

# Performance Specification for the Heating Ventilation and Air Conditioning of the Proposed Gail's



**March 2016**

## Design Overview

Chapman Ventilation will design, manufacture, deliver, install, test and commission the ventilation, heating and air conditioning systems for the proposed Gail's restaurant as detailed on the Design Drawings.

Taking into account good working practice and 40 years of experience we design summer temperatures to be 6 degrees C below external ambient, this eliminates the "chill factor" often associated with American shopping malls where you need a coat to go into the air conditioned shops, and more often now in the UK the use of oversized A/C units and poor design.

Equally, winter temperatures are designed to give comfort given customers will require an ambient internal temperature to suit their winter attire.

Design criteria is as follows:

|                                        |                                     |
|----------------------------------------|-------------------------------------|
| Maximum external temperature 30 deg C  | Front of house temperature 24 deg C |
|                                        | Back of house temperature ambient   |
| Minimum external temperature – 4 deg C | Front of house temperature 20 deg C |
|                                        | Back of house temperature ambient   |
| Fresh air provision per person         | 10 l/s                              |
| Kitchen Canopy Extract rate            | 0.8 m3/s                            |
| Kitchen/Restaurant/BoH Supply Air      | 0.8 m3/s                            |
| Toilet ventilation                     | 80 l/s                              |

# Kitchen Extract

Design Extract Duty: 0.8m<sup>3</sup>/s

## Canopies

The kitchen cookline canopy will be manufactured by Sirius Products Ltd, model type 1400 x 1200 x 555. The Canopy is to incorporate "capture and containment" technology. The canopy will have will have 2no. 400 x 200mm spigots that will connect to the 400dia extract header and 2 no. 200 dia spigots at the front where fresh air supply can be connected and diffused through the front face.

Dishwash condense canopy will be of stainless steel construction, 1.6mm thick.

## Kitchen Extract Fan

The extract fan will be manufactured by Helios model type Gigabox GBW500-1-4. A fully speed controllable boxed backward curved centrifugal fan 0.8 m<sup>3</sup>/s at the pressure required by the system. The unit will be mounted on A/V mounts and have flexible connections on the inlet/outlet to reduce noise/vibration transmission through the ductwork.

The fan is to be controlled via a stepped speed controller located in agreement with the architect.

## Odour Control

In order to minimise cooking smells a carbon filters unit will be installed within the kitchen extract ductwork. The unit consists of a pre-filter followed by 2 no. 600 x 600 carbon blocks giving a dwell time of 0.2 seconds (technical literature attached).

## Ductwork

All ductwork will be manufactured and installed to DW 144 specification for sheet metal ductwork as produced by the HVCA. The ductwork will, where building construction permits, will be 400dia.

Every 1.5m or where restricted as near as possible and every change of direction, an access door suitable for the duct size will be installed to allow for cleaning.

The ductwork will pass through the location of the extract fan and terminate either at high level through an accelerator or through a 1000 x 600 louvre (50% free area).

## Toilet Extract

We will provide a toilet extract system to all toilets. Our design is for 20 ACH per toilet which exceeds the recommended rate but in our experience eliminates the odours sometimes found in public toilets. A Systemair K100L fan (or equivalent) should be used providing a duty of 80 l/s.

The termination of the system shall either be at high level or through a 300 x 300 louvre.

### Ductwork

All ductwork will be manufactured and installed to DW 144 specification for sheet metal ductwork as produced by the HVCA.

### Grilles

Each toilet will have 1 no. 100dia Lindab type CRL valve located directly above the toilet connected to the toilet extract header via grey PVC ducting. The male urinals will have 1 no. 150 dia Lindab CRL type valve located centrally to extract from this area.

## Restaurant Air Conditioning

The air conditioning to the restaurant will be provided by 2no. Toshiba Cassette units connected to 2no. RAV-SM1403AT-E single height condenser units connected to corresponding cassettes located in agreed position with the architect, each with a cooling load of 12.1 Kw. Within an operating range of -15 to +43 and a heating load of 12.8 Kw Within an operating range of -15 to +15.

The units will be controlled via return air temperature sensors with temperature controllers. The wired remote controllers will be type Toshiba RBC-AMS41-E.

Each unit will operate using re-circulated air and 20% air supplied via the fresh air system.

## Fresh air

There will be a fresh air, air handling unit located internally or at roof level manufactured by Helios Gigabox GBW500-1-4 (or equivalent) providing un tempered air to the kitchen canopy, servery, restaurant and all back of house areas.

The 400dia air intake shall be via a 1000 x 600 louvre (50% free area) or direct from and external intake.

The unit will supply 0.8 m<sup>3</sup>/s which when taken with all the extract systems will provide 85% of the required air to the building. The remaining 15% will be through natural infiltration keeping the building under slight negative pressure. SFP for fan = 0.57 w/l/s

### Ductwork

All ductwork will be manufactured and installed to DW 144 specification for sheet metal ductwork as produced by the HVCA. As the ductwork is running in the void and above the ceiling we would not propose to insulate it.

### Grilles

The office and other back of house areas will have Lindab CRL diffusers connected via grey PVC ducting.

## Over Door Heater

Install a Thermoscreen type C1000NT electric door curtain, controlled via a controller located in agreed position with the architect.

## Controls

To enable the system to be functional we require the following power supplies to be provided foc to chapman ventilation adjacent to the plant, as detailed below.

