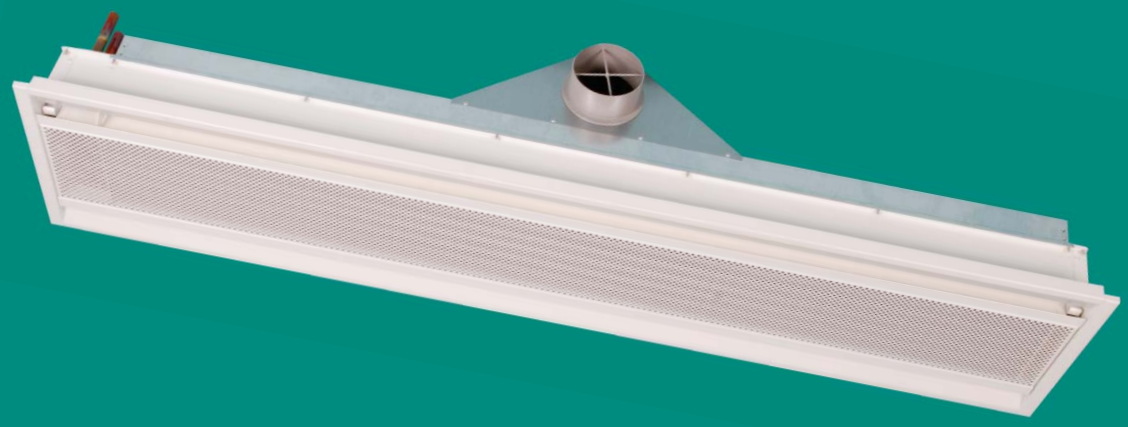
waterloo

Operating and Maintenance Instructions

ABM Chilled Beam modules

Sizes 1200 - 3000



ABM Active Chilled Beams

Installation

General Information

Foreword

These instructions are given as a guide to good practice in the installation, start-up, operation, and maintenance by the user, of Waterloo ABM 300 Active Chilled Beams.

Unit Identification

Units arrive on site with an unit model size, coil type, presence identification sticker with of an electric heater, unit handing pictograms, which clearly indicates important information such as the customer order number, job name, unit model size, coil type, unit handling etc.

Recommended Air and Water Quality

To maintain unit performances, ensure that the air entering the unit is of sufficient quality (**Table 1**).

Water Quality Recommendations for Water Coils

At installation and then yearly, the manufacturer recommends having water analyzed for bacteria (ferro-bacteria, bacteria generating H_2S and reducing sulfates) and also a chemical analysis, to avoid corrosion and scaling. The water circuit must include water treatment devices: filters, additives, intermediate exchangers, purges, vents, isolating valves, etc, depending on the results of these analyses. The results of the analyses must correspond to values in the (**Table 2**).

Duct Inlet Conditions

As with all types of ATD, the duct inlet conditions are very important to the correct function and operation of this product. Best practice procedures and techniques should always be followed.

It should be noted that insufficient consideration of duct entry conditions can result in:

- Poor velocity distribution
- Excessive turbulence
- Unpredictable throw
- Breakdown of ceiling attachment
- High noise levels
- Difficult balancing procedures

Air Quality Recommendations	
SO_2	<0.02 ppm
H_2S	<0.02 ppm
NO	<1.00 ppm
NO_2	<1.00 ppm
NH_3	<6.00 ppm
N_2O	<0.25 ppm

Table 1- Air Quality Recommendations

Water Quality Recommendations	
Total hardness in French degrees	10 < TH < 15
Chloride [C L-]	< 10 mg/l
Sulfate [SO42-]	< 30 mg/l
Nitrate [NO_3-]	= 0 mg/l
Dissolved iron	< 0.5 mg/l
Dissolved oxygen	4 < [O_2] < 9 mg/l
Carbon dioxide [CO_2]	< 30 mg/l
Resistance	2000<Resistance<5000 cm
pH	6.9 < pH < 8

Table 2- Water Quality Recommendations

ABM Active Chilled Beams

Overall Dimensions (mm)

Sizes

- W is the nominal Width 300.
- L is the nominal Length (1200 - 3000).
- C is the nominal Height 250 for 125 Ø and 230 for 100 Ø.

