

7 Darnley Rd Information and specification

The extraction system has been designed to suit the cooking equipment located beneath the canopy and as per DW172 and DEFRA Guidance on the Control of Odour (Annex C) and Noise from Commercial Kitchen Exhaust Systems.

The co efficient has been worked out as $0.906\text{m}^3\text{s} = 3261\text{m}^3\text{h}$ (see appendix 1)

Extraction Fan

Flakt Woods Estoc 500 Power Box) (see appendix 2)

Fan diameter 500mm

Velocity 4.6m/s

Pressure at selected duty of $1.3\text{m}^3\text{s} = 600\text{ Pa}$

Pressure drop

Pressure drop for the system will be as follows;

Clean;

Canopy mounted baffle filters 60 Pa

Duct work 40 Pa

Bag filter 50 Pa

Carbon filter 120 Pa

Total drop 270 Pa

Dirty;

Canopy mounted baffle filters 70 Pa

Duct work 50 Pa

Bag filter 120 Pa

Carbon filter 360 Pa

Total drop 600 Pa

Carbon Blocks

To achieve a 0.3s residency time within the carbon filter blocks the following applies based on using Jasun Envirocare DC242424(see appendix 3) carbon blocks, these blocks are rated at 3800m³h giving a dwell time of 0.1s @ 3800m³h

Blocks required;

$$3261 \times 3 = 14040$$

$$9783 / 3800 = 2.57 \text{ carbon blocks} = 3 \text{ blocks}$$

Actual residency time;

$$3 \times 3800 = 11400 @ 0.1s$$

$$11400/3261 = 3.5 \times 0.1 = 0.35s$$

$$\text{Dwell time} = 0.35s$$

Pre Filter

Pre filters to protect the carbon filters;

Jasun Envirocare Fire rated CP4-24L-6 (see appendix 4) rated at 4200m³h

$$\text{Total air flow using 4no filters} = 3 \times 4200 = 12600m^3h$$

$$12600 / 3261 = 3.863 \times 0.1 = 0.38s$$

$$\text{Dwell time in filters} = 0.38s$$

Noise Attenuation

The system will be installed with 2no Flakt Woods C2DM x 500 silencers located after the extraction fan to comply with the data gathered by the sound engineer. (appendix 5 and 5-2 and 5-3)

Annex C: Risk Assessment for Odour

Odour control must be designed to prevent odour nuisance in a given situation. The following score methodology is suggested as a means of determining odour control requirements using a simple risk assessment approach. The odour control requirements considered here are consistent with the performance requirements listed in this report.

Impact Risk	Odour Control Requirement	Significance Score*
Low to Medium	Low level odour control	Less than 20
High	High level odour control	20 to 35
Very high	Very high level odour control	more than 35

* based on the sum of contributions from dispersion, proximity of receptors, size of kitchen and cooking type:

Criteria	Score	Score	Details
Dispersion	Very poor	20	Low level discharge, discharge into courtyard or restriction on stack.
	Poor	15	Not low level but below eaves, or discharge at below 10 m/s.
	Moderate	10	Discharging 1m above eaves at 10 -15 m/s.
	Good	5	Discharging 1m above ridge at 15 m/s.
Proximity of receptors	Close	10	Closest sensitive receptor less than 20m from kitchen discharge.
	Medium	5	Closest sensitive receptor between 20 and 100m from kitchen discharge.
	Far	1	Closest sensitive receptor more than 100m from kitchen discharge.
Size of kitchen	Large	5	More than 100 covers or large sized take away.
	Medium	3	Between 30 and 100 covers or medium sized take away.
	Small	1	Less than 30 covers or small take away.
Cooking type (odour and grease loading)	Very high	10	Pub (high level of fried food), fried chicken, burgers or fish & chips.
	High	7	Kebab, Vietnamese, Thai or Indian.
	Medium	4	Cantonese, Japanese or Chinese.
	Low	1	Most pubs, Italian, French, Pizza or steakhouse.

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Specific Extract Flow Rate Calculation Sheet

based on the THERMAL CONVECTION METHOD as recommended in **HVCA Specification DW172**



Project;	7 Darnley Rd	Job No:	TBC
For:	Advantage	Drg No:	N/A
Canopy/Ceiling Ref:	Wall Canopy	Date:	22/09/16
		Assessed By:	Colin Smith

	Power	Plan Size		Area (m ²)	TCC (m ³ /s/m ²)	Flow Rate (m ³ /s)
		X(m)	Y(m)			
Cooking Equipment						
Open Top Range and Oven, Gas	Gas	0.90	0.70	0.63	0.35	0.22
Heavy Duty Deep Fat Fryer, Gas	Gas	0.60	0.70	0.42	0.50	0.21
Griddle (mild steel), Electric	Gas	0.60	0.70	0.42	0.25	0.11
Combination Steaming Ovens, Electric	Electric	0.90	0.70	0.63	0.30	0.19
-						
-						
-						
-						
-						
-						
-						
-						

X Factor for Canopy / Ceiling Type:

Theoretical Flow Rate (m ³ /s)	0.72 m ³ /s
07. Overhead Wall Type (open both ends)	1.25
Specific Extract Flow Rate	0.906 m ³ /s
Make-up-Air Ratio	85%
Make-up-Air Flow Rate (m ³ /s)	0.77 m ³ /s



Fläkt Woods Limited

Technical Data Sheet Estoc - Powerbox



Quotation Number	:	Project Code	:	AF-23121-1
Project Name	:	Customer	:	
Item Reference:	:	Date:	:	Thursday, September 22, 2016

Fan Code	Estoc (Power Box) 67-500-1 [Express]
Fan Diameter / Size	500
Velocity	4.6 m/s

Requested Duty (199v)	0.9m³/s @ 600 Pa (static)
Outlet Dynamic Pressure	13 Pa

Acoustic figures for adjusted running speeds have been interpolated and are for reference only.

Duty Shaft Power	1.21 kW
Max Shaft Power	1.46 kW
Total Efficiency	45.6 %

Terms and Conditions: This offer is made subject to the terms and conditions detailed on the accompanying letter.

Motor Frame	Integral
Motor Rating	1.43 kW
Full Load Current	6.7 A
Starting Current	26.13 A
Electrical Supply	220-240 Volts 50 Hz 1 Phase
Start Type	Enquire
Motor Winding	Standard

Regulation 1253/2014	
UVU Efficiency	52.6%
UVU Target Efficiency	37.2%
Nominal Flow Rate	1.45 m³/s @ 517 Pa
Effective Input Power	1.43 kW

Internal Fan Efficiency	54%
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SFP value	1.34 W/(l/s) @ Requested Duty
Power from mains	1.21 kW
Energy Consumption	3629 kWh (3000 h/year)
Running Cost / Year	£508

Air Density	1.2 kg/m³ / 20 °C / 0 m / 50% RH
Smoke Venting	Non Smoke Venting
Product Number	UB675515

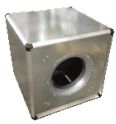
	Sound Spectrum (Hz)								Overall	
	63	125	250	500	1k	2k	4k	8k	Lw*	LpA @ 3 m**
Inlet*	-	74	79	74	71	68	65	58	82	57
Outlet*	-	77	79	76	78	71	67	60	84	61
Breakout*	-	74	70	59	55	45	39	33	75	44