Power to be provided by the site electricians:

1. 2 x 25 amp single phase supplies for comfort cooling/heating condensers
2. 1 x 20 amp single phase supply for kitchen extract fan
3. 1 x 20 amp single phase supply for supply air fan
4. 1 x 5 amp single phase supply for toilet extract fan
5. 1 x 15 amp 3 phase supply for door curtain

## Commissioning

On completion, balance and commission each system to give the design requirements. Record and demonstrate if required, the performance of each system and record all data, which will be filed in the Operating and Maintenance Manual, which will be issued at handover.

Provide a laminated “layman’s” guide to each piece of equipment, which the builder must fix to the nearest wall/surface to enable non-technical people to understand the operation of the equipment.

Along with this, supply as fitted drawings in a plastic sleeve to be fixed on the plant room wall by the builder.

On completion walk through the system with the client’s representatives and demonstrate the day-to-day operation of the HVAC along with any local remedial actions that can be taken.

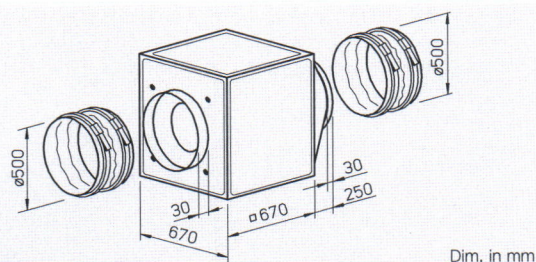
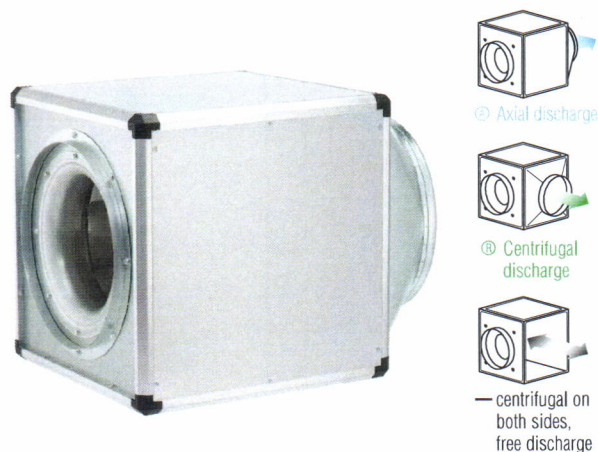
## Technical Literature

Please see attached.



**Models GB..**

Arbitrary installation position and flexible assembly by five possible discharge directions.

**■ Special features of type GB.. T120**

- Designed for moving dirty, humid and hot air volumes up to max. 120° C.
- Motor located outside of air flow.
- Temperature insulated partition panel between motor and impeller, lined with 20 mm thick, flame-retardant mineral wool.
- Easily accessible motor and impeller unit, removable without disassembling the system components.
- Inspection cover with handle, simply remove for cleaning and maintenance.
- Condensate collector with delivery. Drill hole for rain drainage (accessories) for outdoor installation is prepared.

**□ Assembly of types GB.. T120**

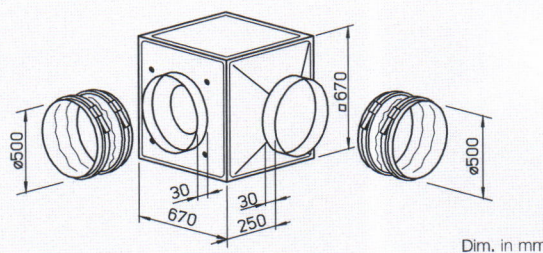
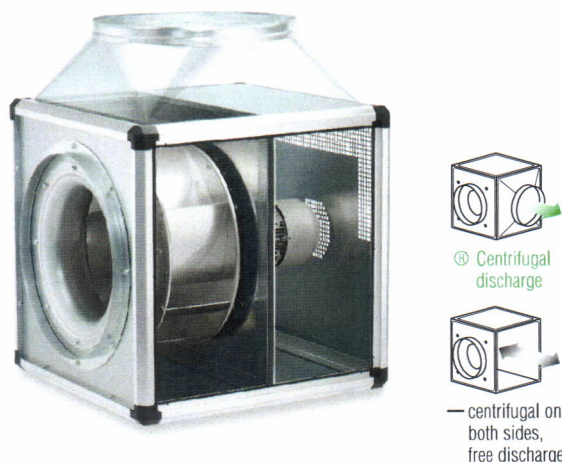
Installation must be carried out with condensation discharge showing downward. Flexible assembly by three possible centrifugal discharge directions via the discharge adapter. Outdoor installation is possible using outdoor cover hood and external weather louvers (accessories).

**■ Feature**

**□ Assembly of types GB..**  
Arbitrary installation position and flexible assembly by five possible discharge directions via the discharge adapter. For wall mounting the wall bracket (accessories) has to be used. Outdoor installation is possible using outdoor cover hood and external weather louvers (accessories).

**Models GB.. T120****NEW!**

Designed for moving dirty, humid and hot air up to max. 120° C.

**■ Specification of both types****□ Casing**

Self-supporting frame construction from aluminium hollow profiles. Double-walled side panels from galvanised sheet steel, lined with 20 mm thick temperature insulating and flame-retardant mineral wool. Intake cone for ideal inflow as well as spigot and flexible sleeve (for the respective max. permissible air flow temperature) for duct connection. With discharge adapter (from square to circular) on the pressure side for low-loss discharge and flexible sleeve to reduce vibration transmission. Simple positioning by standard crane hooks.

**□ Impeller**

Smooth running backward curved aluminium hollow profile impeller highly efficient and direct driven. Energy efficient with a low noise development. Dynamically balanced together with the motor to DIN ISO 1940 Pt.1 – class 6.3.