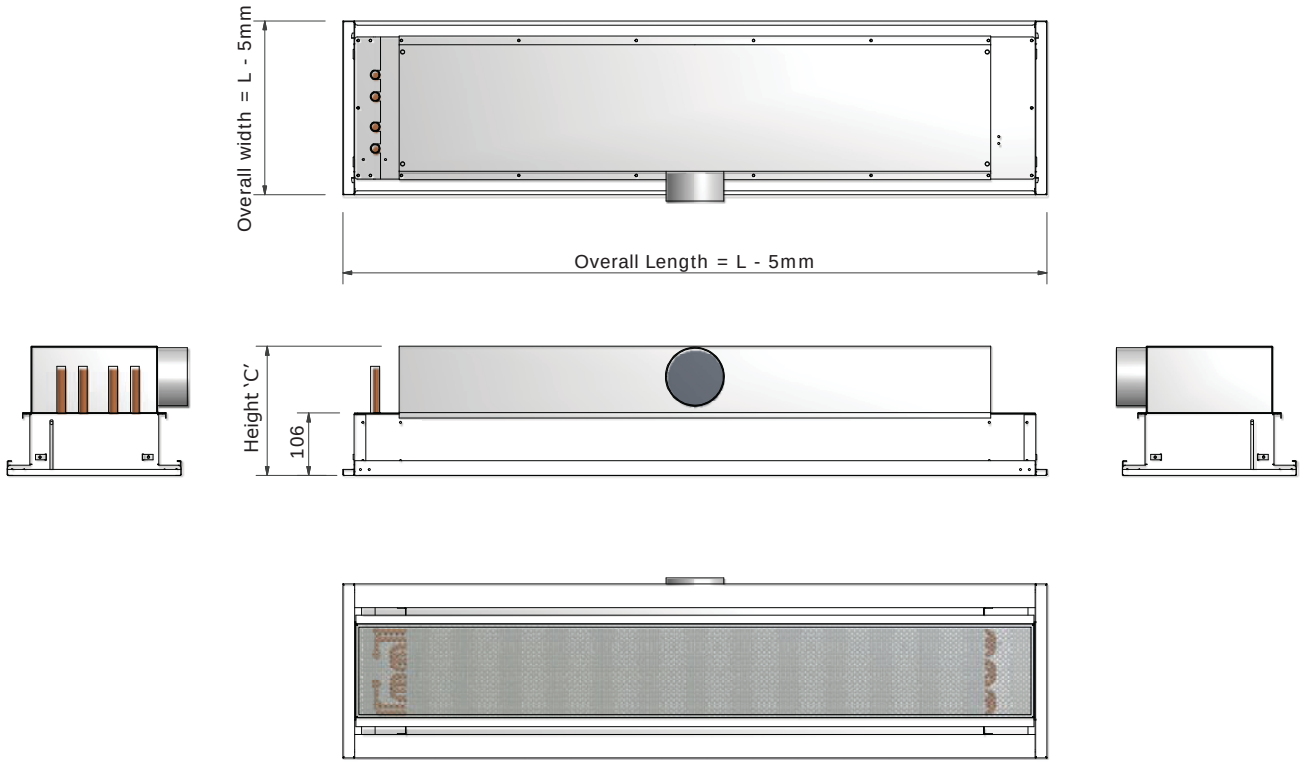
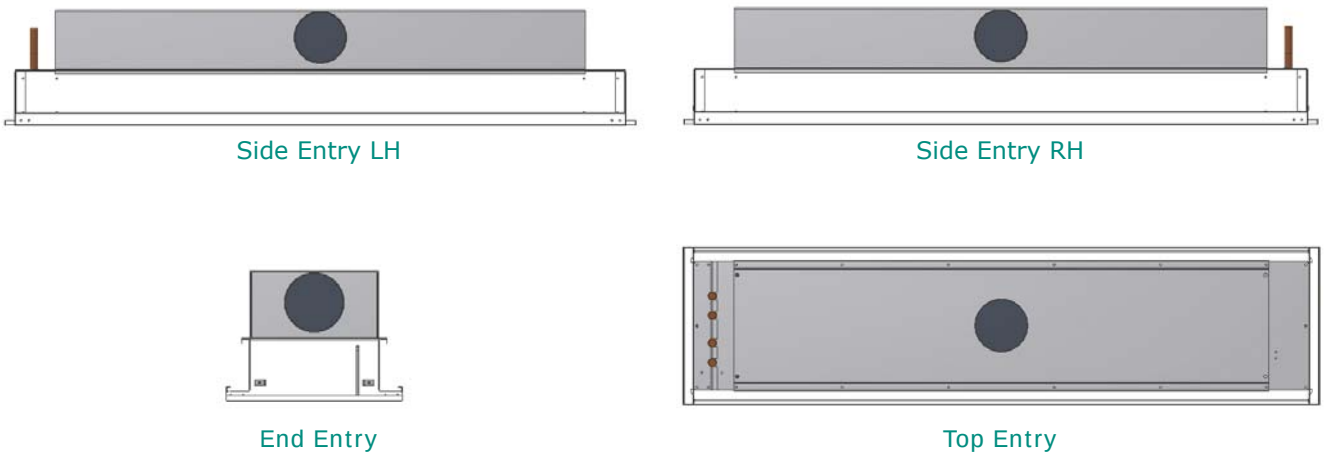


Figure 1- Overall Dimensions

Handling the Unit

WARNING!

Wear protection gloves when handling the unit. When removing the unit from its pallet, do not handle it by pipes, spigots, valves or fresh air inlet. Take precaution to not damage the unit.



Side Entry LH

Side Entry RH

End Entry

Top Entry

Figure 2- Possible air intake positions

ABM Active Chilled Beams

Mounting the Unit

Waterloo ABM's are provided with mounting apertures as part of their construction. They should be supported independantly from the underside of the ceiling on 6mm threaded rods.

Two potential installation methods are described.

Method 1 is if the rods are permenantly fitted to the supporting ceiling.

Method 2 is if the rods are de-mountable from the supporting ceiling.

Method 1

Measure the distance from the underside of the supporting ceiling to the mounting point height on the beam (**Figure 3**). Cut the rods to the required length, allowing 50mm for the bolt to attach to. Include extra for any required adjustment.

Secure the rods to the underside of the solid ceiling, at the mounting points shown on the next page, depending on the unit size.

Offer the beam up to the ceiling, sliding the supporting rods through mounting holes on the beam. Secure with bolts underneath.

Method 2

Measure the distance from the underside of the supporting ceiling to the mounting point height on the beam (**Figure 3**). Cut the rods to the required length, allowing 50mm for the bolt to attach to. Include extra for any required adjustment.

On top of the measured distance for adjustment, push the threaded rods through the mounting points on the beam, secure with bolts undernath and then offer the unit up to the supporting ceiling.

With the unit now hanging from the supporting ceiling, adjust the bolts on the threaded rods to ensure the beam face is completely flush with the false ceiling that the beam is to be incorporated into.

Note: If hanging brackets have been supplied, choose evenly spaced mounting points along the length of the beam (**Table 3**).

