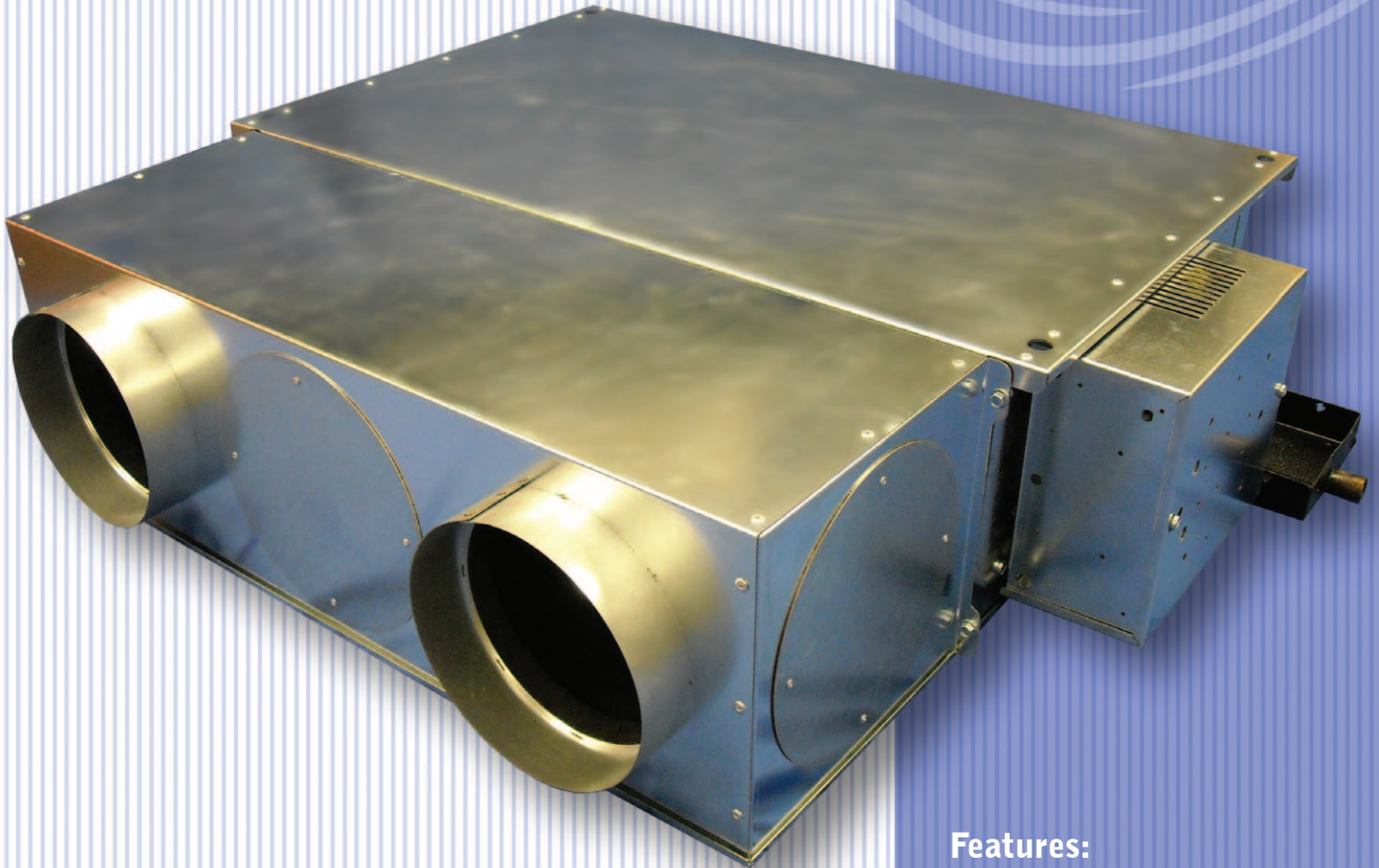


# Highline 270ec

## Waterside Control Fan Coil Units



### Features:

- ▶ Incorporating Leading ec/dc Motor Technology
- ▶ ErP Directive 2015 Compliant
- ▶ Low Specific Fan Powers
- ▶ Infinite Fan Speed Control
- ▶ Performance at System Pressures Up To 50 pa
- ▶ Independently Established Performance Data
- ▶ Lifetime "eco" Filter

# Highline 270ec

## Waterside Control Fan Coil Units

### Description

The Diffusion Highline ranges of waterside control fan coils have been specifically designed with consideration to their intended installation; being either a concealed horizontal ceiling void application, or recessed under the floor.