**□ Motor**

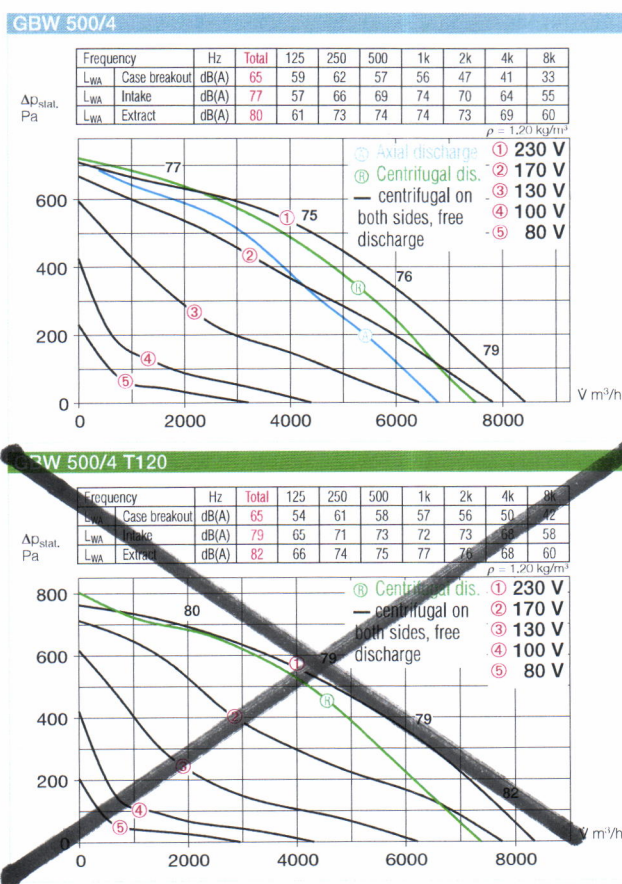
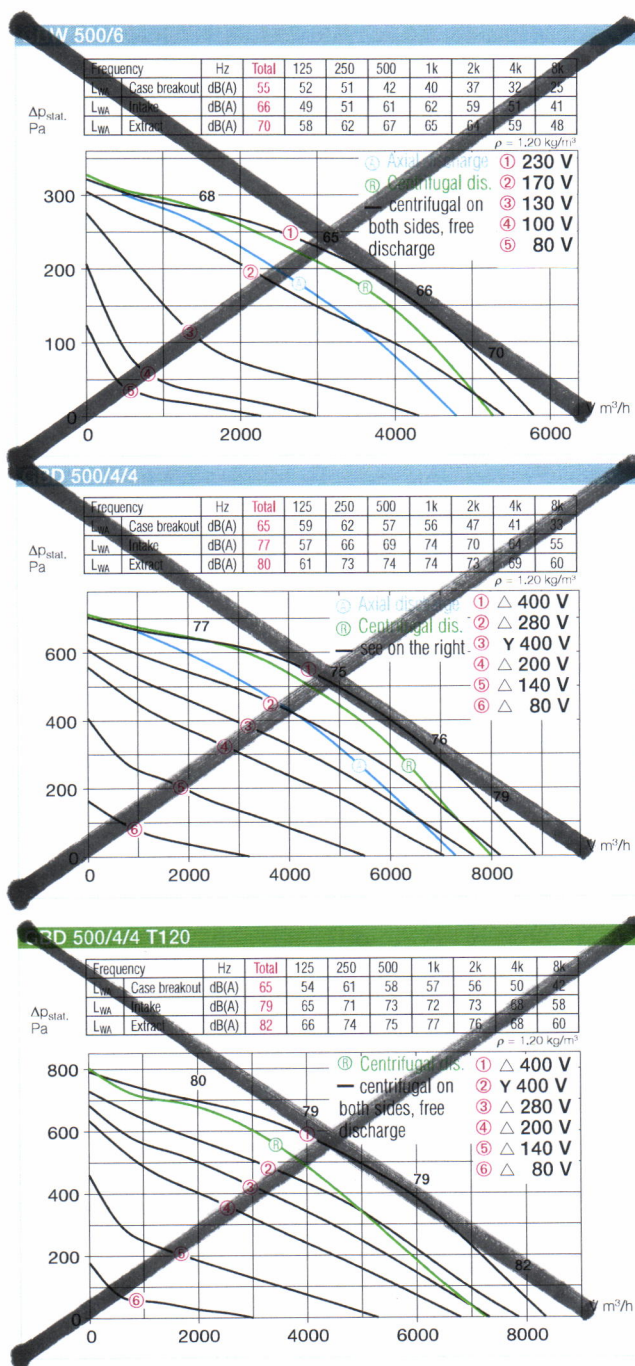
Maintenance-free external rotor motor or IEC-standard motor protected to IP 44 or 54. With ball bearings and radio suppressed as standard.

**□ Electrical connection**

Standard terminal box (IP 54) fitted on the motor; with GB.. T120 fitted on the motor support plate.