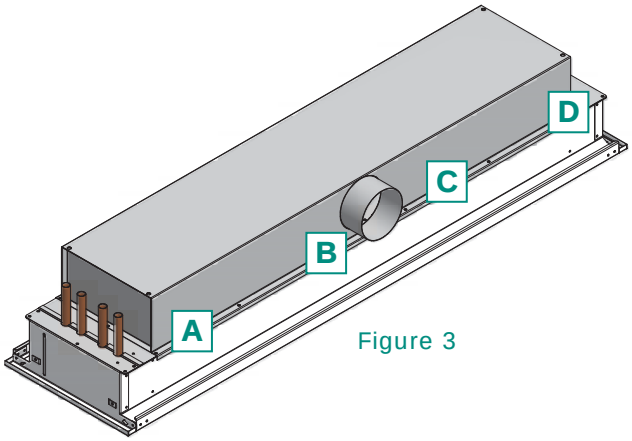


Figure 3

Hanging bracket mounting positions							
Nom unit length	Coil length	Plenum length	Qty of brackets	Mounting positions on plenum			
				Length			
				A	B	C	D
1200	980	1004	4	100	n/a	n/a	900
1500							
1500	1270	1294					1190
1800							
1800	1570	1594	6			800	1490
2400	2170	2194				1100	2090
3000	2770	2794	8		862	1724	2690

Table 3

ABM Active Chilled Beams

Clip the hanging bracket to the hanging rail (**Figure 4 & Figure 5**). Offer the beam up to the rod suspended from the ceilling, and secure with bolts (**Figure 6**)

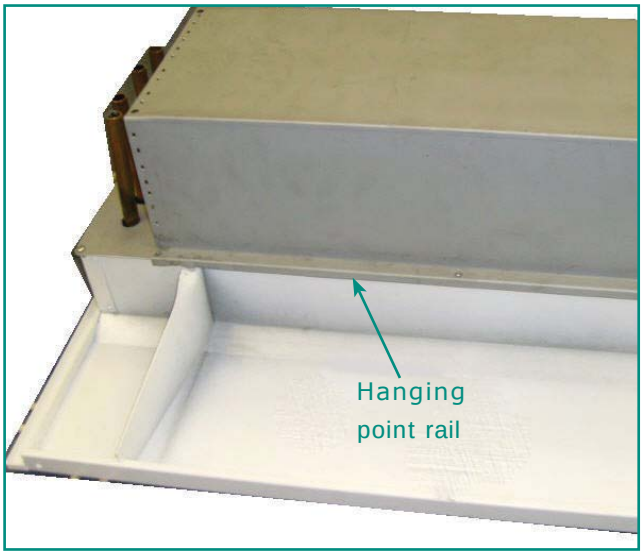


Figure 4

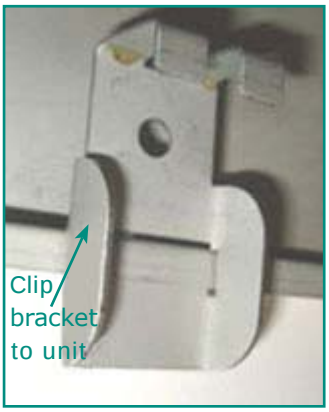


Figure 5

Figure 6

Ductwork Connection

Ducts must be connected to spigots by means of duct tape. They must never be screwed. Make sure that the entire spigot surface area is covered. Push the duct as far as possible onto the spigot towards the unit to get the best air tightness.

ø 100	1200 1500 1800	Circular connection ø 100mm
ø 125	2400 3000	Circular connection ø 125mm

ABM Active Chilled Beams

Water Connection

Waterloo ABM300 series chilled beams are fitted with 15mm diameter copper water connections as standard.

These connections are always laid out in the same order as illustrated in the (**Figure 7**).

Inlet and outlet water connections

CAUTION! The use of untreated or improperly treated water in this equipment may result in scaling, slime, erosion or corrosion. The services of a qualified water treatment specialist should be engaged to determine what treatment, if any, is advisable. Waterloo will not accept any ability in regards of damage due to the use of untreated or improperly treated water.

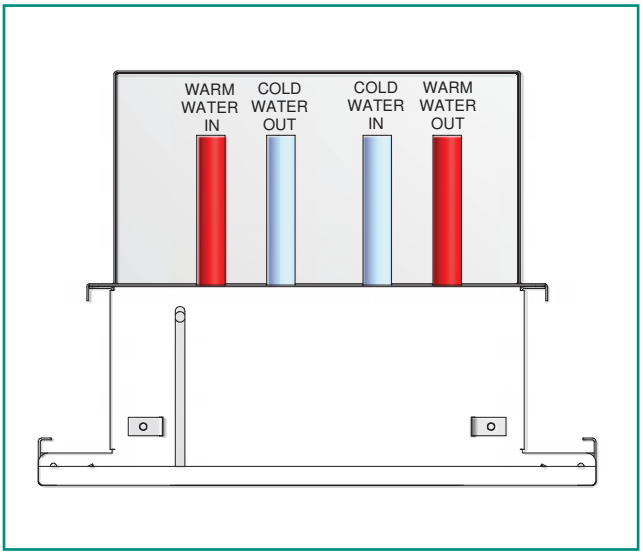


Figure 7

Static Pressure Measurement

A static pressure measurement point is provided in the end plate of the plenum for the measurement of positive differential pressure relative to atmosphere. The measurement can be used for the indication of operating differential pressure in accordance with the published data during the installation and commissioning phases as well as for periodic monitoring (**Figure 8 and 9**).