All of the Highline models have been configured to perform efficiently against external system static pressures up to 50 Pa.

Flexibility of design allows the Highline range to be configured to suit a variety of installation requirements; including circular, rectangular and bulkhead ducted connections.

The numerous models within the Highline range enable performance selections ranging from NR25 to NR40, and air volumes up to 700l/s.

### Outline Engineering Specification

#### Chassis

The chassis shall be manufactured from heavy gauge galvanised mild steel sheet, with burr free edges and a natural finish, formed and strengthened to provide a rigid and distortion free construction.

Units shall have reinforced mounting points incorporated within the overall chassis width to facilitate drop rod installation.

Full width removable maintenance panels shall be fitted providing access to key internal components for maintenance purposes.

#### Fans

Fans shall be of the double inlet, double width, direct driven, centrifugal type.

Scrolls shall be manufactured from galvanised mild steel, complete with forward curved multi-bladed aluminum or galvanised steel impellers.

Impeller and motor assemblies shall be balanced in accordance with BS ISO 1940.

#### Motors

Motors shall be of the electronically commutated direct current type, rated for continuous operation with inbuilt overload protection devices, and shall be capable of performance control via a 0 to 10 Volt dc signal.

Construction shall be of the totally enclosed design protection rated to IP42, Insulation class 'B', with maintenance free sealed for life ball bearings, and compliant with BS 5000-11 and BS EN 60034

EMC: Interference emissions acc. to EN 61000-6-3  
Interference immunity acc. to EN 61000-6-2

Electrical supply requirements: 230V-1ph-50Hz in accordance with DIN IEC 38.

#### Heat Exchanger

Heat exchanger matrixes shall be manufactured from solid drawn copper tubes; mechanically expanded into accurately pre-formed collars in rippled plate type aluminium fins.

Multi circuit designs shall be incorporated ensuring maximum thermal performance efficiency, headers unifying the circuits shall terminate in plain tail connections on 40mm centres.

Heating and Cooling circuit headers shall incorporate manually operated key pattern air vents and drains.

Heat exchangers shall be suitable for operating at system pressures up to 12 bar, tested to 30 bar dry air / nitrogen at manufacture, and subsequently leak tested again when fitted with valve sets at our works.

#### Electric Elements

Electric heating elements shall be manufactured from 8mm fully sheathed stainless steel rods, with spiral fin on a 4mm pitch. A manual re-set high temperature cut-out shall be fitted in accordance with standard safety requirements. The element construction shall comply with BS7351 – 1990.

#### Filters

Fitted as standard the Diffusion "eco" filter shall be made of a fine woven mesh manufactured from galvanised steel wire, welded to a rigid galvanised steel support frame; retained on the unit via thumb screws.

The "eco" filter shall be capable of being vacuum cleaned whilst fitted to the fan coil and removable for cleaning elsewhere if required.

Optionally lofted continuous filament synthetic media replaceable pad in frame filters can be fitted; providing filtration grades G2 or G3 in accordance with BS EN 779.



## Condensate Drip Trays

Condensate drip trays shall be manufactured from hot dipped galvanised steel, designed with a dual axis fall to drain; welded at each corner and fitted with a 22mm diameter brass end drain connection at the lowest point. (15mm diameter connection option available).

The assembly is fully degreased and spray finished with an anti-condensation coating.

## Insulation

Units shall be insulated throughout with 90kg/m<sup>3</sup>, CFC &HFC free, impregnated open cell flexible PU foam; with fire performance rating to BS 476 Part 7: Class 1 & Part 6: I < 12, I<sub>(a)</sub> < 6; Class '0' to building regulations.

Insulation adhesive shall be a light and age resisting modified acrylic resin with high temperature stability.

## Controls Enclosures

A ventilated control enclosure shall be built onto the unit providing an enclosed location for fitment of thermal and speed switching control equipment.

Enclosure wiring shall be in accordance with BS 7671:2008 / IEE wiring regulations 17<sup>th</sup> edition.

## Quality Testing

When fully assembled each unit shall be subjected to thorough mechanical examination, be run tested and function tested where possible; and need to have passed a series of electrical compliance checks prior to being QC approved in accordance with our BS EN ISO 9001:2000 quality standards; ready for packing and dispatch.