| Type                                                                                        | Ref. No. | Air flow volume (FID) | R.P.M.    | Sound press. level case breakout | Motor power (nominal) | full load | Current speed controlled | Wiring diagram | Maximum air flow temperature full load | Nominal weight (net) | 5 step transformer controller with motor protect. unit | Full motor protection unit using the thermal contacts |
|---------------------------------------------------------------------------------------------|----------|-----------------------|-----------|----------------------------------|-----------------------|-----------|--------------------------|----------------|----------------------------------------|----------------------|--------------------------------------------------------|-------------------------------------------------------|
|                                                                                             |          | m³/h                  | min⁻¹     | dB(A) at 4 m                     | kW                    | A         | A                        | Nr.            | +°C                                    | +°C                  | Type Ref. No.                                          | Type Ref. No.                                         |
| <b>1 Phase motor, 230 V / 1 ph. / 50 Hz, capacitor motor, protection to IP 54</b>           |          |                       |           |                                  |                       |           |                          |                |                                        |                      |                                                        |                                                       |
| GBW 500/6                                                                                   | 5519     | 5760                  | 880       | 35                               | 0.52                  | 2.30      | 2.60                     | 864            | 45                                     | 45                   | MWS 3 1948                                             | TSW 3.0 1496 MW <sup>1)</sup> 1579                    |
| GBW 500/4                                                                                   | 5517     | 8400                  | 1350      | 45                               | 1.38                  | 6.40      | 8.20                     | 865            | 65                                     | 55                   | MWS 10 1946                                            | — — — —                                               |
| <b>2 speed motor, 3 Phase motor, 400 V / 3 ph. / 50 Hz, Y/Δ-wiring, protection to IP 54</b> |          |                       |           |                                  |                       |           |                          |                |                                        |                      |                                                        |                                                       |
| GBD 500/4/4                                                                                 | 5518     | 8000/8850             | 1075/1340 | 45                               | 0.97/1.45             | 1.60/2.80 | 2.90                     | 867            | 50                                     | 50                   | RDS 7 1578                                             | TSB 5.5 1503 M4 <sup>2)</sup> 1571                    |
| <b>1 Phase motor, 230 V / 1 ph. / 50 Hz, capacitor motor, protection to IP 54</b>           |          |                       |           |                                  |                       |           |                          |                |                                        |                      |                                                        |                                                       |
| GBW 500/4 T120                                                                              | 5776     | 8345                  | 1340      | 45                               | 1.40                  | 6.1       | 7.0                      | 301            | 120                                    | 100                  | MWS 10 1946                                            | — — MW <sup>1)</sup> 1579                             |
| <b>2 speed motor, 3 Phase motor, 400 V / 3 ph. / 50 Hz, Y/Δ-wiring, protection to IP 54</b> |          |                       |           |                                  |                       |           |                          |                |                                        |                      |                                                        |                                                       |
| GBD 500/4/4 T120                                                                            | 5777     | 7320/8350             | 1070/1365 | 45                               | 1.07/1.50             | 1.80/3.00 | 3.0                      | 947            | 120                                    | 110                  | RDS 4 1316                                             | TSB 3.0 1502 M4 <sup>2)</sup> 1571                    |

<sup>1)</sup> incl. operation switch<sup>2)</sup> incl. operation and 2 speed switch



**Motor protection**

Motors have thermal contacts wired to the terminal block and must be connected to a motor protection unit.

**Speed control**

All types are speed controllable by voltage reduction using a transformer controller.

The 3-phase models can also be 2 speed controlled by star/delta switch (accessories DS 2 or full motor protection unit M 4). The duties at different speeds are given in the performance curve.

**Sound levels**

Total sound power levels and the spectrum figures in dB(A) are given for:

- sound level case breakout
- sound level intake
- sound level extract in the tables above the performance curve. Beside, the sound power level (on intake) is stated over the rated characteristic curve. In the table below you can also find the
- case breakout level at 4 m (freefield conditions).

**Information**

**Pages**

Design of systems, acoustic 12 on  
General techn. information, speed control 17 on

**Accessory-Details**

**Pages**

Speed controller and full motor protection unit 397 on

**Accessories of both types**

Anti vibration mounts for installation indoors. Set of 4.

**SDD-U** Ref. No. 5627

Wall bracket for wall mounting.

**GB-WK 500** Ref. No. 5626

External weather louvers to over exhaust opening.

**GB-WSG 500** Ref. No. 5639

Outdoor cover hood for outdoor installation.

**GB-WSD 500** Ref. No. 5748

On/Off and 2-speed switch for 3-phase star/delta motors.

**DS 2<sup>3)</sup>** Ref. No. 1351

**Specific accessories**

for types GB..

**Condensate collector** with condensate spigot for pipe connection.  
**GB-KW 500** Ref. No. 5644

(Condensate collector with condensate spigot included in delivery with GB.. T120).

for types GB.. T120

**Rain drainage** for outdoor installation (drill holes for rain drainage is already prepared).

**GB-RA** Ref. No. 9418

<sup>3)</sup> full motor protection unit recommended: MD Ref. No. 5849

## DESCRIPTION

- Speed-controllable
- Integral thermal contacts
- Can be installed in any position
- Can be installed outdoors
- Maintenance-free and reliable

The K series is designed for installation in ducts. The KV series is designed to be used as wall mounted duct connected extract fans. All the K and KV-fans have minimum 25 mm long spigot connections.

To simplify the installation the K-fan has a preassembled fixing bracket included as standard. The FK mounting clamp facilitates easy installation and removal, and prevents the transfer of vibration to the duct. The fans have backward-curved blades and external rotor motors.

K and KV fans can be speed-controlled via a stepless thyristor or a 5-step transformer. To protect the motor from overheating the K/KV 100 M and K/KV 125 M are impedance protected. K 100 XL and K 125 XL has integral thermal contacts with electrical reset, KV 100 XL and KV 125 XL with automatic reset.