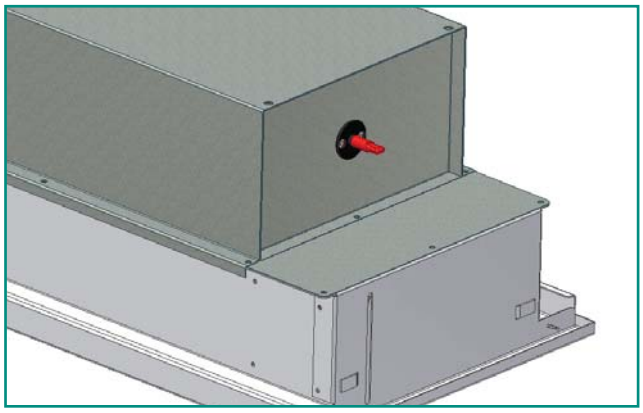


Figure 8 Static pressure measurement point (with cap fitted)

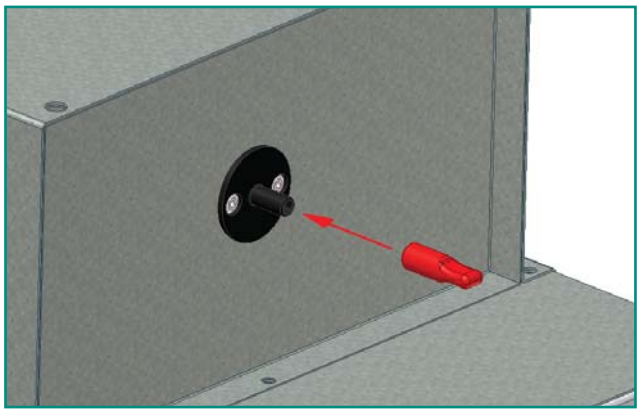


Figure 9 When static pressure measurement is not in use replace cap

ABM Active Chilled Beams

Chilled Beam Commissioning Guide

It is recommended that the main supply and return pipework to either chilled ceiling elements or chilled beams is designed in accordance with current CIBSE guidelines.

The system should maintain a positive pressure at all times throughout the complete pipework system and should be designed to facilitate ease of balancing and speedy purging of any air contained within the system. Adequate provision should be made for draining and back flushing on both main and sub circuits. The following guidelines should be considered.

a). As chilled ceiling elements and chilled beam systems can contain a substantial amount of horizontal small bore pipework it is essential that the system is properly cleansed of any on site debris or contamination from soldering or welding processes. This should be done by draining and back flushing of the complete system.

b). The heat transfer in a water to air heat exchanger such as a chilled ceiling or beam is not linearly proportional to the water flow rate. It is essential that water flow rates are accurately maintained to ensure correct output figures the use of correct commissioning valves with measuring facility are placed on main risers and secondary branches as a minimum requirement.

c). Water quality should be of mains drinking water dosed with a suitable inhibitor and incoming mains should be sized to provide suitable flow rates to ensure an adequate supply when the pipework is flushed / cleaned. System pressure at the highest point of the primary pipework should be at least 3 Bar to maintain suitable flushing volumes during cleansing.

d). Due to the use of small bore pipework of 15 mm or less in the horizontal plane it recommended that the connections to the main supply and return headers are taken from the top of the primary flow and return circuit or at an angle of not less than 45^{o} this should ensure that the ingress of contaminants does not take place.

e). Primary chilled water branch circuits should be designed to use the reverse return principle to ensure that the pressure drop to the secondary chilled element circuits are of similar rating. Air release devices on the secondary chilled water system serving elements or combination chilled beams are not normally required as the water velocities within the circuit should have been selected to maintain a turbulent flow characteristic which ensures stated output and assists in the self balancing of the circuit. However main chilled water circuits should be provided with manual air venting at the end of each horizontal run and at the top of any circuit high point to avoid any air pockets forming which may be difficult or impossible to remove.

f). It is also recommended that the velocity of the flushing water should be of sufficient velocity to pick up and carry system contaminants and debris in the flushing process (typically for 15mm pipes at least 0.96 m/sec @ 0.20 l/sec) this should provide the minimum criteria to remove small steel or copper particles.

g). The flushing process should be carried by the forward flush / backward flush method as this provides a more reliable way of removing system contamination than by forward flushing alone.

h). As most chilled ceiling and beam chilled water circuits contain a high proportion of flexible stainless steel braided hoses these should be of not less than 12 strand stainless steel over braiding and manufactured in thermoplastic to NTK 1291 grade which should avoid kinking and subsequent loss of flow rate and output. Hoses should be of sufficient length to allow for natural bend s and any tendency to form high points that may allow air to collect and reduce flow should be avoided. When using push fit flexible connectors it is advisable not to exceed 15 bar test pressures.

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Chilled Beam Commissioning Guide

i). Water Treatment Once a closed system is correctly cleaned by back flushing and the final water charge is in situe there should be very little make up required to restore water lost by any leakage from valve stems packing or pump seals etc. The dissolved solids in the system water do not concentrate since there is no evaporation from the system . Any leakage from the system is replaced directly by make up water containing the same amount of dissolved solids. Therefore unless the incoming charge water is exceptionally hard then pre-treatment to remove scale forming elements within the chilled system should be unnecessary . However it is recommended that the incoming water charge is tested by an accredited N.A.M.A.S. laboratory and any dosing requirements carried out by an approved water treatment company.

