357	-422	-495	-571	-648
								0.03	0.034	0.039	0.045	0.051
25	100	90	D4	-249	-312	-374	-436	-395	-482	-569	-655	-737
								0.031	0.038	0.045	0.052	0.058
30	115	80	C2	-299	-374	-449	-523	-471	-565	-661	-757	-845
								0.038	0.045	0.053	0.061	0.067
35	126	80	B2	-349	-436	-523	-611	-496	-595	-692	-785	-888
								0.04	0.048	0.055	0.062	0.071
25	109	100	D6	-249	-312	-374	-436	-452	-544	-640	-731	-821
								0.036	0.043	0.051	0.058	0.065
30	126	100	C8	-299	-374	-449	-523	-522	-624	-729	-829	-923
								0.042	0.05	0.059	0.067	0.073
40	150	100	B0	-399	-498	-598	-698	-573	-686	-798	-908	-1016
								0.045	0.054	0.063	0.072	0.081
45	157	100	A4	-449	-561	-673	-785	-595	-717	-829	-940	-1046
								0.047	0.058	0.067	0.076	0.083
30	127	125	D4	-299	-374	-449	-523	-542	-646	-753	-851	-950
								0.044	0.052	0.061	0.068	0.075
35	140	125	C6	-349	-436	-523	-611	-586	-695	-806	-917	-1026
								0.047	0.055	0.064	0.073	0.082
40	152	125	B8	-399	-498	-598	-698	-617	-733	-849	-963	-1076
								0.049	0.058	0.067	0.076	0.085
45	162	125	B0	-449	-561	-673	-785	-641	-760	-880	-999	-1117
								0.051	0.06	0.07	0.08	0.09
50	173	125	A4	-498	-623	-748	-872	-674	-798	-921	-1043	-1164
								0.054	0.064	0.074	0.084	0.094
30	135	150	D8	-299	-374	-449	-523	-583	-700	-815	-922	-1028
								0.046	0.056	0.066	0.074	0.082
40	160	150	C4	-399	-498	-598	-698	-659	-778	-896	-1014	-1132
								0.053	0.062	0.071	0.08	0.089
50	180	150	B0	-498	-623	-748	-872	-700	-824	-951	-1079	-1204
								0.056	0.065	0.075	0.086	0.096
58	202	150	A0	-596	-723	-867	-1012	-743	-878	-1009	-1139	-1270
								0.059	0.07	0.08	0.09	0.1

NOTE: 0.03 L/s is the minimum required water flow rate for the CACB.

CACB 1500X600 2-WAY ACTIVE CHILLED BEAM WITH 2-PIPE COIL

Primary Air	Total Supply Air	Plenum Static Pressure	Nozzle Configuration	$\Delta T_{pr}$ (T primary air - T room) [K] Primary Air Sensible Capacity [W] (Cooling)				$\Delta T_{wr}$ (T entering coil water - T room) [K] Secondary Air Capacity [W] (Cooling) Water Flowrate [L/s] <small>Note: Water Temperature Differential <math>\Delta T_w = 3</math> K</small>				
				8	10	12	14	8	9	10	11	12
L/s	L/s	Pa		8	10	12	14	8	9	10	11	12
25	99	50	D8	-244	-309	-374	-441	-363	-442	-521	-595	-677
								0.03 (2.9K)	0.035	0.041	0.047	0.054
30	111	50	C8	-294	-371	-449	-528	-442	-531	-622	-711	-804
								0.035	0.042	0.049	0.057	0.064
35	124	50	B8	-344	-433	-523	-616	-508	-604	-705	-809	-920
								0.04	0.048	0.056	0.064	0.073
28	122	80	D16	-274	-346	-419	-493	-539	-648	-745	-868	-975
								0.043	0.052	0.059	0.069	0.078
30	125	80	D12	-294	-371	-449	-528	-551	-664	-764	-891	-996
								0.044	0.053	0.061	0.071	0.079
35	140	80	D2	-344	-433	-523	-616	-622	-735	-869	-987	-1086
								0.05	0.059	0.069	0.079	0.086
40	153	80	C4	-394	-495	-598	-703	-673	-799	-937	-1050	-1155
								0.054	0.064	0.075	0.084	0.092
32	141	100	D14	-314	-396	-479	-563	-652	-768	-909	-1025	-1121
								0.052	0.061	0.072	0.082	0.089
35	148	100	D10	-344	-433	-523	-616	-676	-802	-940	-1053	-1160
								0.054	0.064	0.075	0.084	0.092
40	163	100	D0	-394	-495	-598	-703	-730	-881	-1012	-1120	-1265
								0.058	0.07	0.081	0.089	0.101
45	175	100	C4	-444	-558	-673	-790	-773	-932	-1060	-1187	-1334
								0.062	0.074	0.084	0.094	0.106
50	186	100	B8	-493	-620	-748	-878	-807	-963	-1088	-1231	-1375
								0.064	0.077	0.087	0.098	0.109
36	164	125	D14	-354	-446	-538	-633	-755	-916	-1044	-1163	-1311
								0.06	0.073	0.083	0.093	0.104
40	174	125	D8	-394	-495	-598	-703	-796	-953	-1079	-1217	-1362
								0.063	0.076	0.086	0.097	0.108
45	188	125	D0	-444	-558	-673	-790	-849	-1002	-1123	-1286	-1426
								0.068	0.08	0.089	0.102	0.114
50	199	125	C4	-493	-620	-748	-878	-882	-1033	-1165	-1329	-1466
								0.07	0.082	0.093	0.106	0.117
60	221	125	B2	-593	-745	-897	-1052	-938	-1083	-1244	-1402	-1548
								0.075	0.086	0.099	0.112	0.123
40	183	150	D14	-394	-495	-598	-703	-852	-1005	-1126	-1291	-1430
								0.068	0.08	0.09	0.103	0.114
45	197	150	D6	-444	-558	-673	-790	-898	-1046	-1187	-1349	-1484
								0.071	0.083	0.094	0.107	0.118
60	232	150	B10	-593	-745	-897	-1052	-983	-1123	-1306	-1459	-1630
								0.078	0.089	0.104	0.116	0.13
65	245	150	B2	-643	-807	-972	-1140	-1011	-1162	-1346	-1496	-1682
								0.081	0.093	0.107	0.119	0.134