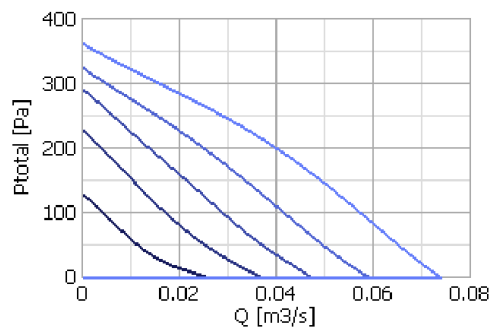
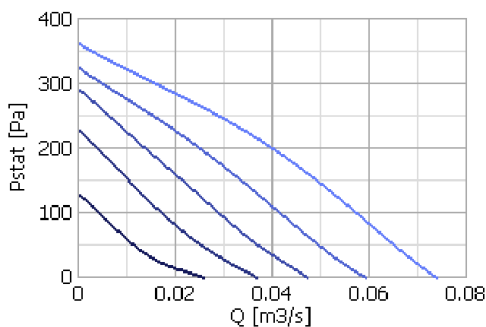
The casing is manufactured from galvanised sheet steel and folded which gives the fan a close to air tight casing. Duct connected outdoor and wet room applications of the fan are possible due to the air tight casing and the IP55 rated terminal box with a IP68 rated M20 cable gland.

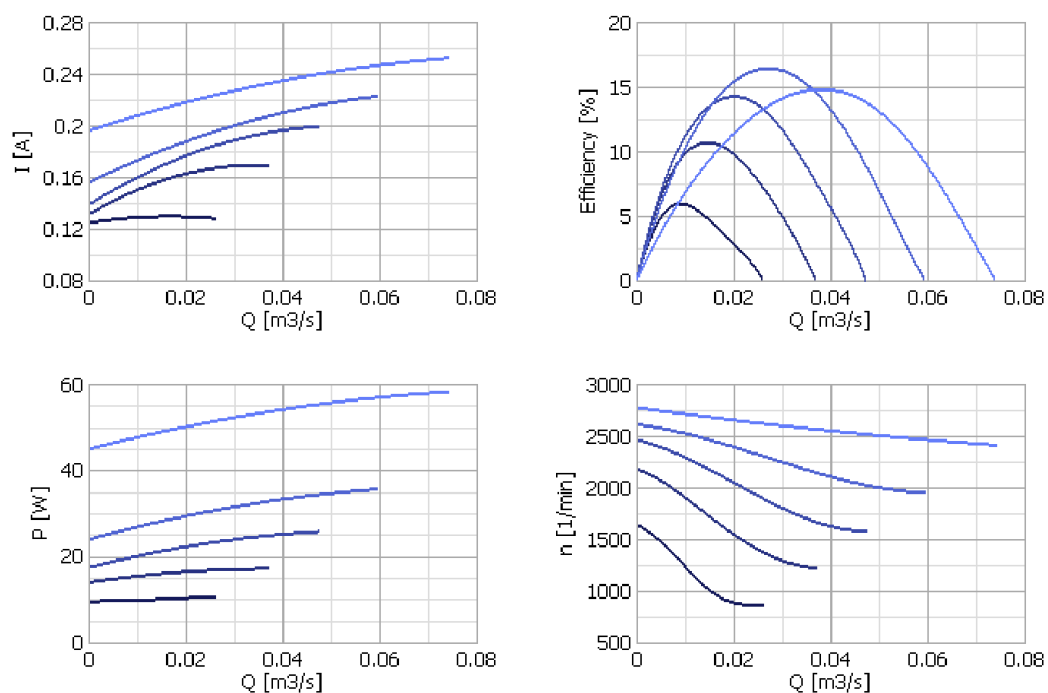


## SPECIFICATION

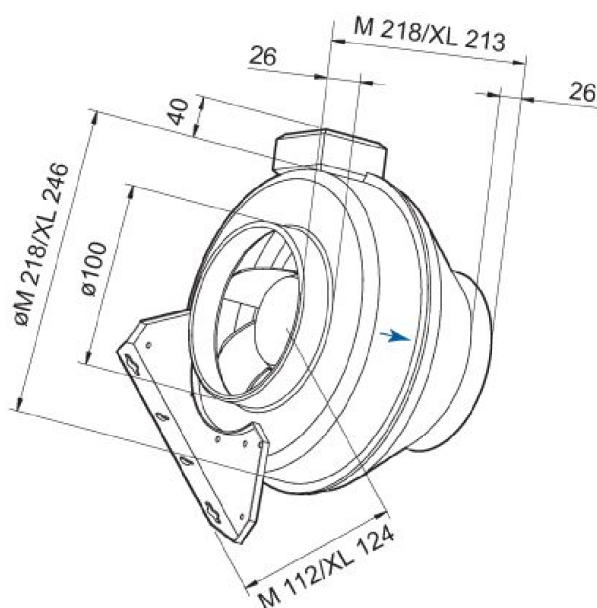
| Parameter                                                 | Unit              | Value |
|-----------------------------------------------------------|-------------------|-------|
| Voltage                                                   | V                 | 230   |
| Frequency                                                 | Hz                | 50    |
| Phase                                                     | ~                 | 1     |
| Power                                                     | W                 | 58    |
| Current                                                   | A                 | 0.25  |
| Maximum air flow                                          | m <sup>3</sup> /s | 0.07  |
| R.p.m.                                                    | 1/min             | 2435  |
| Max. temperature of transported air                       | °C                | 70    |
| Max. temperature of transported air when speed-controlled | °C                | 70    |
| Sound pressure level at 3 m                               | dB(A)             | 49    |
| Weight                                                    | kg                | 4.5   |
| Insulation class, motor                                   |                   | B     |
| Enclosure class, motor                                    |                   | IP 44 |
| Capacitor                                                 | µF                | 2     |