## Options and Equipment

- ▶ Units are supplied as standard without performance modulation controls or waterside control valves; we can fit free-issued controls packages or supply controls packages specifically configured to your requirements
- ▶ Control valve fitting kits (Required when adaptors/connectors are not supplied with free issued valves)
- ▶ Pad and Frame G2 or G3 media filters
- ▶ Condensate pumps
- ▶ Fan fault monitoring boards. (Recommended when units are fitted with electric heating elements)
- ▶ Fan three speed interface board, allowing three pre-defined fan speeds to be selected for manual or control relay switching
- ▶ Anti-vibration Mount Kits
- ▶ Pre-commissioning filters
- ▶ Inlet/Return air plenums, and Inlet attenuators
- ▶ Additional options and equipment are available – for details contact our sales office.

# Highline 270ec

## Waterside Control Fan Coil Units

### Airflow/NR/Speed Data

Model Reference	Air Volume Against A 30 Pa System Resistance	Individual Unit Acoustic Guide	Duty Fan Speed Setting
	l/s	NR	
HIGHLINE 27Bec WHCH-06/1	66	25	uLow
	81	27	xLow
	100	30	Low
	106	31	Low+1
	113	32	Low+2
	119	33	Low+3
	130	35	Med
	137	36	Med+1
	150	38	Med+3
	162	40	High
HIGHLINE 27Bec WHCH-09/1	76	25	uLow
	100	27	xLow
	117	30	Low
	130	31	Low+1
	139	32	Low+2
	150	33	Low+3
	169	35	Med
	179	36	Med+1
	199	38	Med+3
	215	40	High
HIGHLINE 27Bec WHCH-09/2	70	25	uLow
	114	27	xLow
	153	30	Low
	176	31	Low+1
	198	32	Low+2
	217	33	Low+3
	258	35	Med
	278	36	Med+1
	319	38	Med+3
	357	40	High
HIGHLINE 27Bec WHCH-12/2	110	25	uLow
	153	27	xLow
	198	30	Low
	222	31	Low+1
	244	32	Low+2
	265	33	Low+3
	308	35	Med
	329	36	Med+1
	373	38	Med+3
	416	40	High
HIGHLINE 27Bec WHCH-13/2	123	25	uLow
	168	27	xLow
	214	30	Low
	238	31	Low+1
	262	32	Low+2
	284	33	Low+3
	328	35	Med
	350	36	Med+1
	398	38	Med+3
	443	40	High

### Cooling Phase Data

Sensible Cooling Performance	Total Cooling Performance	Chilled Water Flow Rate	Chilled Water Hydraulic Pressure Drop	Supply Air Temperature
Watts	Watts	l/s	kPa	db°C
974	1245	0.050	1.66	10.7
1122	1394	0.056	2.04	11.4
1360	1678	0.067	2.87	11.6
1438	1772	0.071	3.17	11.7
1531	1886	0.076	3.55	11.7
1603	1970	0.079	3.85	11.8
1737	2129	0.086	4.44	11.9
1812	2212	0.089	4.77	12.0
1954	2369	0.096	5.42	12.1
2084	2515	0.102	6.06	12.3
1185	1548	0.062	1.4	10.0
1406	1747	0.070	1.8	11.3
1562	1901	0.076	2.1	11.9
1740	2120	0.085	2.6	11.8
1862	2270	0.091	2.9	11.8
2008	2449	0.098	3.4	11.8
2255	2747	0.111	4.1	11.9
2379	2896	0.117	4.6	11.9
2603	3149	0.127	5.3	12.1
2778	3345	0.136	6.0	12.2
1126	1492	0.060	1.3	9.6
1538	1879	0.075	2.1	11.7
2057	2507	0.100	3.5	11.8
2356	2868	0.115	4.4	11.8
2618	3169	0.127	5.3	12.0
2828	3402	0.136	6.1	12.1
3278	3911	0.157	7.8	12.4
3486	4141	0.167	8.7	12.5
3894	4585	0.185	10.5	12.8
4266	4986	0.202	12.3	13.0
1630	2074	0.083	2.8	10.7
2243	2840	0.113	4.9	10.8
2842	3563	0.142	7.5	11.0
3147	3922	0.157	8.9	11.2
3401	4212	0.169	10.1	11.4
3640	4482	0.180	11.4	11.5
4115	5010	0.201	14.0	11.8
4342	5258	0.211	15.3	12.0
4793	5747	0.231	18.1	12.3
5216	6209	0.251	20.9	12.5
1910	2485	0.099	2.5	10.1
2560	3299	0.132	4.3	10.3
3221	4130	0.165	6.4	10.5
3552	4538	0.181	7.6	10.6
3879	4937	0.197	8.9	10.7
4158	5266	0.211	10.0	10.8
4681	5862	0.235	12.2	11.1
4942	6159	0.247	13.4	11.2
5484	6773	0.272	16.0	11.5
5968	7311	0.295	18.5	11.8