* Lw dB re 10⁻¹² W

** dBA re 2x10⁻⁵ Pa

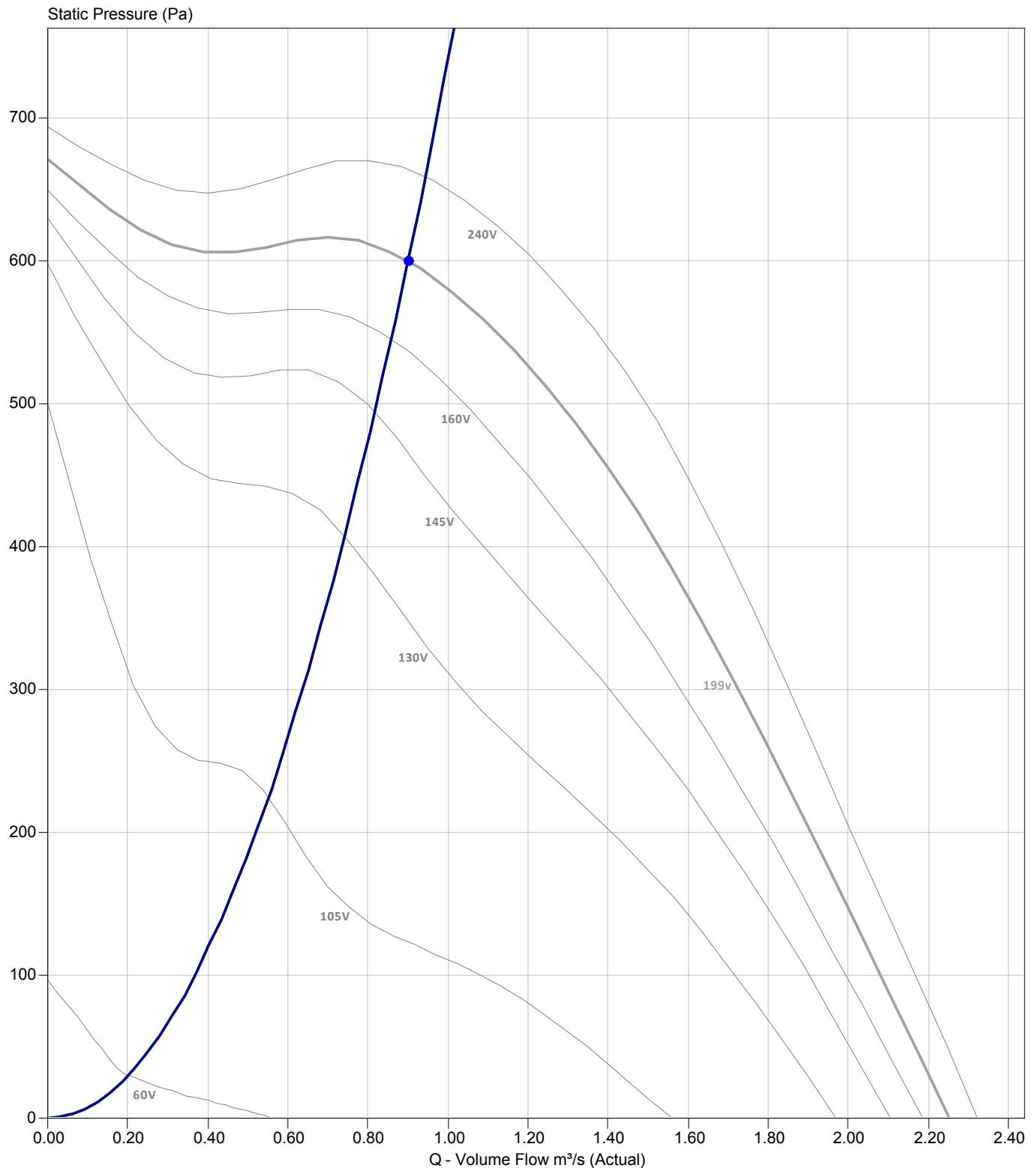
Sound data at requested duty.

Description	Qty
Fan UB675515 - Estoc (Power Box) 67-500-1 [Express]	1
Accessories **TEID 7.5amp Transfromer Speed Controller **B2D Melinex Lined Silencer	1 2
** Special, non standard	
Optional Controllers & Sensors  EEDS (Switched - Electronic) [EA900105]	Optional Accessories



Quotation Number :
Project Name : 7 Darnley Road
Item Reference: : Kitchen Extract

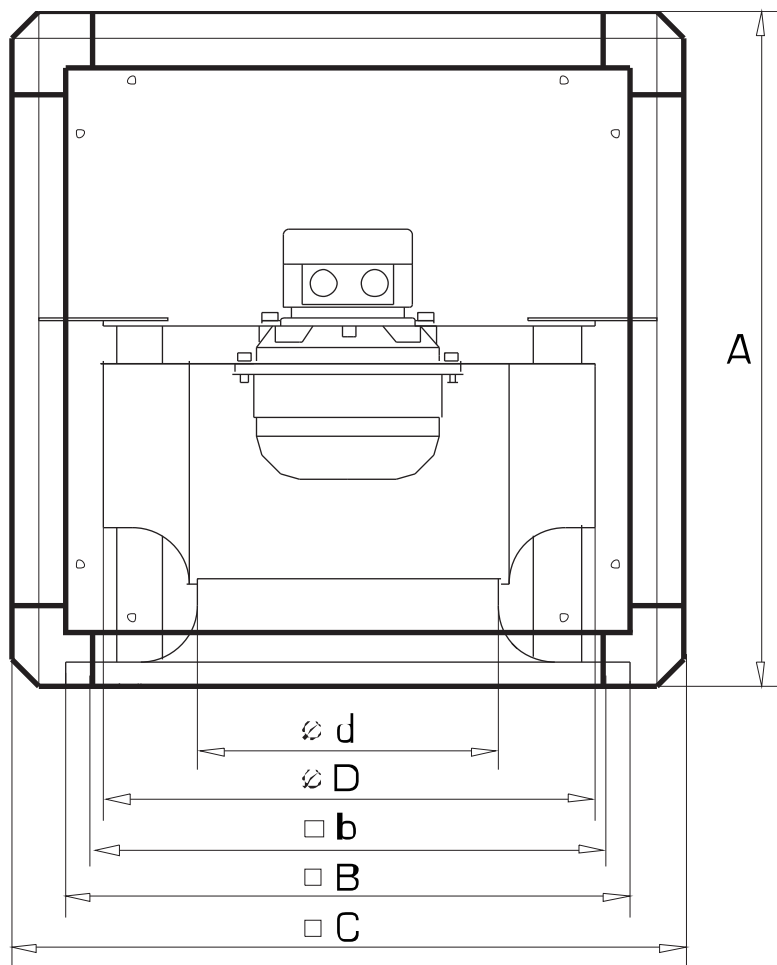
Project Code : AF-23121-1
Customer :
Date: : Thursday, September 22, 2016
Fan Code : Estoc (Power Box) 67-500-1 [Express]





Quotation Number :
Project Name : 7 Darnley Road
Item Reference: : Kitchen Extract

Fan Code : Estoc (Power Box) 67-500-1 [Express]
Customer :
Date: : Thursday, September 22, 2016



A	670
B	620
b	590
C	670
Max Weight (kg)	66
Ø D	504
Ø d	321

Notes : Dimensions shown in mm / Weight in kg

Reference :Catalogue drawing

This drawing shows dimensions that should be used as a guide only and are subject to change. Certified drawings are available on request.