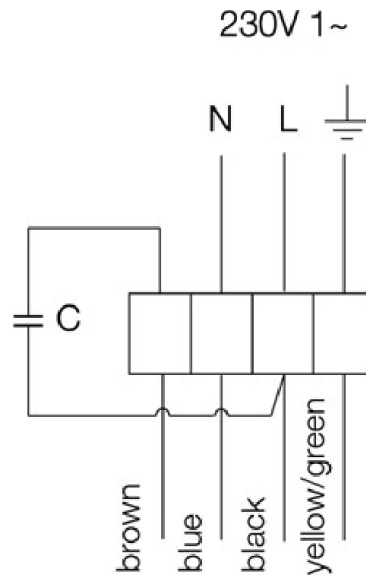
## DIAGRAMS





## DIMENSIONS



**WIRING DIAGRAM**

**ELECTRICAL ACCESSORIES**

|             |                              |
|-------------|------------------------------|
| RE 1,5      | Manual five-step transformer |
| REE 1       | Thyristor speed controller   |
| REU 1,5     | Manual five-step transformer |
| REV-3POL/03 | Isolators                    |

**ACCESSORIES**

|               |                                             |
|---------------|---------------------------------------------|
| CB 100-0,4    | Duct heater                                 |
| CB 100-0,6    | Duct heater                                 |
| CBM 100-0,6   | Duct heater with integral control equipment |
| CWK 100-3-2.5 | Water-cooling battery                       |
| VBC 100       | Water-heating battery                       |
| VBF 100       | Water-heating battery with filter           |
| LDC 100-600   | Silencer                                    |
| LDC 100-900   | Silencer                                    |
| FFR 100       | Filter cassette                             |
| FGR 100       | Filter cassette                             |
| FK 100        | Fast clamps                                 |
| IGC 100       | Intake grid                                 |
| IGK 100       | Intake grid                                 |
| MK 2          | Installation bracket                        |
| RSK 100       | Back draft damper                           |
| SG 100        | Protection guard                            |
| VK 10         | Louvre shutters                             |
| VKK 100       | Back draft damper                           |

|                                  |         | SDI                            |                                |                                  |                                  | Twin SDI                        |                                 |
|----------------------------------|---------|--------------------------------|--------------------------------|----------------------------------|----------------------------------|---------------------------------|---------------------------------|
| Outdoor unit                     |         | RAV-SP562AT-E<br>RAV-SM564UT-E | RAV-SP802AT-E<br>RAV-SM804UT-E | RAV-SP1104AT-E<br>RAV-SM1104UT-E | RAV-SP1404AT-E<br>RAV-SM1404UT-E | RAV-SP1104AT-E<br>RAV-SM564UT-E | RAV-SP1404AT-E<br>RAV-SM804UT-E |
| Cooling capacity                 | kW      | 5.3                            | 7.1                            | 10.0                             | 12.5                             | 10.0                            | 12.5                            |
| Cooling capacity, min-max        | kW      | 2.2-5.6                        | 2.2-8.0                        | 2.6-12.0                         | 2.6-14.0                         | 2.6-12.0                        | 2.6-14.0                        |
| Power input, cooling             | kW      | 1.53                           | 1.93                           | 2.21                             | 3.16                             | 2.21                            | 3.16                            |
| EER                              | W/W     | 3.46                           | 3.68                           | 4.52                             | 3.96                             | 4.52                            | 3.96                            |
| Energy efficiency class, cooling |         | A                              | A                              | A                                | A                                | A                               | A                               |
| Annual energy consumption        | kWh     | 765                            | 965                            | 1105                             | 1580                             | 1105                            | 1580                            |
| Heating capacity                 | kW      | 5.6                            | 8.0                            | 11.2                             | 14.0                             | 11.2                            | 14.0                            |
| Heating capacity, min-max        | kW      | 2.2-7.1                        | 2.2-10.0                       | 2.4-13.0                         | 2.4-16.5                         | 2.4-13.0                        | 2.4-16.5                        |
| Power input, heating             | kW      | 1.20                           | 2.03                           | 2.34                             | 3.21                             | 2.34                            | 3.21                            |
| COP                              | W/W     | 4.67                           | 3.94                           | 4.79                             | 4.36                             | 4.79                            | 4.36                            |
| Energy efficiency class, heating |         | A                              | A                              | A                                | A                                | A                               | A                               |
| Power supply                     | V-ph-Hz | 220/240-1-50                   | 220/240-1-50                   | 220/240-1-50                     | 220/240-1-50                     | 220/240-1-50                    | 220/240-1-50                    |

|                                  |         | DI                             |                                |                                  |                                  | Twin DI                         |                                 |
|----------------------------------|---------|--------------------------------|--------------------------------|----------------------------------|----------------------------------|---------------------------------|---------------------------------|
| Outdoor unit                     |         | RAV-SM563AT-E<br>RAV-SM564UT-E | RAV-SM803AT-E<br>RAV-SM804UT-E | RAV-SM1103AT-E<br>RAV-SM1104UT-E | RAV-SM1403AT-E<br>RAV-SM1404UT-E | RAV-SM1103AT-E<br>RAV-SM564UT-E | RAV-SM1403AT-E<br>RAV-SM804UT-E |
| Cooling capacity                 | kW      | 5.3                            | 6.7                            | 10.0                             | 12.0                             | 10.0                            | 12.5                            |
| Cooling capacity, min-max        | kW      | 1.5-5.6                        | 1.5-8.0                        | 3.0-11.2                         | 3.0-13.2                         | 3.0-11.2                        | 3.0-13.2                        |
| Power input, cooling             | kW      | 1.65                           | 2.09                           | 3.11                             | 3.74                             | 3.11                            | 4.09                            |
| EER                              | W/W     | 3.21                           | 3.21                           | 3.22                             | 3.21                             | 3.22                            | 3.06                            |
| Energy efficiency class, cooling |         | A                              | A                              | A                                | A                                | A                               | B                               |
| Annual energy consumption        | kWh     | 825                            | 1045                           | 1555                             | 1870                             | 1555                            | 2045                            |
| Heating capacity                 | kW      | 5.6                            | 8.0                            | 11.2                             | 14.0                             | 11.2                            | 14.0                            |
| Heating capacity, min-max        | kW      | 1.5-6.3                        | 1.5-9.0                        | 3.0-13.0                         | 3.0-16.0                         | 3.0-13.0                        | 3.0-16.0                        |
| Power input, heating             | kW      | 1.44                           | 2.21                           | 2.93                             | 3.80                             | 2.93                            | 4.00                            |
| COP                              | W/W     | 3.89                           | 3.62                           | 3.82                             | 3.68                             | 3.82                            | 3.50                            |
| Energy efficiency class, heating |         | A                              | A                              | A                                | A                                | A                               | B                               |
| Power supply                     | V-ph-Hz | 220/240-1-50                   | 220/240-1-50                   | 220/240-1-50                     | 220/240-1-50                     | 220/240-1-50                    | 220/240-1-50                    |