### Heating Phase Data

Sensible Heating Performance	Hot Water Flow Rate	Hot Water Hydraulic Pressure Drop	Supply Air Temperature
Watts	l/s	kPa	db°C
1278	0.031	2.24	37.1
1450	0.035	2.81	35.9
1659	0.040	3.60	34.8
1729	0.042	3.88	34.6
1807	0.044	4.20	34.3
1868	0.045	4.47	34.1
1972	0.048	4.93	33.6
2030	0.049	5.20	33.3
2148	0.052	5.76	32.9
2240	0.054	6.22	32.5
1696	0.041	0.7	39.6
1829	0.044	0.8	36.2
2024	0.049	1.0	35.4
2162	0.053	1.1	34.9
2263	0.055	1.2	34.6
2378	0.058	1.4	34.2
2567	0.062	1.6	33.7
2675	0.065	1.7	33.5
2841	0.069	1.9	32.9
2969	0.072	2.0	32.5
1675	0.041	0.7	40.9
1994	0.048	1.0	35.6
2409	0.058	1.4	34.1
2645	0.064	1.6	33.5
2834	0.069	1.9	32.9
2983	0.072	2.1	32.5
3311	0.080	2.5	31.7
3457	0.084	2.7	31.4
3755	0.091	3.1	30.8
4033	0.098	3.6	30.4
2157	0.052	1.3	37.3
2639	0.064	1.9	35.4
3124	0.076	2.5	34.1
3377	0.082	2.9	33.7
3556	0.086	3.2	33.1
3739	0.091	3.5	32.8
4081	0.099	4.1	32.0
4253	0.103	4.5	31.8
4582	0.111	5.1	31.2
4904	0.119	5.8	30.8
2645	0.064	2.1	38.9
3060	0.074	2.8	36.2
3573	0.087	3.7	34.9
3835	0.093	4.2	34.4
4098	0.100	4.7	34.0
4288	0.104	5.1	33.6
4666	0.113	6.0	32.9
4846	0.118	6.4	32.5
5241	0.127	7.4	32.0
5587	0.136	8.3	31.5

### Electrical Data

Motor Power	Maximum Start/Run Current	Specific Fan Power
Watts	Amps	W/l/s
10	0.39	0.16
14	0.39	0.17
19	0.39	0.19
22	0.39	0.20
24	0.39	0.21
27	0.39	0.23
32	0.39	0.25
36	0.39	0.26
41	0.39	0.28
49	0.39	0.31
12	0.8	0.16
16	0.8	0.16
22	0.8	0.18
24	0.8	0.19
28	0.8	0.20
32	0.8	0.21
41	0.8	0.24
46	0.8	0.26
59	0.8	0.30
73	0.8	0.34
12	0.7	0.16
16	0.7	0.14
22	0.7	0.14
25	0.7	0.14
31	0.7	0.15
35	0.7	0.16
48	0.7	0.19
56	0.7	0.20
75	0.7	0.23
98	0.7	0.27
13	0.9	0.12
19	0.9	0.12
26	0.9	0.13
31	0.9	0.14
36	0.9	0.15
43	0.9	0.16
56	0.9	0.18
64	0.9	0.20
86	0.9	0.23
116	0.9	0.28
14	1.0	0.11
20	1.0	0.12
29	1.0	0.13
34	1.0	0.14
40	1.0	0.15
47	1.0	0.16
61	1.0	0.19
70	1.0	0.20
94	1.0	0.23
126	1.0	0.28

#### Based on following Design Condition:

- ▶ Return Air Temperature(summer): 23°C db and 16.4°C wb
- ▶ Chilled Water Temperature: 6/12 °C
- ▶ Return Air Temperature(winter): 21°C
- ▶ LPHW Temperature: 60/50 °C
- ▶ External Static Pressure: 30Pa
- ▶ Electric heat is available on all units.
- ▶ For further information please contact us.
- ▶ For any alternative design conditions please contact the Cooling Department at Diffusion.