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Sitesafe Discarb Units

General Description

Standard Discarb multipanel carbon units have been in circulation for over 30 years and there are many tens of thousand of units in service today. These filters are very heavy and nearly always installed in situations with very poor access.

With the new appreciation of risk which we have in the 21st Century it has become apparent that these units represent a real danger to health and potentially offer risk in the work place when a filter change is required.

The new Sitesafe Discarb cells provide exactly the same filter performance with a set of filters which will retrofit exactly for an existing full size cell.

Will require two people plus lifting gear to carry and install



Discarb DC242424

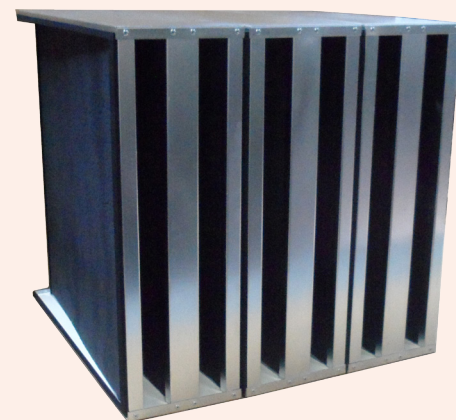
Size 594x594x597
Gross Weight 68.2Kg
Carbon Weight 50kg
Rated Airflow 3800m³/hr*
Pressure Drop 120Pa

Safe for one person to carry, no special lifting gear required.



Sitesafe DCS240824

Size 594x196x597
Gross Weight 17.95Kg
Carbon Weight 16.6kg
Rated Airflow 1266m³/hr*
Pressure Drop 120Pa



Sitesafe 3xDCS240824

Size 594x594x597
Gross Weight 53.85Kg
Carbon Weight 50kg
Rated Airflow 3800m³/hr*
Pressure Drop 120Pa

Standard Sizes

SiteSafe Reference	SiteSafe Cells Needed	Retrofit Discarb	Nominal Size (Inches)	Height (mm)	Width (mm)	Depth (mm)	Weight of Carbon (Kg)	Cell Weight (Kg)	Capacity m³/hr
DCS080624	-	-	8 x 6 x 24	196	149	597	4.1	5.45	320
DCS120618	-	-	12 x 6 x 18	292	146	451	4.5	5.85	340
DCS120824	-	-	12 x 8 x 24	296	196	597	6.5	7.85	495
DCS180912	2	DC181812	18 x 9 x 12	445	220	297	6.5	7.85	495
DCS240612	2	DC241212	24 x 6 x 12	594	146	297	6.5	7.85	990
DCS240812	3	DC242412	24 x 8 x 12	594	196	297	8.4	9.7	633
DCS180918	2	DC181818	18 x 9 x 18	445	220	451	9.5	10.85	722
DCS240618	2	DC241218	24 x 6 x 18	594	146	451	9	10.35	685
DCS240818	3	DC242418	24 x 8 x 18	594	196	451	12	13.35	915
DCS180924	2	DC181824	18 x 9 x 24	445	220	597	12.5	13.85	950
DCS240624	2	DC241224	24 x 6 x 24	594	146	597	12.5	13.85	950
DCS240824	3	DC242424	24 x 8 x 24	594	196	597	16.6	17.95	1266

The above capacities are based on a 0.1 second dwell time. Please refer to the table below for the recommended minimum dwell times required for different applications and scale up accordingly. It should be noted that filtration performance will be improved by increasing the dwell times applied. The appropriate suffix should be added to the part number to specify the required grade e.g. DCS240824-AC

Application	Recommended Dwell Time	Grade	Suffix
Cooking - Low Odour, Tea Shop, Canteens	0.1 to 0.2 Seconds	Carbon grade Enhanced for improved performance for light catering odours	-ACO
Cooking - Moderate Odour. Pizza, Steak House, French, Italian, Pubs, Chinese, Japanese, Cantonese	0.2 to 0.4 Seconds	Enhanced Carbon grade suitable for many applications 65% Minimum CTC	-AC
Cooking High Odour, Indian, Thai, Vietnamese, Kebab	0.4-0.6 Seconds	Enhanced Carbon grade suitable for many applications 65% Minimum CTC	-AC
Cooking Very High Odour. Fried Chicken, Pubs with large fried food turnover, Fish and Chip Shops, Fast Food / Burgers	0.4-0.8 Seconds	Enhanced Carbon grade suitable for many applications 65% Minimum CTC	-AC
Reduction of Kerosene Exhaust fumes	0.1 to 0.2 Seconds	General Purpose Activated Carbon	-ACS
Reduction of Ozone	0.1 to 0.2 Seconds	General Purpose Activated Carbon	-ACS
Reduction of Diesel Fumes, including H ₂ S, SO ₂ , NOX, HCl	0.2 Seconds	Carbon Museum,Archive, Café Directive: SO2 SOX NO2 NOX Removal	-ACU
Museum and Archives	0.2 Seconds	Carbon Museum,Archive, Café Directive: SO2 SOX NO2 NOX Removal	-ACU
Mortuary / formaldehyde reduction	0.4 Seconds	Mortuary Grade, formaldehyde Removal	-ACMO

The cooking odour classes above are as classified by DEFRA in **Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems, PB10527**

Cleanpak CP4

Fire Rated Bag Filter

General Description

The Cleanpak, fire rated range of bag filters are used widely in government buildings, hospitals and other sensitive areas. This grade of filter is suitable for air condition to offices, theatres, computer rooms and spray booths.

Meets NHS HTM03 Filter Specification

Frame

Outer Frame: Metal
Standard depths 20mm or 25mm
Inner Pocket Frames: Galvanised Steel

Filter Media

- Is 100% polyester
- Deep Filtration layered
- Is available any size
- Is totally non toxic and non irritant
- Is very inexpensive
- Is fire retardant
- No Fibre Shedding

Pockets

Each filter pocket is stitched individually.