| Indoor unit                  |       | RAV-SM564UT-E  | RAV-SM804UT-E  | RAV-SM1104UT-E | RAV-SM1404UT-E |
|------------------------------|-------|----------------|----------------|----------------|----------------|
| Air Flow                     | m³/h  | 1050           | 1230           | 2010           | 2100           |
| Sound pressure level (H-M-L) | dB(A) | 32-29-28       | 35-31-28       | 43-38-33       | 44-38-34       |
| Sound power level (H-M-L)    | dB(A) | 47-44-43       | 50-46-43       | 58-53-48       | 59-53-49       |
| Dimensions (HxWxD)           | mm    | 256x840x840    | 256x840x840    | 319x840x840    | 319x840x840    |
| Weight                       | kg    | 20             | 20             | 24             | 24             |
| Panel model name             |       | RBC-U31PG(W)-E | RBC-U31PG(W)-E | RBC-U31PG(W)-E | RBC-U31PG(W)-E |
| Panel dimensions (HxWxD)     | mm    | 30x950x950     | 30x950x950     | 30x950x950     | 30x950x950     |
| Panel weight                 | kg    | 4.2            | 4.2            | 4.2            | 4.2            |

|                                       |       | SDI            |                |                |                |
|---------------------------------------|-------|----------------|----------------|----------------|----------------|
| Outdoor unit                          |       | RAV-SP562AT-E  | RAV-SP802AT-E  | RAV-SP1104AT-E | RAV-SP1404AT-E |
| Air Flow                              | m³/h  | 3420           | 3420           | 6060           | 6180           |
| Sound pressure level, heating/cooling | dB(A) | 47/46          | 49/47          | 50/49          | 52/51          |
| Sound power level, heating/cooling    | dB(A) | 64/63          | 66/64          | 67/66          | 69/68          |
| Dimensions (HxWxD)                    | mm    | 795x900x320    | 795x900x320    | 1340x900x320   | 1340x900x320   |
| Weight                                | kg    | 55             | 62             | 93             | 93             |
| Compressor type                       |       | DC Twin Rotary | DC Twin Rotary | DC Twin Rotary | DC Twin Rotary |
| Refrigerant type                      |       | R410A          | R410A          | R410A          | R410A          |
| Pipe connections Gas/Liquid           | mm    | 12.7/6.4       | 15.9/9.5       | 15.9/9.5       | 15.9/9.5       |
| Pipe length, min                      | m     | 5              | 5              | 3              | 3              |
| Pipe length, max                      | m     | 50             | 50             | 75             | 75             |
| Pipe length, precharge                | m     | 20             | 30             | 30             | 30             |
| Maximum height difference             | m     | 30             | 30             | 30             | 30             |
| Operating range, cooling              | °C    | -15-43         | -15-43         | -15-43         | -15-43         |
| Operating range, heating              | °C    | -15-15         | -15-15         | -20-15         | -20-15         |

|                                       |       | DI             |                |                |                |
|---------------------------------------|-------|----------------|----------------|----------------|----------------|
| Outdoor unit                          |       | RAV-SM563AT-E  | RAV-SM803AT-E  | RAV-SM1103AT-E | RAV-SM1403AT-E |
| Air Flow                              | m³/h  | 2400           | 2700           | 4500           | 4500           |
| Sound pressure level, heating/cooling | dB(A) | 48/46          | 50/48          | 54/53          | 54/54          |
| Sound power level, heating/cooling    | dB(A) | 65/63          | 67/65          | 71/70          | 71/71          |
| Dimensions (HxWxD)                    | mm    | 550x780x290    | 550x780x290    | 795x900x320    | 795x900x320    |
| Weight                                | kg    | 38             | 42             | 77             | 77             |
| Compressor type                       |       | DC Twin Rotary | DC Twin Rotary | DC Twin Rotary | DC Twin Rotary |
| Refrigerant type                      |       | R410A          | R410A          | R410A          | R410A          |
| Pipe connections Gas/Liquid           | mm    | 12.7/6.4       | 15.9/9.5       | 15.9/9.5       | 15.9/9.5       |
| Pipe length, min                      | m     | 5              | 5              | 5              | 5              |
| Pipe length, max                      | m     | 30             | 30             | 50             | 50             |
| Pipe length, precharge                | m     | 20             | 20             | 30             | 30             |
| Maximum height difference             | m     | 30             | 30             | 30             | 30             |
| Operating range, cooling              | °C    | -15-43         | -15-43         | -15-43         | -15-43         |
| Operating range, heating              | °C    | -15-15         | -15-15         | -15-15         | -15-15         |