### Airflow/NR/Speed Data

Model Reference	Air Volume Against A 30 Pa System Resistance	Individual Unit Acoustic Guide	Duty Fan Speed Setting
	l/s	NR	
HIGHLINE 27Bec WHCH-15/2	116	25	uLow
	162	27	xLow
	211	30	Low
	236	31	Low+1
	260	32	Low+2
	283	33	Low+3
	328	35	Med
	350	36	Med+1
	396	38	Med+3
	440	40	High
HIGHLINE 27Bec WHCH-15/3	70	25	uLow
	138	27	xLow
	203	30	Low
	251	31	Low+1
	297	32	Low+2
	340	33	Low+3
	399	35	Med
	443	36	Med+1
	525	38	Med+3
	580	40	High
HIGHLINE 27Bec WHCH-18/3	102	25	uLow
	170	27	xLow
	234	30	Low
	282	31	Low+1
	329	32	Low+2
	372	33	Low+3
	430	35	Med
	475	36	Med+1
	559	38	Med+3
	616	40	High
HIGHLINE 27Bec WHCH-18/4	152	27	uLow
	212	28	xLow
	304	30	Low
	348	31	Low+1
	388	32	Low+2
	435	33	Low+3
	521	35	Med
	559	36	Med+1
	635	38	Med+3
	707	40	High

### Cooling Phase Data

Sensible Cooling Performance	Total Cooling Performance	Chilled Water Flow Rate	Chilled Water Hydraulic Pressure Drop	Supply Air Temperature
Watts	Watts	l/s	kPa	db°C
1965	2661	0.106	2.1	8.9
2521	3284	0.131	3.1	10.0
3270	4253	0.170	4.9	10.1
3638	4721	0.189	5.9	10.2
3986	5159	0.206	7.0	10.2
4314	5567	0.223	8.0	10.3
4935	6333	0.254	10.2	10.5
5212	6660	0.267	11.1	10.6
5778	7318	0.294	13.3	10.9
6293	7907	0.319	15.4	11.1
1324	1871	0.075	1.1	7.3
2210	2920	0.117	2.5	9.6
3150	4099	0.164	4.6	10.1
3859	5000	0.200	6.6	10.2
4512	5811	0.232	8.6	10.3
5101	6533	0.261	10.7	10.5
5835	7388	0.296	13.4	10.8
6363	7993	0.321	15.5	11.0
7301	9050	0.364	19.6	11.4
7945	9802	0.396	22.8	11.6
1868	2609	0.104	1.6	7.7
2790	3728	0.149	3.1	9.3
3678	4817	0.192	4.9	9.9
4403	5748	0.230	6.7	10.0
5082	6599	0.264	8.7	10.1
5689	7351	0.294	10.6	10.3
6479	8317	0.333	13.3	10.5
7041	8972	0.359	15.3	10.7
8037	10109	0.406	19.1	11.0
8688	10840	0.437	21.8	11.3
2510	3362	0.134	2.5	9.2
3334	4367	0.174	4.1	9.9
4727	6155	0.246	7.6	10.0
5357	6940	0.277	9.5	10.2
5915	7627	0.305	11.3	10.3
6554	8406	0.336	13.5	10.5
7611	9627	0.385	17.3	10.8
8062	10140	0.406	19.1	11.0
9001	11237	0.451	23.1	11.2
9766	12078	0.486	26.5	11.5

### Heating Phase Data

Sensible Heating Performance	Hot Water Flow Rate	Hot Water Hydraulic Pressure Drop	Supply Air Temperature
Watts	l/s	kPa	db°C
3197	0.078	3.5	44.0
3340	0.081	3.8	38.2
3892	0.095	5.0	36.4
4182	0.102	5.7	35.8
4455	0.108	6.4	35.3
4711	0.114	7.1	34.9
5206	0.126	8.5	34.2
5396	0.131	9.1	33.8
5798	0.141	10.4	33.2
6177	0.150	11.6	32.7
2575	0.063	2.4	51.7
3307	0.080	3.7	41.0
3798	0.092	4.8	36.6
4354	0.106	6.1	35.5
4866	0.118	7.5	34.7
5308	0.129	8.8	34.0
5818	0.141	10.4	33.2
6197	0.150	11.7	32.7
6874	0.167	14.2	31.9
7307	0.177	15.8	31.5
3502	0.085	1.7	49.6
4174	0.101	2.4	41.5
4518	0.110	2.8	37.1
5064	0.123	3.4	36.0
5593	0.136	4.1	35.2
6065	0.147	4.7	34.6
6679	0.162	5.7	33.9
7064	0.172	6.3	33.4
7774	0.189	7.5	32.6
8251	0.200	8.4	32.2
4082	0.099	2.3	43.4
4249	0.103	2.5	37.7
5313	0.129	3.7	35.6
5802	0.141	4.4	34.9
6244	0.152	5.0	34.4
6723	0.163	5.7	33.9
7456	0.181	6.9	32.9
7774	0.189	7.5	32.6
8410	0.204	8.7	32.0
8969	0.218	9.8	31.6