Benefits

- Increased Filter Life
- Excellent Dust Holding Capacity
- Reduced Disposal Costs
- Elimination of Fibre shedding
- Reduced Energy Costs

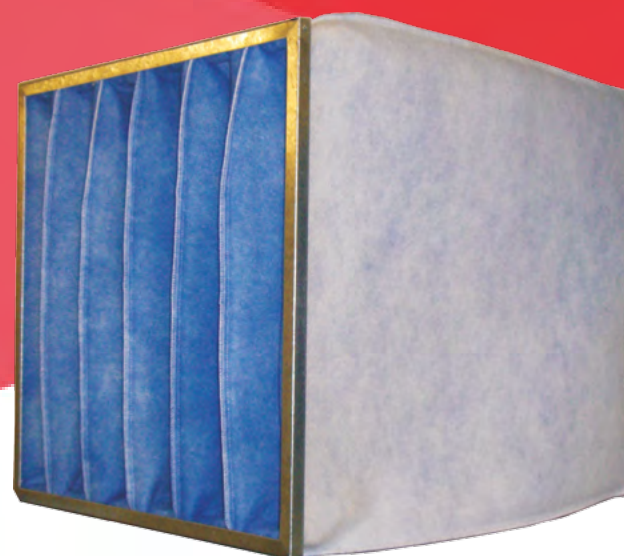
Operating Temperature

Continuous 80 °Centigrade

Performance

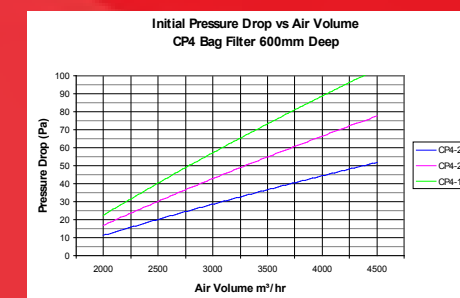
Filter Class EN779:2012 G4
Final Pressure Drop* 250Pa

*this is a recommended value only



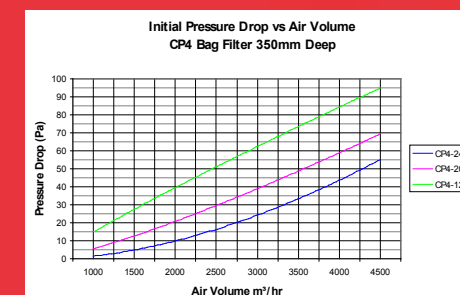
Series 600 - Long Pocket, long Life, High Capacity Configuration

Part Number	Header Dimensions			Pocket Details		Capacity m³/hr
	Height (mm)	Width (mm)	Thickness (mm)	Depth (mm)	No. of Pockets	
CP4-12L-3	592	287	20	600	3	2000
CP4-20L-4	592	492	20	600	4	3460
CP4-24L-6	592	592	20	600	6	4200



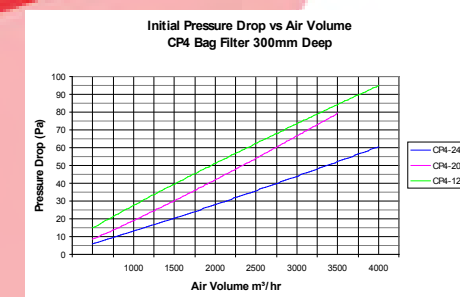
Series 350 - Low Initial Pressure Drop Configuration

Part Number	Header Dimensions			Pocket Details		Capacity m³/hr
	Height (mm)	Width (mm)	Thickness (mm)	Depth (mm)	No. of Pockets	
CP4-12S-3	592	287	20	350	3	1500
CP4-20S-4	592	492	20	350	4	2500
CP4-24S-6	592	592	20	350	6	3100



Series 300 - Economy Configuration

Part Number	Header Dimensions			Pocket Details		Capacity m³/hr
	Height (mm)	Width (mm)	Thickness (mm)	Depth (mm)	No. of Pockets	
CP4-1212	592	287	20	300	2	1000
CP4-2012	592	492	20	300	3	1800
CP4-2412	592	592	20	300	4	2100



Filter Classification to EN 779:2012		G4
Pocket Depth	Rated Airflow	Initial Pressure Drop
300mm	1.70m/sec	30Pa
355mm	2.46m/sec	30Pa
600mm	3.30m/sec	50Pa
Maximum Final Recommended Pressure Drop		250Pa
Minimum Velocity required		2m/sec

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Flakt Woods Limited

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Index	Description	Type	Bore dia	Length	Melinex	63	125	250	500	1000	2000	4000	8000
1	B1D x 280	B	280	1D	-	1	1	2	8	11	8	8	7
2	B2D x 280	B	280	2D	-	1	2	4	10	13	10	10	9
3	B1DM x 280	B	280	1D	M	1	1	2	6	8	6	6	5
4	B2DM x 280	B	280	2D	M	1	2	3	8	9	7	7	6
5	B1D x 315	B	315	1D	-	1	2	4	9	11	10	9	7
6	B2D x 315	B	315	2D	-	1	2	5	11	16	12	11	10
7	B1DM x 315	B	315	1D	M	1	2	3	7	8	7	6	5
8	B2DM x 315	B	315	2D	M	1	2	4	8	11	8	8	7
9	B1D x 355	B	355	1D	-	1	2	4	10	12	10	9	7
10	B2D x 355	B	355	2D	-	2	3	6	13	17	14	11	11
11	B1DM x 355	B	355	1D	M	1	2	3	8	8	7	6	5
12	B2DM x 355	B	355	2D	M	2	3	5	10	12	10	8	8
13	B1D x 400	B	400	1D	-	2	3	5	10	13	11	9	8
14	B2D x 400	B	400	2D	-	3	4	7	14	18	15	11	12
15	B1DM x 400	B	400	1D	M	2	3	4	8	9	8	6	6
16	B2DM x 400	B	400	2D	M	3	4	6	11	13	11	8	8
17	B1D x 450	B	450	1D	-	2	3	6	12	13	11	10	6
18	B2D x 450	B	450	2D	-	3	4	8	17	18	15	11	11
19	B1DM x 450	B	450	1D	M	2	3	5	9	9	8	7	4
20	B2DM x 450	B	450	2D	M	3	4	6	13	13	11	8	8
21	B1D x 500	B	500	1D	-	2	3	6	13	14	10	10	5
22	B2D x 500	B	500	2D	-	3	4	8	19	18	14	11	10
23	B1DM x 500	B	500	1D	M	2	3	5	10	10	7	7	4
24	B2DM x 500	B	500	2D	M	3	4	6	14	13	10	8	7
25	B1D x 560	B	560	1D	-	2	4	7	14	14	9	10	7
26	B2D x 560	B	560	2D	-	3	5	9	19	18	14	12	11
27	B1DM x 560	B	560	1D	M	2	4	6	11	10	6	7	5
28	B2DM x 560	B	560	2D	M	3	5	7	14	13	10	8	8
29	B1D x 630	B	630	1D	-	2	5	7	15	13	8	9	8
30	B2D x 630	B	630	2D	-	4	6	9	19	19	14	13	12
31	B1DM x 630	B	630	1D	M	2	5	6	11	9	6	6	6
32	B2DM x 630	B	630	2D	M	4	5	7	14	13	10	9	8
33	B1D x 710	B	710	1D	-	3	5	7	15	13	9	9	8
34	B2D x 710	B	710	2D	-	4	6	9	19	17	13	12	11
35	B1DM x 710	B	710	1D	M	3	5	6	11	9	6	6	6
36	B2DM x 710	B	710	2D	M	4	5	7	14	12	9	8	8
37	B1D x 800	B	800	1D	-	3	5	8	16	12	9	9	8
38	B2D x 800	B	800	2D	-	4	6	10	19	15	12	11	10
39	B1DM x 800	B	800	1D	M	3	5	6	12	8	6	6	6
40	B2DM x 800	B	800	2D	M	4	5	8	14	11	8	8	7
41	B1D x 900	B	900	1D	-	3	5	10	17	13	11	10	8
42	B2D x 900	B	900	2D	-	4	6	12	19	15	12	11	10
43	B1DM x 900	B	900	1D	M	3	5	8	13	9	8	7	6
44	B2DM x 900	B	900	2D	M	4	5	10	14	11	8	8	7
45	B1D x 1000	B	1000	1D	-	4	5	11	16	11	10	8	9
46	B2D x 1000	B	1000	2D	-	4	6	13	19	14	12	11	11
47	B1DM x 1000	B	1000	1D	M	4	5	9	12	8	7	6	6
48	B2DM x 1000	B	1000	2D	M	4	5	10	14	10	8	8	8
49	B1D x 1120	B	1120	1D	-	4	5	11	17	11	9	8	8
50	B2D x 1120	B	1120	2D	-	4	6	13	19	14	12	11	8
51	B1DM x 1120	B	1120	1D	M	4	5	9	13	8	6	6	6
52	B2DM x 1120	B	1120	2D	M	4	5	10	14	10	8	8	6
53	B1D x 1250	B	1250	1D	-	4	6	12	17	10	9	8	7
54	B2D x 1250	B	1250	2D	-	4	6	14	19	14	11	11	9
55	B1DM x 1250	B	1250	1D	M	4	5	10	13	7	6	6	5
56	B2DM x 1250	B	1250	2D	M	4	5	11	14	10	8	8	6