NOTE: 0.03 L/s is the minimum required water flow rate for the CACB.

CACB 1200X600 2-WAY ACTIVE CHILLED BEAM WITH 2-PIPE COIL

Primary Air	Total Supply Air	Plenum Static Pressure	Nozzle Configuration	$\Delta T_{wr}$ (Tempering coil water - T room) [K] Secondary Air Capacity [W] (Heating) Water Flowrate [L/s] Note: Water Temperature Differential $\Delta T_w=10$ K				
				20	25	30	35	40
L/s	L/s	Pa						
20	80	50	D0	717 0.03 (5.7)	890 0.03 (7.2)	1079 0.03 (8.5)	1252 0.03	1552 0.037
25	91	50	B8	864 0.03 (7.0)	1092 0.03 (8.6)	1340 0.032	1716 0.041	2089 0.05
30	100	50	A8	871 0.03 (7.0)	1094 0.03 (8.7)	1353 0.032	1731 0.042	2105 0.05
25	100	80	D2	1020 0.03 (8.1)	1286 0.031	1744 0.042	2193 0.053	2635 0.063
30	115	80	C2	1113 0.03 (9.0)	1523 0.037	2036 0.049	2538 0.061	3030 0.073
35	126	80	B2	1176 0.03 (9.4)	1659 0.04	2203 0.053	2734 0.066	3255 0.078
25	109	100	D6	1094 0.03 (8.7)	1458 0.035	1957 0.047	2444 0.059	2923 0.07
30	126	100	C8	1201 0.03 (9.5)	1707 0.041	2261 0.054	2802 0.067	3334 0.08
40	150	100	B0	1337 0.032	1961 0.047	2571 0.062	3166 0.076	3753 0.09
45	157	100	A4	1436 0.034	2091 0.05	2728 0.065	3352 0.08	3968 0.095
30	127	125	D4	1273 0.03	1876 0.045	2467 0.059	3044 0.073	3612 0.087
35	140	125	C6	1373 0.033	2007 0.048	2626 0.063	3232 0.077	3890 0.092
40	152	125	B8	1507 0.036	2184 0.052	2841 0.068	3486 0.084	4142 0.099
45	162	125	B0	1574 0.038	2271 0.054	2947 0.071	3611 0.087	4270 0.102
50	173	125	A4	1646 0.039	2364 0.057	3062 0.073	3747 0.09	4428 0.106
30	135	150	D8	1368 0.033	2000 0.048	2618 0.063	3223 0.077	3819 0.091
40	160	150	C4	1599 0.038	2302 0.055	2986 0.072	3657 0.088	4323 0.104
50	180	150	B0	1745 0.042	2492 0.06	3217 0.077	3921 0.094	4645 0.111
58	202	150	A0	1899 0.046	2690 0.064	3461 0.083	4222 0.101	4987 0.119