### Electrical Data

Motor Power	Maximum Start/Run Current	Specific Fan Power
Watts	Amps	W/l/s
13	1.0	0.11
19	1.0	0.12
28	1.0	0.13
34	1.0	0.14
40	1.0	0.15
45	1.0	0.16
60	1.0	0.18
68	1.0	0.20
90	1.0	0.23
122	1.0	0.28
13	1.2	0.19
19	1.2	0.13
26	1.2	0.13
34	1.2	0.14
43	1.2	0.14
52	1.2	0.15
68	1.2	0.17
84	1.2	0.19
123	1.2	0.23
165	1.2	0.28
14	1.2	0.13
20	1.2	0.12
28	1.2	0.12
36	1.2	0.13
44	1.2	0.13
54	1.2	0.14
69	1.2	0.16
84	1.2	0.18
122	1.2	0.22
163	1.2	0.26
18	1.2	0.12
23	1.2	0.11
34	1.2	0.11
40	1.2	0.11
47	1.2	0.12
56	1.2	0.13
79	1.2	0.15
90	1.2	0.16
123	1.2	0.19
175	1.2	0.25

### NR Guide Qualification

Calculations detailed in the CIBSE Guide for Sound Control are used to model the combined Inlet and Case Radiated sound power levels and Discharge sound power levels for each unit and speed setting; providing a Guide NR rating for the units when installed in a typical manner.

- ▶ Room size based on a cooling load of: 90Watts per square metre.
- ▶ Ceiling allowance / loss; from: 125Hz to 4kHz -4,-7,-9,-11,-14, and -16 dB.
- ▶ Discharge system allowance / loss; from: 125Hz to 4kHz -3,-5,-9,-10,-10 and -11 dB.
- ▶ Room acoustic characteristics: Medium Live.
- ▶ Distance to listener: 1.5 metres.

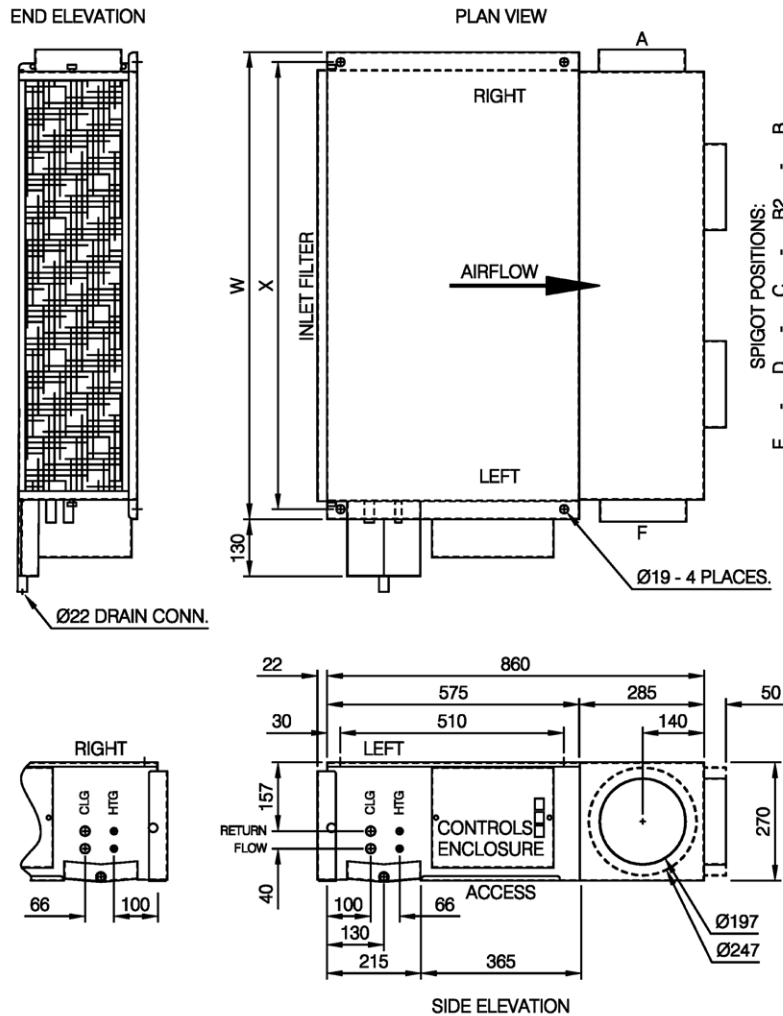
\*Please note that our NR figure should be considered as a guide only.