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Index	Description	Type	Bore dia	Length	Melinex	63	125	250	500	1000	2000	4000	8000
57	B1D x 1400	B	1400	1D	-	4	6	12	16	10	8	7	6
58	B2D x 1400	B	1400	2D	-	4	7	14	18	13	10	10	8
59	B1DM x 1400	B	1400	1D	M	4	5	10	12	7	6	5	4
60	B2DM x 1400	B	1400	2D	M	4	6	11	14	9	7	7	6
61	B1D x 1600	B	1600	1D	-	4	7	12	16	10	8	7	6
62	B2D x 1600	B	1600	2D	-	4	8	15	18	12	10	9	7
63	B1DM x 1600	B	1600	1D	M	4	6	10	12	7	6	5	4
64	B2DM x 1600	B	1600	2D	M	4	7	12	14	8	7	6	5
65	C1D x 315	C	315	1D	-	2	5	5	9	18	20	18	15
66	C2D x 315	C	315	2D	-	2	6	6	12	20	25	20	17
67	C1DM x 315	C	315	1D	M	2	5	5	7	13	15	13	11
68	C2DM x 315	C	315	2D	M	2	5	6	10	18	19	15	12
69	C1D x 355	C	355	1D	-	2	5	6	9	18	22	19	16
70	C2D x 355	C	355	2D	-	2	6	7	13	25	27	21	17
71	C1DM x 355	C	355	1D	M	2	5	5	8	13	17	14	12
72	C2DM x 355	C	355	2D	M	3	6	6	11	20	20	16	13
73	C1D x 400	C	400	1D	-	2	6	6	10	19	24	20	17
74	C2D x 400	C	400	2D	-	3	7	8	14	29	29	23	18
75	C1DM x 400	C	400	1D	M	2	4	6	10	14	16	15	12
76	C2DM x 400	C	400	2D	M	2	5	7	12	20	20	15	14
77	C1D x 450	C	450	1D	-	2	4	7	13	20	23	22	17
78	C2D x 450	C	450	2D	-	2	5	9	16	29	29	21	20
79	C1DM x 450	C	450	1D	M	2	3	6	12	15	15	15	12
80	C2DM x 450	C	450	2D	M	2	4	8	15	20	21	14	18
81	C1D x 500	C	500	1D	-	2	3	8	16	21	22	21	17
82	C2D x 500	C	500	2D	-	2	4	10	20	29	30	20	26
83	C1DM x 500	C	500	1D	M	3	5	6	12	14	13	13	11
84	C2DM x 500	C	500	2D	M	4	5	8	15	20	20	15	16
85	C1D x 560	C	560	1D	-	3	5	8	16	20	18	19	15
86	C2D x 560	C	560	2D	-	4	5	10	20	29	28	21	23
87	C1DM x 560	C	560	1D	M	3	5	6	11	13	11	10	8
88	C2DM x 560	C	560	2D	M	5	5	8	14	20	18	15	14
89	C1D x 630	C	630	1D	-	3	5	8	15	19	16	14	12
90	C2D x 630	C	630	2D	-	5	6	10	19	29	25	21	20
91	C1DM x 630	C	630	1D	M	3	5	6	11	13	11	10	8
92	C2DM x 630	C	630	2D	M	5	5	8	15	18	16	13	12
93	C1D x 710	C	710	1D	-	3	5	8	15	19	15	14	12
94	C2D x 710	C	710	2D	-	5	6	10	20	26	23	18	17
95	C1DM x 710	C	710	1D	M	4	5	6	12	13	11	10	9
96	C2DM x 710	C	710	2D	M	5	6	9	17	16	15	11	10
97	C1D x 800	C	800	1D	-	4	5	8	16	19	15	14	13
98	C2D x 800	C	800	2D	-	5	7	11	22	23	21	16	14
99	C1DM x 800	C	800	1D	M	4	5	7	13	13	11	10	9
100	C2DM x 800	C	800	2D	M	5	6	10	18	16	15	11	11
101	C1D x 900	C	900	1D	-	4	5	9	17	19	15	14	13
102	C2D x 900	C	900	2D	-	5	7	12	24	23	21	16	15
103	C1DM x 900	C	900	1D	M	5	5	9	14	13	11	10	9
104	C2DM x 900	C	900	2D	M	5	6	10	20	17	14	11	11
105	C1D x 1000	C	1000	1D	-	5	5	11	18	19	15	14	13
106	C2D x 1000	C	1000	2D	-	5	7	13	26	24	20	16	16
107	C1DM x 1000	C	1000	1D	M	5	6	9	14	13	10	9	8
108	C2DM x 1000	C	1000	2D	M	5	7	10	19	16	13	11	9
109	C1D x 1120	C	1120	1D	-	5	7	11	19	18	14	13	12
110	C2D x 1120	C	1120	2D	-	5	8	13	25	23	18	16	13
111	C1DM x 1120	C	1120	1D	M	5	7	10	14	12	10	8	7
112	C2DM x 1120	C	1120	2D	M	5	7	11	19	12	12	12	8

Flakt Woods Limited

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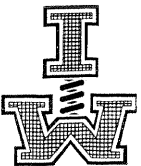
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Index	Description	Type	Bore dia	Length	Melinex	63	125	250	500	1000	2000	4000	8000
113	C1D x 1250	C	1250	1D	-	5	8	12	19	17	14	12	10
114	C2D x 1250	C	1250	2D	-	5	8	14	25	17	17	17	12
115	C1DM x 1250	C	1250	1D	M	5	7	10	14	11	9	8	6
116	C2DM x 1250	C	1250	2D	M	5	8	12	17	15	12	11	7
117	C1D x 1400	C	1400	1D	-	5	8	12	18	16	13	11	9
118	C2D x 1400	C	1400	2D	-	5	9	15	23	22	17	15	10
119	C1DM x 1400	C	1400	1D	M	5	7	10	13	11	9	8	6
120	C2DM x 1400	C	1400	2D	M	5	9	14	16	14	12	10	6
121	C1D x 1600	C	1600	1D	-	5	8	13	17	16	13	11	8
122	C2D x 1600	C	1600	2D	-	6	10	17	21	20	17	14	9
123	C1DM x 1600	C	1600	1D	M	5	7	10	13	11	9	8	6
124	C2DM x 1600	C	1600	2D	M	5	9	14	16	14	12	10	6