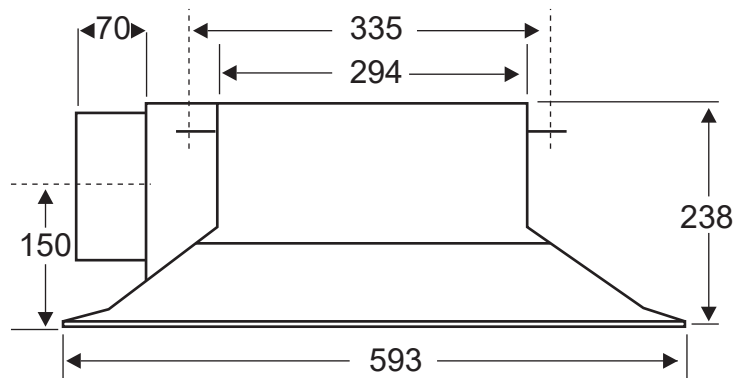
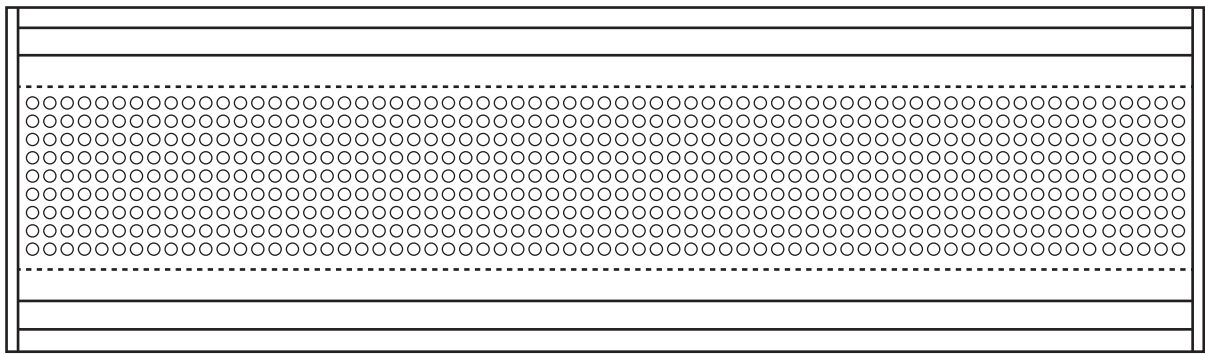
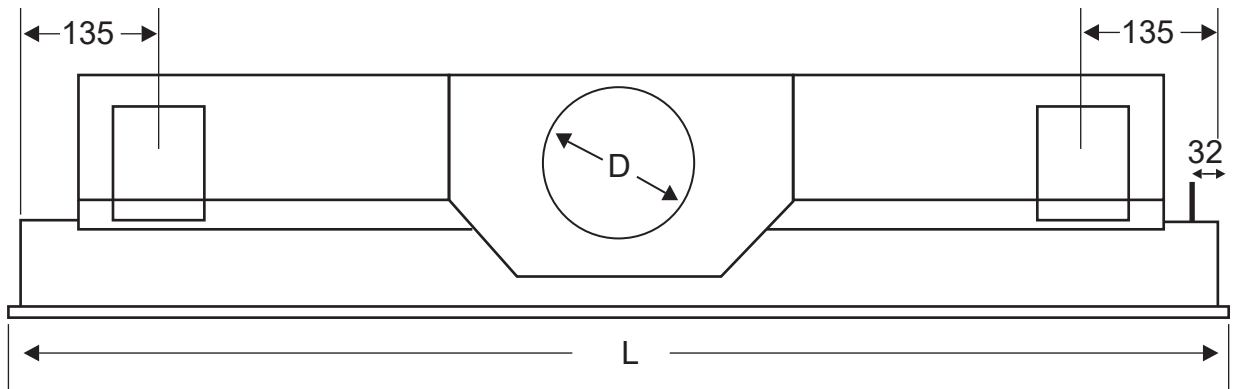
NOTE: 0.03 L/s is the minimum required water flow rate for the CACB.