Hose Design & Installation Recommendations

To obtain maximum relibility, flexible hoses should not be flexed beyond the minimum bend radius, and sharp bends or tortional twisting should be avoided. The following formulae should be used:

Where:

R = Minimum bend radius

M = Movement

π = 3.142

L = Minimum Active length without end fittings

For vertically hung loop with vertical travel,

Inside Dia	6	10	15	20
X =	56	75	100	125

$L = X + \pi + (R + M/_2)$

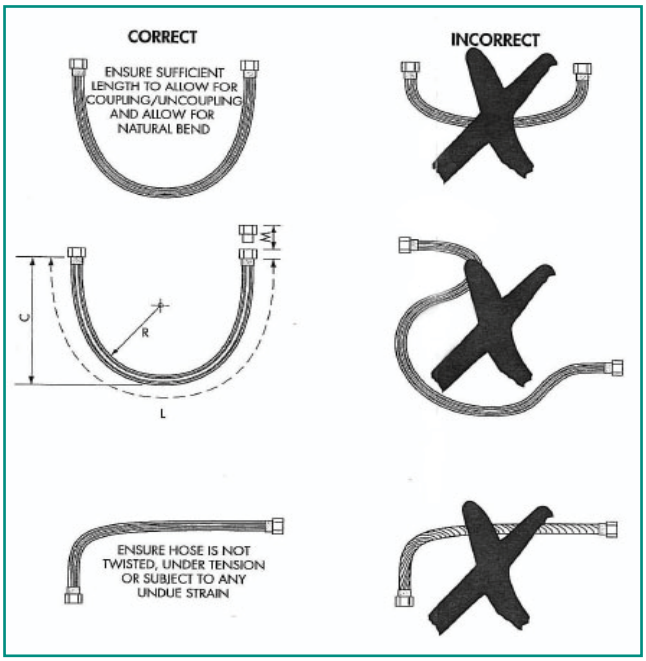


Figure 10 Hose Design & Installation Recommendations

Chilled Beam Operating Parameters

Waterloo ABM units should be selected to meet the design specification for the project in question. Each unit should be individually selected, and will be supplied with an reference label to ensure that the installer locates it correctly , and it performs to the design characteristics.

All Beams supplied should match with a technical submittal issued prior to delivery, giving the design characteristics. Any discrepancies should be made known to Waterloo within 1 week of delivery.

Ensure the air flow level to the beam is correct to maintain the correct noise and duty level, and the water flow rate is correct to ensure the coil pressure and duty are also in line with design parameters.

The following five pages give selection examples for various room conditions, heating and cooling duties, water flow rates and air flow rates. Whilst these may not relate exactly to your requirements, it should give a good indication of required performance, and allow correct unit selection. If your requirements are not in direct accordance with the data provided, use the Waterloo Selection program to generate a complete technical submittal.

Selection Data

Chilled Beam Selection Parameters

ABM 300 1200mm

980mm Heat Exchanger																	
AIRSIDE DATA								WATERSIDE DATA									
Supply Air Quantity Primary		Static Pressure Loss	Cooling Throw	Heating Throw	Sound Level L_{WA} (Sound power - 8dB)	Air Cooling capacity Room to Air ΔT		Water Quantity		Cooling at Various Room to mean Water ΔT				Heating at Various Room to mean Water ΔT			
						ΔT=8	ΔT=10			Pressure Loss	ΔT=8,5	ΔT=9,5	ΔT=11	Pressure Loss	ΔT=20	ΔT=30	
l/s	m³/h	Pa	m		dB(A)	Watts		l/h	l/s	kPa	Watts			kPa	Watts		
Nozzle A - 20																	
5.6	20	64	0.7	0.8	21	54	68	90	0.025	0.9	201	217	266	2.6	517	775	
								120	0.033	1.4	229	248	303	3.9	588	882	
								150	0.042	2.1	252	272	333	5.7	644	966	
6.9	25	107	1.2	1.3	22	66	86	90	0.025	0.9	263	284	346	2.6	572	858	
								120	0.033	1.4	301	325	398	3.9	653	979	
								150	0.042	2.1	332	359	438	5.7	716	1074	
8.3	30	152	1.6	1.9	25	80	103	90	0.025	0.9	302	328	400	2.6	624	937	
								120	0.033	1.4	349	376	460	3.9	714	1070	
								150	0.042	2.1	384	415	506	5.7	784	1176	
Nozzle B - 20																	
9.7	35	63	1.3	1.5	20	93	120	90	0.025	0.9	187	202	246	2.6	589	884	
								120	0.033	1.4	214	231	283	3.9	672	1008	
								150	0.042	2.1	236	255	311	5.7	738	1107	
11.1	40	80	1.5	1.8	21	107	137	90	0.025	0.9	237	256	312	2.6	656	985	
								120	0.033	1.4	272	294	360	3.9	751	1126	
								150	0.042	2.1	301	325	397	5.7	826	1239	
13.9	50	130	2.0	2.3	24	133	171	90	0.025	0.9	316	341	416	2.6	718	1077	
								120	0.033	1.4	364	393	480	3.9	823	1235	
								150	0.042	2.1	402	435	533	5.7	907	1361	
Nozzle C - 20																	
13.9	50	76	1.5	1.7	24	133	171	90	0.025	0.9	230	249	304	2.6	676	1015	
								120	0.033	1.4	265	286	350	3.9	774	1162	
								150	0.042	2.1	293	316	387	5.7	852	1279	
16.7	60	112	1.8	2.1	28	160	205	90	0.025	0.9	288	311	380	2.6	721	1082	
								120	0.033	1.4	332	359	438	3.9	827	1241	
								150	0.042	2.1	368	398	486	5.7	912	1368	
19.4	70	160	2.1	2.4	32	186	240	90	0.025	0.9	353	382	467	2.6	763	1145	
								120	0.033	1.4	409	442	539	3.9	877	1316	
								150	0.042	2.1	453	489	598	5.7	968	1452	
22.2	80	204	2.4	2.7	36	213	274	90	0.025	0.9	415	448	548	2.6	803	1204	
								120	0.033	1.4	481	519	634	3.9	924	1386	
								150	0.042	2.1	533	576	704	5.7	1021	1531	