There are many factors which influence the actual resultant NR level within a given space; thus we would recommend that for a more accurate prediction of the resultant NR level an independent acoustic specialist be employed.

# Highline 270ec

## Waterside Control Fan Coil Units

### GENERAL ARRANGEMENT DETAILS



UNITS ARE HANDED LOOKING AGAINST THE DIRECTION OF AIRFLOW i.e. AT THE DISCHARGE OF THE UNIT;  
 e.g. ABOVE UNIT DETAILED AS LEFT HAND CONNECTIONS.  
 SPIGOT POSITIONS ARE IDENTIFIED CLOCKWISE FROM PLAN VIEW; FOR BOTH LEFT AND RIGHT HAND UNITS.

MODEL SIZE	DIMENSIONS		WEIGHT kg	SPIGOT Qty.		COIL CONNECTION Ø			COIL VOLUME ltr.	
	W	X		Ø197	Ø247	Clg. 'A'	Clg. 'B'	Htg.	Clg.	Htg.
06/1	691	645	32	A-B-D-F	A-B-D-F	15	15	15	1.00	0.22
09/2	911	865	44	A-B-C-D-F	A-B-D-F	15	15	15	1.38	0.29
12/2	1066	1020	48	A-B-C-D-F	A-B-D-F	15	15	15	1.64	0.34
13/2	1244	1198	54	A-B-C-D-F	A-B-C-D-F	15	15	15	1.95	0.39
15/2	1491	1445	63	A-B-C-D-E-F	A-B-C-D-F	15	22	15	2.37	0.46
15/3	1491	1445	67	A-B-C-D-E-F	A-B-C-D-F	15	22	15	2.37	0.46
18/3	1876	1830	82	A-B-B2-C-D-E-F	A-B-B2-C-D-E-F	22	22	15	3.10	0.57
18/4	1876	1830	86	A-B-B2-C-D-E-F	A-B-B2-C-D-E-F	22	22	15	3.10	0.57





### DIFFUSION Fan Coil Coding System

UNIT MODEL	COIL DESIGN	FAN TYPE	CONTROL	APPLICATION	OPTIONS	UNIT SIZE
<b>H27</b> –Highline 270	<b>B</b> –Circuit Type	<b>ec</b> –ec/dc motor	<b>W</b> –Waterside	<b>H</b> –Horizontal	<b>CH</b> –COOLING & HEATING	06/1
				<b>U</b> –Under-floor	<b>CO</b> –COOLING ONLY	09/2
					<b>CE</b> –COOLING & ELECHTG	12/2
					<b>OH</b> –HEATING ONLY	13/2
						15/2
						15/3
						18/3
		18/4				

e.g.

▶ **H27Bec-WHCH-12/2**

HIGHLINE 270 – B circuit coil with ec/dc fans - Waterside Horizontal – Cooling and Heating 4 pipe - Size 12/2.

▶ **H27Bec-WHCE-15/3**

HIGHLINE 270 – B circuit coil with ec/dc fans - Waterside Horizontal – Cooling and Electric Heating 2 pipe - Size 15/3.

Established in 1960,  
Diffusion has over 50 years  
experience in producing  
environmental solutions  
via the manufacture of heating,  
air conditioning and  
ventilating products.



**Diffusion Environmental Systems**  
47 Central Avenue, West Molesey, Surrey KT8 2QZ  
Tel: (+44) 020 8783 0033 Fax: (+44) 020 8783 0140  
Email: [diffusion@etenv.co.uk](mailto:diffusion@etenv.co.uk) [www.diffusion-group.co.uk](http://www.diffusion-group.co.uk)