Noise reduction using 2 x silencers as per spec

HZ	125	250	500	1k	2k	4k	8k
Inlet	74	79	74	71	68	65	58
Outlet	77	79	76	78	71	67	60
Breakout	74	70	59	55	45	39	33
Silencer loss	4	6	14	13	10	8	7
New Inlet	70	73	60	58	58	57	51
New Outlet	73	73	62	65	61	59	53
New Breakout	70	64	45	42	35	31	26



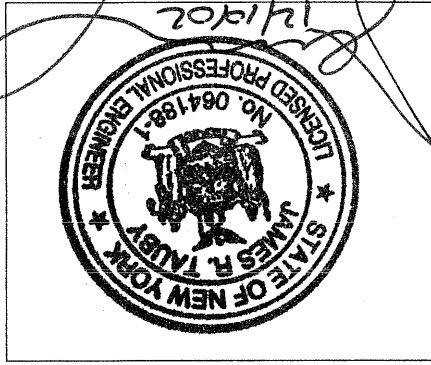
MASON INDUSTRIES, Inc.
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Hanger Box Safety Factors

DATE: 12-10-02 DRAWING NO. A-27775

Hanger Box	Spring Capacity lbs	Tensile Safety Factor	Compression Safety Factor
30N-X	210	10	3.6
30N-A	95	123	20.5
30N-B	540	21	3.0
30N-C	1265	14	1.6
30N-D	2150	9	4.4
30N-F	2750	5	4.3
30-X	210	9	4.1
30-A	95	62	23.0
30-B	540	31	2.7
30-C	1265	5	2.5
30-D	2150	9	4.4
30-F	2750	5	4.3
DNHS-X	210	10	3.6
DNHS-A	625	18	2.8
DNHS-B	1000	13	2.3
DNHS-1	2935	6	2.5
DNHS-2	5870	11	2.1
DNHS-4	11740	5.3	2.3
HS-X	210	9	4.1
HS-A	625	9	3.5
HS-B	1000	16	1.5
HS-1	2935	4	1.1
HS-2	5870	7	1.9
HS-4	11740	5	1.6
HD	75	43	6.3
HD-A	125	32	5.1
HD-B	650	15	3.9
HD-BS	1000	17	2.3
HD-CS	2100	9	1.2
HD-DS	4200	5	1.0

The above are certified safety factors based on testing. The safety factors are based on the capacity of the largest spring that normally goes into the box. Certified by, James R. Tauby P.E.



DATE: 12-10-02

CHKD:

DWN: JT

PRESSURE CALCULATIONS

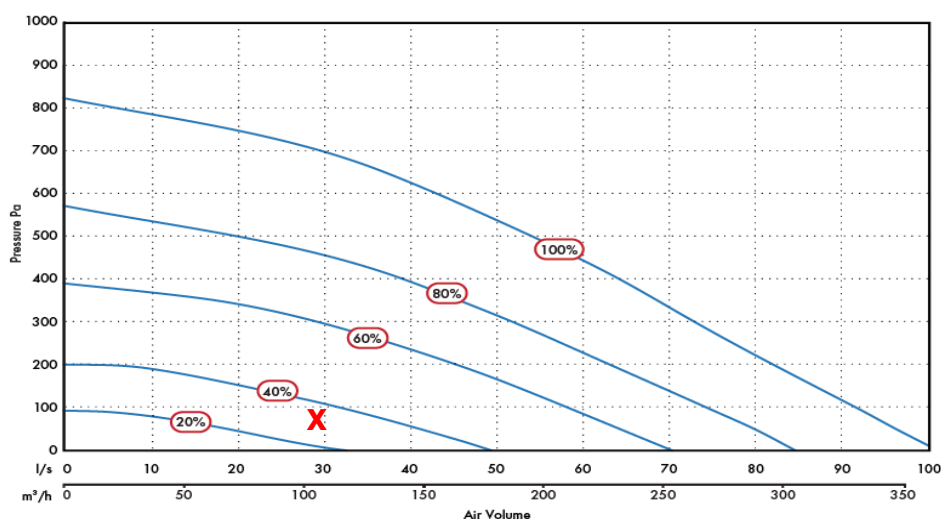
The following are our calculations based on the design shown on drawing SV3198-01 to check if the proposed system can achieve the flow rates required.

Index duct run is the Kitchen vent extract on boost speed running to fan and exhaust to exterior.

Extract Run, Airvent to Fan	Component Size	Flow Rate (l/s)	Resistance (Pa)
Kitchen Adjustable Airvent	125mm Ø	13.0	18.0
1m of Straight Duct	125mm Ø	13.0	0.2
2m of Straight Duct	204x60mm	13.0	1.0
0.5m of Straight Duct	125mm Ø	21.0	0.2
0.5m of Straight Duct	125mm Ø	29.0	0.3
Straight Connector x2	204x60mm	13.0	0.2
45° Vertical Bend x2	204x60mm	13.0	1.1
90° Bend x1	125mm Ø	13.0	2.0
90° Bend x1	125mm Ø	29.0	8.4
Tee (Bathroom vent joins)	125mm Ø	21.0	10.0
Tee (Shower Vent joins)	125mm Ø	29.0	16.8
Straight Adaptor x2	204x60 ⇒ 125mm Ø	13.0	0.9
Flex down to fan	125mm Ø	29.0	2.0
		Sub Total	61.0

Exhaust Run, Fan to Exterior	Component Size	Flow Rate (l/s)	Resistance (Pa)
Flex up from fan	125mm Ø	29.0	2.0
1m of Straight Duct	125mm Ø	29.0	0.7
90° Bend x2	125mm Ø	29.0	16.8
Roof Vent	150mm Ø	29.0	5.5
		Sub Total	25.0

Total Pa (@ 29 l/s or 104.4 m3/h)	86.0
--	-------------



The calculations show that the system pressure is within the Fan curve, and therefore will achieve the required flow rates

Unit Running Cost

SV NO: SV3198

DATE: 27/09/16

PROJECT: PLOT N7, 7 DARNLEY ROAD, GRAVESEND, KENT DA11 0RU

CUSTOMER: STEFAN APOSTOL

	Flow Rate l/s	SFP W/l/s	Electrical Consumption kWh/year	Electrical COST £/yr at 16p/kWh	Temp. Efficiency %	Energy Recovered kWh/year	Value of energy RECOVERED £/yr at 6p/kWh	Cost £/annum
Vent-Axia Sentinel Kinetic FH	13	0.51	58	£9.29	89	1,511	£90.66	£81.37

Assumptions:

- 1) Time spent at "Boost" speed has been disregarded for both electricity used and energy recovered.
- 2) Properties are gas heated
- 3) Price of electricity 16p/kWh
- 4) Price of gas at 6p/kWh
- 5) The Specific Fan Powers are from the SAP Appendix Q database and assumes the installed system resistance is the same as in that test.

NOTES:

Temperature efficiency is very predictable based on the two air flows through the heat recovery cell.

Specific fan power is very dependent on the quality of installation.