Unit Selection Data

ABM 300 1500mm

1270mm Heat Exchanger																	
AIRSIDE DATA								WATERSIDE DATA									
Supply Air Quantity Primary		Static Pressure Loss	Cooling Throw	Heating Throw	Sound Level L_{WA} (Sound power - 8dB)	Air Cooling capacity Room to Air ΔT		Water Quantity		Cooling at Various Room to mean Water ΔT				Heating at Various Room to mean Water ΔT			
						ΔT=8	ΔT=10			Pressure Loss	ΔT=8,5	ΔT=9,5	ΔT=11	Pressure Loss	ΔT=20	ΔT=30	
l/s	m³/h	Pa	m		dB(A)	Watts		l/h	l/s	kPa	Watts			kPa	Watts		
Nozzle A - 20																	
6.9	25	61	0.6	0.7	18	69	86	80	0.022	0.8	163	177	216	2.1	537	806	
								110	0.031	1.3	191	206	252	3.6	625	937	
								140	0.039	1.9	213	230	280	5.1	693	1039	
8.3	30	86	1.0	1.1	19	82	103	80	0.022	0.8	249	269	327	2.1	604	907	
								110	0.031	1.3	291	314	385	3.6	705	1057	
								140	0.039	1.9	325	352	430	5.1	783	1175	
9.7	35	119	1.3	1.5	20	96	120	80	0.022	0.8	321	346	423	2.1	666	999	
								110	0.031	1.3	377	407	498	3.6	779	1169	
								140	0.039	1.9	422	456	558	5.1	868	1302	
Nozzle B - 20																	
11.1	40	53	1.1	1.3	19	110	137	80	0.022	0.8	177	192	235	2.1	591	887	
								110	0.031	1.3	209	226	276	3.6	689	1034	
								140	0.039	1.9	232	251	307	5.1	766	1149	
13.9	50	81	1.5	1.7	20	137	171	80	0.022	0.8	258	287	332	2.1	673	1009	
								110	0.031	1.3	291	320	370	3.6	787	1181	
								140	0.039	1.9	314	349	402	5.1	877	1315	
16.7	60	122	1.8	2.1	24	164	205	80	0.022	0.8	310	335	410	2.1	745	1118	
								110	0.031	1.3	368	397	485	3.6	876	1313	
								140	0.039	1.9	412	445	544	5.1	978	1467	
Nozzle C - 20																	
19.4	70	76	1.6	1.9	27	192	240	80	0.022	0.8	247	266	325	2.1	707	1061	
								110	0.031	1.3	291	314	384	3.6	829	1244	
								140	0.039	1.9	326	351	430	5.1	925	1387	
22.2	80	103	1.8	2.1	31	219	274	80	0.022	0.8	304	329	402	2.1	759	1138	
								110	0.031	1.3	361	390	476	3.6	892	1338	
								140	0.039	1.9	405	437	534	5.1	996	1494	
25.0	90	131	2.0	2.4	33	246	308	80	0.022	0.8	363	391	479	2.1	806	1210	
								110	0.031	1.3	430	465	568	3.6	950	1425	
								140	0.039	1.9	484	523	639	5.1	1063	1595	
27.8	100	162	2.3	2.6	36	274	342	80	0.022	0.8	419	453	553	2.1	851	1276	
								110	0.031	1.3	499	539	658	3.6	1004	1507	
								140	0.039	1.9	562	607	742	5.1	1126	1689	

Unit Selection Data

ABM 300 1800mm

1570mm Heat Exchanger																	
AIRSIDE DATA								WATERSIDE DATA									
Supply Air Quantity Primary		Static Pressure Loss	Cooling Throw	Heating Throw	Sound Level L_{WA} (Sound power - 8dB)	Air Cooling capacity Room to Air ΔT		Water Quantity		Cooling at Various Room to mean Water ΔT				Heating at Various Room to mean Water ΔT			
						ΔT=8	ΔT=10			Pressure Loss	ΔT=8,5	ΔT=9,5	ΔT=11	Pressure Loss	ΔT=20	ΔT=30	
l/s	m^3/h	Pa	m		dB(A)	Watts		l/h	l/s	kPa	Watts			kPa	Watts		
Nozzle A - 20																	
8.3	30	53	0.6	0.7	18	82	103	70	0.019	0.6	161	174	212	1.9	563	845	
								100	0.028	1.3	194	210	256	3.9	674	1012	
								130	0.036	2.1	220	237	289	6.4	759	1139	
9.7	35	77	0.9	1.0	20	96	120	70	0.019	0.6	276	299	365	1.9	620	930	
								100	0.028	1.3	335	361	442	3.9	745	1118	
								130	0.036	2.1	379	410	502	6.4	841	1261	
11.1	40	102	1.1	1.3	20	110	137	70	0.019	0.6	341	369	451	1.9	673	1009	
								100	0.028	1.3	415	449	548	3.9	811	1216	
								130	0.036	2.1	471	509	623	6.4	917	1375	
Nozzle B - 20																	
13.9	50	53	1.1	1.3	21	137	171	70	0.019	0.6	211	228	279	1.9	626	939	
								100	0.028	1.3	242	277	307	3.9	753	1129	
								130	0.036	2.1	291	314	384	6.4	849	1274	
16.7	60	77	1.4	1.7	25	164	205	70	0.019	0.6	288	317	375	1.9	693	1039	
								100	0.028	1.3	346	374	456	3.9	836	1254	
								130	0.036	2.1	394	425	520	6.4	946	1419	
19.4	70	102	1.7	2.0	28	192	240	70	0.019	0.6	330	357	436	1.9	753	1130	
								100	0.028	1.3	403	435	532	3.9	912	1368	
								130	0.036	2.1	460	497	607	6.4	1035	1552	
Nozzle C - 20																	
22.2	80	67	1.5	1.7	31	219	274	70	0.019	0.6	237	256	313	1.9	705	1057	
								100	0.028	1.3	288	311	381	3.9	851	1277	
								130	0.036	2.1	329`	354	433	6.4	964	1446	
25.0	90	86	1.7	1.9	34	246	308	70	0.019	0.6	291	314	385	1.9	748	1123	
								100	0.028	1.3	355	384	469	3.9	906	1359	
								130	0.036	2.1	405	438	536	6.4	1028	1542	
30.6	110	131	2.0	2.3	39	301	376	70	0.019	0.6	367	418	482	1.9	827	1240	
								100	0.028	1.3	447	483	590	3.9	1006	1509	
								130	0.036	2.1	503	544	667	6.4	1145	1717	
36.1	130	184	2.4	2.8	43	356	445	70	0.019	0.6	419	453	565	1.9	896	1344	
								100	0.028	1.3	528	570	697	3.9	1095	1642	
								130	0.036	2.1	607	656	801	6.4	1250	1875	