CACB 1500X600 2-WAY ACTIVE CHILLED BEAM WITH 2-PIPE COIL

Primary Air	Total Supply Air	Plenum Static Pressure	Nozzle Configuration	$\Delta T_{wr}$ (Entering coil water - T room) [K] Secondary Air Capacity [W] (Heating) Water Flowrate [L/s] Note: Water Temperature Differential $\Delta T_w=10$ K				
				20	25	30	35	40
L/s	L/s	Pa		880	1095	1358	1738	2113
25	99	50	D8	0.03 (7.0)	0.03 (8.7)	0.033	0.042	0.051
30	111	50	C8	1021	1294	1752	2204	2648
				0.03 (8.2)	0.031	0.042	0.053	0.063
35	124	50	B8	1134	1557	2078	2587	3086
				0.03 (9)	0.037	0.05	0.062	0.074
28	122	80	D16	1195	1706	2260	2801	3332
				0.03 (9.5)	0.041	0.054	0.067	0.08
30	125	80	D12	1216	1758	2323	2875	3417
				0.03 (9.7)	0.042	0.056	0.069	0.082
35	140	80	D2	1398	2041	2668	3281	3889
				0.034	0.049	0.064	0.079	0.093
40	153	80	C4	1552	2242	2912	3570	4222
				0.037	0.054	0.07	0.086	0.101
32	141	100	D14	1486	2156	2809	3446	4079
				0.036	0.052	0.067	0.083	0.098
35	148	100	D10	1559	2251	2923	3583	4237
				0.037	0.054	0.07	0.086	0.101
40	163	100	D0	1734	2477	3200	3911	4621
				0.042	0.059	0.077	0.094	0.111
45	175	100	C4	1866	2648	3408	4159	4913
				0.045	0.063	0.082	0.1	0.118
50	186	100	B8	1953	2759	3545	4322	5106
				0.047	0.066	0.085	0.104	0.122
36	164	125	D14	1821	2591	3338	4076	4815
				0.044	0.062	0.08	0.098	0.115
40	174	125	D8	1922	2720	3497	4265	5038
				0.046	0.065	0.084	0.102	0.121
45	188	125	D0	2059	2897	3714	4526	5248
				0.049	0.069	0.089	0.108	0.128
50	199	125	C4	2151	3016	3860	4702	5559
				0.052	0.072	0.092	0.113	0.133
60	221	125	B2	2310	3221	4114	5011	5926
				0.055	0.077	0.099	0.12	0.142
40	183	150	D14	2070	2911	3730	4545	5372
				0.05	0.07	0.089	0.109	0.129
45	197	150	D6	2186	3060	3915	4769	5638
				0.052	0.073	0.094	0.114	0.135
60	232	150	B10	2463	3419	4360	5311	6276
				0.059	0.082	0.104	0.127	0.15
65	245	150	B2	2556	3539	4510	5496	6476
				0.061	0.085	0.108	0.132	0.15 (10.3)

NOTE: 0.03 L/s is the minimum required water flow rate for the CACB.





## DIMENSIONS

Nominal Length [mm]	Actual Length L [mm]	Equivalent Spigot Diameter D [mm]	Weight [kg]
600	592	98, 148	18
1200	1192	98, 148, 198	32
1500	1492	148, 198	43
1800	1792	148, 198	53

*Products supplied may differ slightly from those described in this technical brochure due to on-going product development.*

# INSTALLATION

The CACB is fitted with mounting brackets suitable for suspension by drop rods or threaded rods. The rods are available in a variety of variants and must be specified separately. The weight of the CACB must be borne by the rods; the weight of the CACB must not be borne by the ceiling or ceiling structure. The CACB is suitable for standard 600 mm modular ceiling systems with T-bar profiles. Alternatively, the CACB may be installed in a closed plaster board ceiling.

## Duct Connection

The CACB is equipped with one primary air spigot.