Using data from SAP Appendix Q test date

Sentinel Kinetic FH hyperlink: <http://www.ncm-pcdb.org.uk/sap/pcdbdetails.jsp?pid=34&id=500472&type=323&mid=020002>

Unit Energy Recovered

SV NO: SV3198

DATE: 27/09/16

PROJECT: PLOT N7, 7 DARNLEY ROAD, GRAVESEND, KENT DA11 0RU

CUSTOMER: STEFAN APOSTOL

Assumptions:

3 months with indoor temperature 20C and outdoor temperature 5C

6 months with indoor temperature 20C and outdoor temperature 12C

3 months with no heat recovery

(NB SAP Appendix Q test is with 25C indoor temperature and 5C outdoor temperature)

Sentinel Kinetic FH	Description
29	l/s (Boost Rate)
5	C, Outdoor temperature
20	C, Indoor temperature
89%	temperature efficiency
18.4	Supply temperature
1.005	Cp dry air at 20C, kJ/kg K
1.2	Density of air at 20C, kg/m3
467	Energy recovered, W
13	l/s (Trickle Rate)
12	C, Outdoor temperature
20	C, Indoor temperature
89%	temperature efficiency
19.1	Supply temperature
1.005	Cp dry air at 20C, kJ/kg K
1.2	Density of air at 20C, kg/m3
112	Energy recovered, W
1511	Total per annum, kWh

Unit Sound Levels

SV NO: SV3198

DATE: 27/09/16

PROJECT: PLOT N7, 7 DARNLEY ROAD, GRAVESEND, KENT DA11 0RU

CUSTOMER: STEFAN APOSTOL

		Octave band, Hz, dB SWL								
Unit setting (%)	Test mode	63	125	250	500	1k	2k	4k	8k	Total dB(A) @ 3m
100%	Extract	83.3	68.3	66.9	71.2	60.7	51.4	42.4	36.1	52.2
	Supply	95.5	77.7	74.0	80.4	68.7	62.9	56.9	52.4	61.6
	Breakout	62.1	59.7	62.9	70.0	61.0	57.3	52.3	46.9	47.5
80%	Extract	83.5	65.2	65.0	65.5	57.0	47.7	37.9	31.3	48.0
	Supply	85.0	75.3	72.5	77.9	65.3	58.8	52.1	47.4	58.5
	Breakout	56.4	56.4	60.4	69.8	56.7	53.2	47.8	42.0	46.0
60%	Extract	67.3	61.9	66.5	58.9	52.2	42.7	32.6	27.6	43.6
	Supply	72.8	72.5	82.2	64.4	59.9	53.8	46.2	40.3	56.9
	Breakout	53.9	53.2	65.9	55.8	52.2	48.2	42.5	39.3	40.5
40%	Extract	66.8	56.1	56.9	52.1	44.7	34.6	23.8	25.8	35.7
	Supply	68.9	66.4	68.8	57.8	52.1	44.9	35.3	28.8	44.9
	Breakout	47.3	47.5	56.4	48.0	44.0	39.6	32.8	29.1	30.5
20%	Extract	57.7	56.6	47.2	43.5	35.3	24.1	19.6	25.7	28.2
	Supply	66.2	67.2	54.3	48.0	42.1	33.3	22.5	25.6	36.4
	Breakout	41.2	47.0	41.7	39.5	34.6	30.4	22.5	25.7	20.5

Tested according to BS848. Breakout quoted spherical. Supply and extract quoted hemispherical

EXTRACT	Required Boost (l/s)	Required Trickle (l/s)
Kitchen	13.0	5.8
Bathroom	8.0	3.6
Shower	8.0	3.6
Total	29.0	13.0
SUPPLY	Required Boost (l/s)	Required Trickle (l/s)
Lounge	15.8	7.1
Bedroom	13.2	5.9
Total	29.0	13.0
(Above flow rates based on dwelling design Air Permeability less than 5m3/(h.m2) @ 50pa. If more than 5, the trickle rates will be lower).		

NOTES

THIS SYSTEM HAS BEEN DESIGNED TO COMPLY WITH THE 2010 BUILDING REGULATIONS PART F -MEANS OF VENTILATION.

AS SUCH THE SYSTEM MUST BE INSTALLED AND COMMISSIONED AS PER THE DESIGN SPECIFICATION TO ENSURE COMPLIANCE WITH THE ABOVE MENTIONED.

ADDITIONALLY THE COMMISSIONED SYSTEM MUST COMPLY WITH THE 17th EDITION IEE BS7671 PART 7 (ADDITIONAL WORKS).

THE DESIGN IS SUBJECT TO COPYRIGHT AND MUST NOT BE ALTERED, AMENDED OR INCORPORATED IN ANYWAY WHATSOEVER. NOR SHALL IT BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE EXPRESS PERMISSION OF SERVICE VENT VENTILATION SPECIALISTS.

- LEGEND
- Stale/Moist Air Extract - RED DUCT
- Pre-Warmed Fresh Air Supply -BLUE DUCT
1. VENT-AXIA SENTINEL KINETIC FH MVHR UNIT VERTICALLY MOUNTED WITHIN THE STORE AS INDICATED ON THE DRAWING.
 2. UNIT IS TO RUN AT CONTINUOUS TRICKLE WITH BOOST BEING ACTIVATED VIA A WIRELESS CONTROLLER AND INTEGRAL HUMIDISTAT.
 3. THE SYSTEM UTILISES 125mmØ AND 204x60mm RIGID PLASTIC DUCTING INTERCONNECTING TO 125mmØ CEILING MOUNTED ADJUSTABLE DIFFUSERS. FINAL CONNECTION TO THE UNIT AND DIFFUSERS TO BE VIA FLEXIBLE DUCTING (UNIT=INSULATED, EXTRACT DIFFUSER=PVC, SUPPLY DIFFUSER=ACOUSTIC).
 4. EXHAUST AND INTAKE DUCTING TO AND FROM ATMOSPHERE IS TO BE DUCTED VIA 125mmØ PRE-INSULATED RIGID PLASTIC DUCTING TO EXTERNAL ROOF VENT TERMINATIONS. FINAL POSITION TO BE ESTABLISHED ON SITE. TERMINALS TO HAVE A MINIMUM SEPARATION DISTANCE OF ONE METRE.
 5. THE UNIT REQUIRES A CONDENSATE DRAIN TO RUN TO THE NEAREST INTERNAL WASTE SYSTEM.
 6. THE DESIGN ASSUMES THE CEILING VOIDS ARE SUFFICIENT TO ACCOMMODATE THE DUCTING.