Unit Selection Data

ABM 300 2400mm

2170mm Heat Exchanger																	
AIRSIDE DATA								WATERSIDE DATA									
Supply Air Quantity Primary		Static Pressure Loss	Cooling Throw	Heating Throw	Sound Level L_{WA} (Sound power - 8dB)	Air Cooling capacity Room to Air ΔT		Water Quantity		Cooling at Various Room to mean Water ΔT				Heating at Various Room to mean Water ΔT			
						ΔT=8	ΔT=10			Pressure Loss	ΔT=8,5	ΔT=9,5	ΔT=11	Pressure Loss	ΔT=20	ΔT=30	
l/s	m^3/h	Pa	m		dB(A)	Watts		l/h	l/s	kPa	Watts			kPa	Watts		
Nozzle A - 20																	
13.9	50	75	1.2	1.3	21	137	171	200	0.06	6.7	377	409	483	20.0	967	1450	
								250	0.07	9.8	428	469	551	30.0	1125	1688	
								300	0.084	13.4	465	508	601	41.8	1247	1871	
16.7	60	109	1.6	1.9	22	164	205	200	0.06	6.7	426	463	543	20.0	1087	1631	
								250	0.07	9.8	487	530	621	30.0	1269	1904	
								300	0.084	13.4	529	575	673	41.8	1409	2114	
19.4	70	135	1.9	2.1	24	192	240	200	0.06	6.7	485	530	626	20.0	1199	1798	
								250	0.07	9.8	558	606	713	30.0	1402	2103	
								300	0.084	13.4	604	656	771	41.8	1562	2344	
Nozzle B - 20																	
22.2	80	86	1.3	1.5	24	219	274	200	0.06	6.7	505	551	675	20.0	1064	1596	
								250	0.07	9.8	596	650	796	30.0	1240	1860	
								300	0.084	13.4	667	728	892	41.8	1379	2068	
25.0	90	106	1.5	1.8	27	246	308	200	0.06	6.7	631	689	789	20.0	1142	1713	
								250	0.07	9.8	744	813	931	30.0	1320	1980	
								300	0.084	13.4	833	910	1043	41.8	1477	2216	
27.8	100	131	1.8	2.0	29	274	342	200	0.06	6.7	675	737	844	20.0	1211	1817	
								250	0.07	9.8	797	870	996	30.0	1417	2125	
								300	0.084	13.4	892	974	1115	41.8	1579	2368	
Nozzle C - 20																	
33.3	120	80	1.7	2.0	30	329	411	200	0.06	6.7	395	428	514	20.0	1176	1764	
								250	0.07	9.8	466	505	616	30.0	1356	2034	
								300	0.084	13.4	526	567	693	41.8	1518	2277	
38.9	140	113	1.9	2.2	35	383	479	200	0.06	6.7	497	526	643	20.0	1273	1909	
								250	0.07	9.8	585	620	759	30.0	1492	2238	
								300	0.084	13.4	656	695	850	41.8	1665	2498	
44.4	160	146	2.1	2.4	37	438	547	200	0.06	6.7	592	629	690	20.0	1366	2049	
								250	0.07	9.8	699	742	814	30.0	1606	2408	
								300	0.084	13.4	782	831	912	41.8	1793	2689	
50.0	180	187	2.3	2.7	41	483	616	200	0.06	6.7	709	794	917	20.0	1451	2176	
								250	0.07	9.8	837	937	1082	30.0	1710	2565	
								300	0.084	13.4	941	1054	1217	41.8	1913	2870	