## Coil Connection

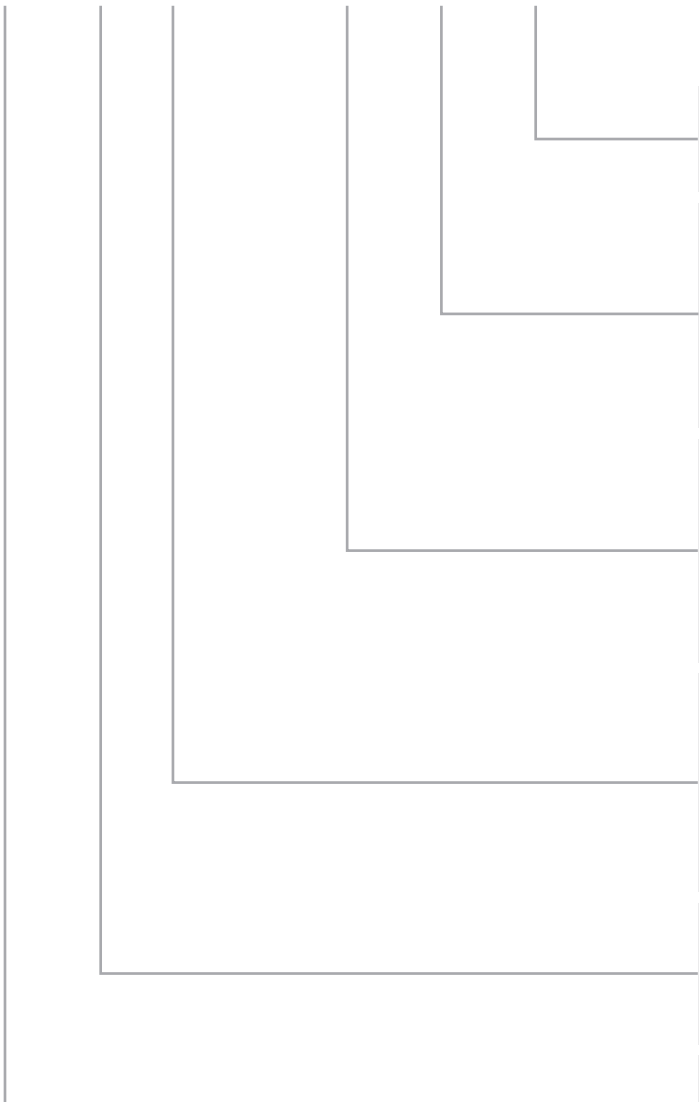
The heat exchanger is available in two-pipe (cooling or heating only) or four-pipe (cooling and heating) configurations. The cooling and heating circuits are indicated by blue and red marks, respectively. The heat exchanger pipe terminations are suitable for pressed or solder connections or may be fitted with ½ inch male flat face tapered brass fittings suitable for the optional flexible hoses.

## Maintenance

The CACB has no fan, no moving parts and no filter. Maintenance is limited to cleaning the heat exchanger every one-to-two years, depending on the dust levels in the room, by means of a vacuum cleaner with soft brush extension. The heat exchanger is accessible by simply unlatching the perforated screen, which is hinged.

# ORDER DETAILS

CACB: \_\_\_\_\_ -600- \_\_\_\_\_ - \_\_\_\_\_



**COLOUR:**  
- RAL \_\_\_\_\_ (White RAL9003 standard)

**NOZZLE CONFIGURATION:**  
- A [0-14]  
- B [0-14]  
- C [0-14]  
- D [0-16]

**PIPING CONFIGURATION\*:**  
-2L - 2-pipe, left connection  
-2R - 2-pipe, right connection  
-4L - 4-pipe, left connection  
-4R - 4-pipe, right connection

**NOMINAL LENGTH:**  
- 1200  
- 1500  
- 1800  
- Other lengths available on request

**AIR PATTERN CONTROLLER:**  
- F - Fixed air pattern  
- A - Adjustable, with air pattern controller

**MODEL:**  
- Ceiling Active Chilled Beam

**Notes:**

\* Right or left pipe connection when viewed looking onto spigot.

Products supplied may differ slightly from those described in this technical brochure due to on-going product development.

## TENDER TEXT

The SMARTEMP Ceiling Active Chilled Beam (CACB) shall be constructed from 0.8 mm galvanised steel panels to provide a compact unit with a primary air plenum, heat exchanger, two air mixing chambers and two discharge slots. Mounting brackets are attached to the sides. An sheet-metal spigot located centrally on the longitude of the primary air plenum permits connection of primary air flexible ducting to the primary plenum. Primary air plenum insulation shall be self-adhesive, fire retardant, thermal insulation to the interior of the primary air plenum to prevent condensation forming on the outside of the unit. The heat exchanger shall be constructed of galvanised steel end plates and frames with ½ inch copper tubes mechanically expanded into aluminium fins. ½ inch BSP male flat face tapered thread fittings will be provided on all heat exchanger connections when ordered with flexible hoses. Water fittings are to be in a vertical arrangement to ensure no water pipes or connections overhang the overall length or width dimensions of the unit. The return air screen is to be an openable hinged panel that swings down on hinge pins secured to the unit return air opening frame. The unit shall incorporate a commissioning tube to measure the static pressure in the plenum. The tube is to be made of flexible plastic, sealed air tight into the plenum and accessible through the return air grille opening for commissioning purposes.



For additional information, please contact [info@smartemp.com](mailto:info@smartemp.com)

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