A	27.09.16	GR	Duct layout revised as no access to ground floor ceiling voids
ORIG	19.09.16	GR	Drawing issued for approval
Ref	Date	Dgnr	Details



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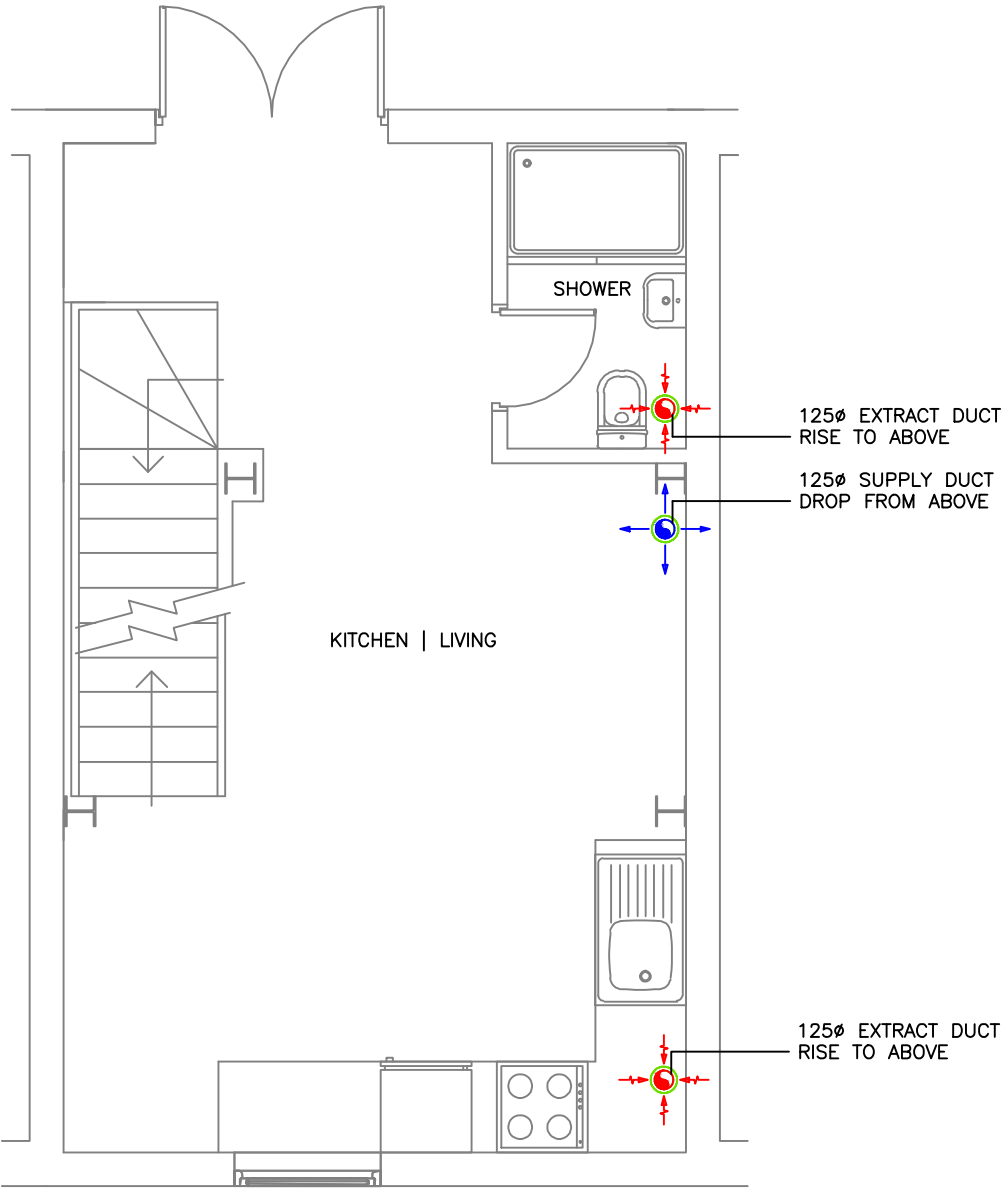
Project
Plot N7, 7 Darnley Road,
Gravesend, Kent DA11 0RU

Client
Stefan Apostol

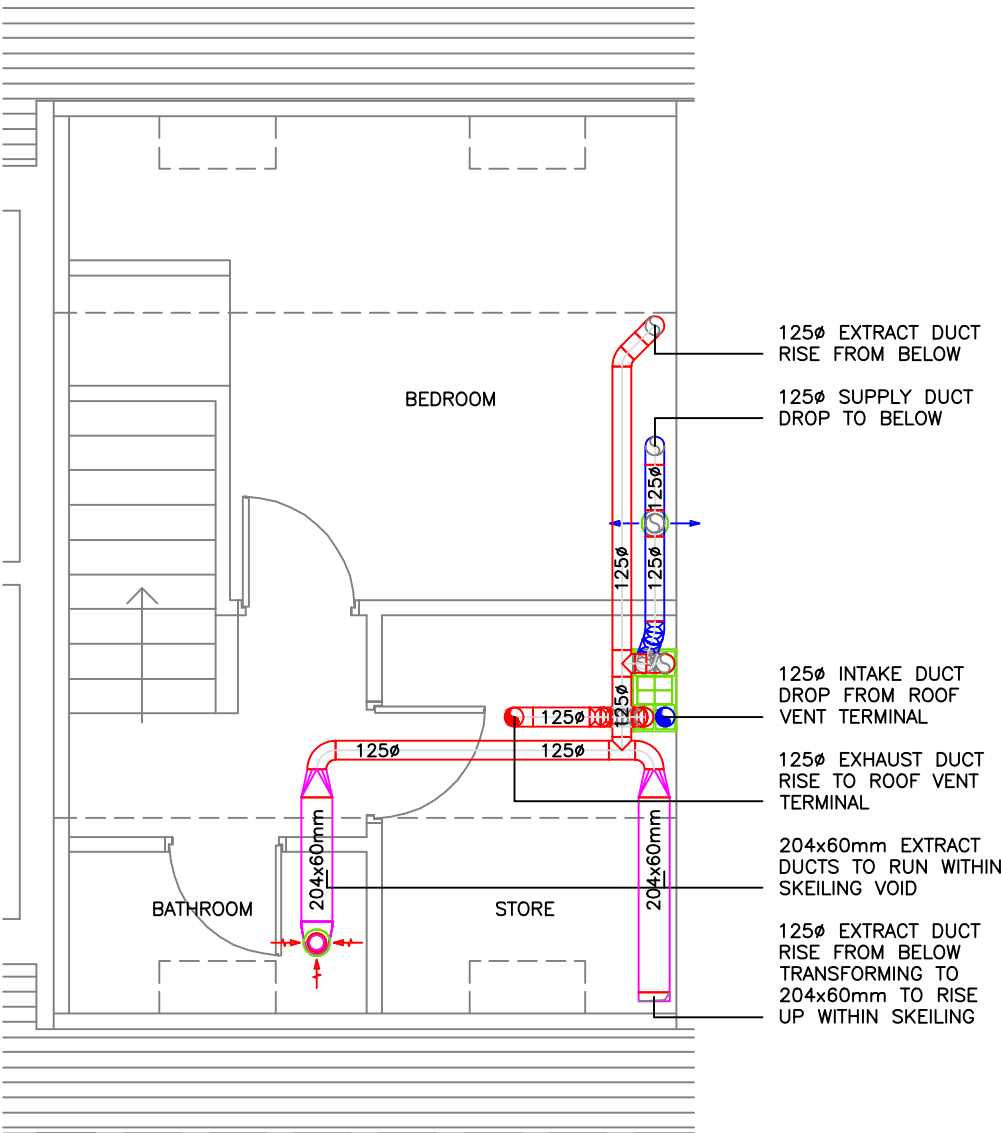
Drawing
MVHR Ventilation Layout

Drawn GR Scale 1:50@A3 Date 19.09.16

Drawing No. SV3198-01	Sheet No. 1	Revision A
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GROUND FLOOR PLAN



FIRST FLOOR PLAN