Unit Selection Data

ABM 300 3000mm

2270mm Heat Exchanger																	
AIRSIDE DATA								WATERSIDE DATA									
Supply Air Quantity Primary		Static Pressure Loss	Cooling Throw	Heating Throw	Sound Level L_{WA} (Sound power - 8dB)	Air Cooling capacity Room to Air ΔT		Water Quantity		Cooling at Various Room to mean Water ΔT				Heating at Various Room to mean Water ΔT			
						ΔT=8	ΔT=10			Pressure Loss	ΔT=8,5	ΔT=9,5	ΔT=11	Pressure Loss	ΔT=20	ΔT=30	
l/s	m^3/h	Pa	m		dB(A)	Watts		l/h	l/s	kPa	Watts			kPa	Watts		
Nozzle A - 20																	
16.7	60	73	1.0	1.1	19	164	205	180	0.05	6.8	455	497	584	19.1	1020	1530	
								250	0.069	11.6	531	580	683	33.9	1188	1781	
								320	0.089	17.7	585	638	751	53.3	1317	1975	
19.4	70	104	1.3	1.5	21	192	240	180	0.05	6.8	530	576	677	19.1	1148	1721	
								250	0.069	11.6	621	674	792	33.9	1340	2009	
								320	0.089	17.7	683	742	871	53.3	1488	2232	
22.2	80	134	1.6	1.8	24	219	274	180	0.05	6.8	604	656	774	19.1	1265	1898	
								250	0.069	11.6	707	768	905	33.9	1480	2220	
								320	0.089	17.7	778	845	996	53.3	1649	2474	
Nozzle B - 20																	
25.0	90	64	1.1	1.3	22	246	308	180	0.05	6.8	555	617	707	19.1	1123	1684	
								250	0.069	11.6	649	721	823	33.9	1309	1964	
								320	0.089	17.7	726	807	922	53.3	1455	2183	
30.6	110	91	1.5	1.7	27	301	376	180	0.05	6.8	633	706	806	19.1	1279	1918	
								250	0.069	11.6	741	826	943	33.9	1495	2243	
								320	0.089	17.7	815	909	1037	53.3	1666	2499	
36.1	130	131	1.8	2.1	33	356	445	180	0.05	6.8	696	776	886	19.1	1416	2123	
								250	0.069	11.6	779	869	992	33.9	1664	2497	
								320	0.089	17.7	841	938	1071	53.3	1858	2787	
Nozzle C - 20																	
41.7	150	74	1.7	2.0	33	411	513	180	0.05	6.8	670	718	799	19.1	1343	2015	
								250	0.069	11.6	737	790	879	33.9	1575	2363	
								320	0.089	17.7	796	853	949	53.3	1758	2636	
47.2	170	94	2.0	2.3	36	465	582	180	0.05	6.8	751	804	895	19.1	1442	2163	
								250	0.069	11.6	827	862	849	33.9	1695	2542	
								320	0.089	17.7	885	915	984	53.3	1892	2839	
52.8	190	119	2.2	2.5	39	520	650	180	0.05	6.8	833	892	993	19.1	1531	2297	
								250	0.069	11.6	933	999	1112	33.9	1805	2708	
								320	0.089	17.7	1023	1088	1201	53.3	2020	3030	
58.3	210	146	2.4	2.7	41	575	719	180	0.05	6.8	908	972	1082	19.1	1617	2425	
								250	0.069	11.6	992	1049	1169	33.9	1908	2861	
								320	0.089	17.7	1051	1111	1239	53.3	2139	3209	

Chilled beam Maintenance and Cleaning

Waterloo ABM's are air terminal devices with no moving parts, which essentially require very little maintenance.

The face plate hinges down (see below) to gain access to the cooling/heating coil, which should be vacuumed on an annual basis to ensure air has a free path through the exchanger for maximum performance. Please ensure that when vacuuming the coil, care is taken not to damage the aluminium fins, as this will affect the performance of the unit.

If the unit becomes marked, it can be cleaned with a cloth wetted with detergent diluted with water. At the same time the coil is being vacuumed, it is commonly good practice to ensure the air connection spigot is still secure.

Waterloo Product Range

GRILLES

A complete range of products suitable for all wall, ceiling and floor applications. Most grilles are made from aluminium and have a range of fixed or moveable blades designed to give performance whilst remaining aesthetically pleasing to the eye. Grilles are made to customer specified sizes and colours (PPM/G); standard colour PPM9010 (20% Gloss White). The range is complemented by the Aircell range of polymer Grilles.

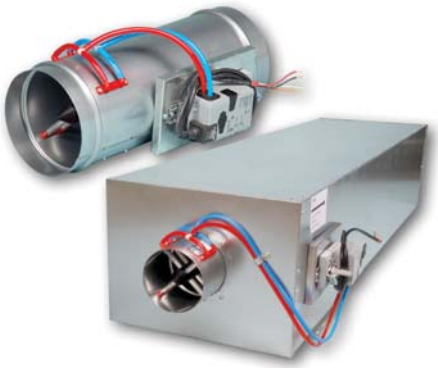
DIFFUSERS

Designed to be installed in various ceiling systems, we have a complete range to suit both performance and aesthetical requirements. Most diffusers are made from aluminium and can be ordered with or without plenum boxes for easy duct work. Diffusers can be ordered in customer specified colours (PPM/G); standard colour is PPM 9010 (20% Gloss White). This range is complemented by the Aircell range of polymer Diffusers.

ACTIVE AND PASSIVE CHILLED BEAMS

The finest quality range of high output active beams, used for ventilated heating and cooling applications. These units have 4 pipe coils to allow heating and cooling circuits to run simultaneously, giving constant and responsive control. The design allows a large optimum capacity and also allows the customer to specify the nozzle type and pitch for individual circumstances.

Active beams are made from steel to a large range of customer specified sizes and as such are suitable for various different ceiling systems. Standard finish is PPM 9010, however other (PPM/G) colours are available on request.



AIR VOLUME CONTROL DAMPERS

Pressure independent Variable Air Volume and Constant Air Volume dampers made from zintec plate. Most volume dampers are regulated with an electronic motor and sensors and are calibrated to customer specifications before delivery.

The Constant Air Volume damper requires no power source as it is controlled via a mechanical device and calibrated before delivery. All volume dampers can be ordered with a single or double (insulation) skin.

EXTERNAL LOUVRES

A quality range of products for external wall applications. Made from aluminium, with birdscreen or insect screen options. All louvres are made to customer specified sizes and (PPM/G) colours; standard colour is PPM 9006.

DISPLACEMENT

A full range of recessed, semi-recessed, floor, wall and corner units providing high ventilation efficiency and excellent comfort. The very low pressure involved also offer quiet installations. Displacement units are available as wall or floor mounted, or indeed integrated within the architectural design.

waterloo

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bsi. ISO 9001 Quality Management
FM 27823

bsi. ISO 14001 Environmental Management
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All products conform to the Terms and Conditions of Waterloo Air Products plc a copy of which are available upon request. Due to our continuous research and development programme, Waterloo Air Products plc reserve the right to alter products and prices without prior notification.

Waterloo declare that, at the time of print, all products are in accordance with relevant directives, as identified by HEVAC and other European Organisations and will display the CE Marking where required.

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