## C RANGE NT



Mounting Height Max. 3.0m

| Models     | Dimensions<br>(mm)<br>(L x D x H) | Supply<br>(50Hz) | Heat<br>Output<br>(kW) | Loading<br>(A) *per<br>phase | Max.<br>Velocity<br>(m/s) | Max. Air<br>Volume<br>(m³/h) | Weight<br>(kg) | dB(A)<br>@3m<br>High, Med, Low |
|------------|-----------------------------------|------------------|------------------------|------------------------------|---------------------------|------------------------------|----------------|--------------------------------|
| Ambient    |                                   |                  |                        |                              |                           |                              |                |                                |
| C1000A NT  | 1137 x 275 x 198                  | 230V~1P&N        | -                      | 0.7                          | 9.0                       | 1250                         | 15             | 55, 53, 50                     |
| C1500A NT  | 1669 x 275 x 198                  | 230V~1P&N        | -                      | 0.9                          | 9.0                       | 1800                         | 21             | 55, 53, 49                     |
| C2000A NT  | 2200 x 275 x 198                  | 230V~1P&N        | -                      | 1.1                          | 9.0                       | 2500                         | 31             | 56, 54, 50                     |
| Electric   |                                   |                  |                        |                              |                           |                              |                |                                |
| C1000E NT  | 1137 x 275 x 198                  | 400V~3P&N        | 4.5/9                  | *13.7                        | 9.0                       | 1250                         | 16             | 55, 53, 50                     |
| C1500E NT  | 1669 x 275 x 198                  | 400V~3P&N        | 6/12                   | *18.3                        | 9.0                       | 1800                         | 23             | 55, 53, 49                     |
| C2000E NT  | 2200 x 275 x 198                  | 400V~3P&N        | 9/18                   | *27.2                        | 9.0                       | 2500                         | 33             | 56, 54, 50                     |
| LPHW 82/71 |                                   |                  |                        |                              |                           |                              |                |                                |
| C1000W NT  | 1137 x 275 x 198                  | 230V~1P&N        | 6                      | 0.7                          | 8.5                       | 1180                         | 18             | 55, 53, 50                     |
| C1500W NT  | 1669 x 275 x 198                  | 230V~1P&N        | 9                      | 0.9                          | 8.5                       | 1700                         | 26             | 55, 53, 49                     |
| C2000W NT  | 2200 x 275 x 198                  | 230V~1P&N        | 12                     | 1.1                          | 8.5                       | 2360                         | 37             | 56, 54, 50                     |

## GENERAL DESCRIPTION

These filters are manufactured for ease of installation and incorporation into ducted air systems. They can be used on both supply for purifying incoming air, and can be used on the extract to remove toxic gasses and odours generated within a process.

## Construction

These modules are manufactured by mounting a series on carbon panel filters with a sealed case. The airflow is epitomize by presenting the filtering surfaces in a "V" formation.

Each carbon panel is sealed into the filter case so as to ensure no air can bypass the carbon granules.

The panels are manufactured using long established bonding techniques which hold the activated carbon granules in a rigid biscuit. The biscuit is encapsualted in a carbon impreganted cloth which prevents any leakage of granules or powder.

The unique bonding method used by Jasun Filtration ensures that, unlike our competitors filters, that the panels will remain intact and rigid even if wet.

## Stock Grades of Carbon

208 - Good general Carbon grade suitable for many applications

209 - Copper Coated Carbon for use in Mueums and archives

KI - For enhanced garlic odour removal

## Typical Applications include:

Elimination of Cooking Odours

Removal of Kerosene Exhaust Fumes

General Odour Removal

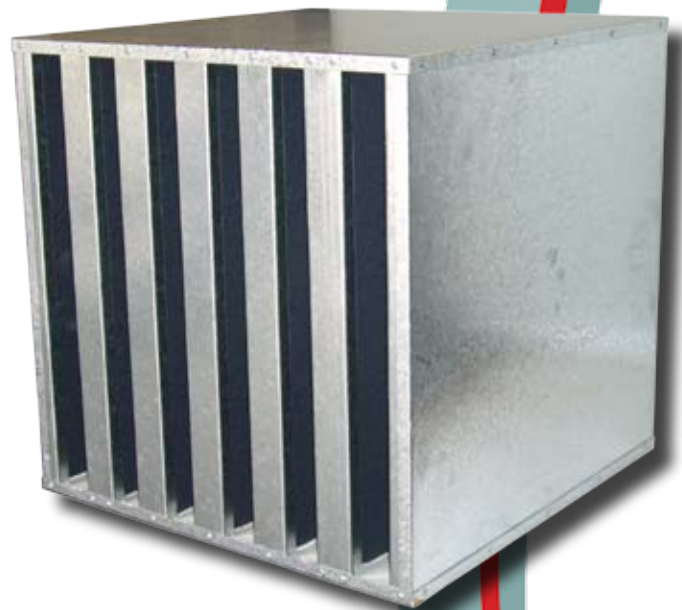
Smoke Removal

Neutralisation of Ammonia and its  
Derivatives

Removal of Formaldehyde

Removal of Airborne Pollutants and  
Contaminants

Removal of Acid Gases ( $H_2S$ ,  $SO_2$ ,  $NOX$ ,  
 $HCl$ )



### ENVIRONMENT



EMS 81914  
BS EN ISO 14001:2004

### QUALITY



FM 29257  
BS EN ISO 9001:2000

### Jasun Filtration Plc

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# MultiCarb Cells STANDARD SIZES

| No.            | Nominal Size (Inches) | Height (mm) | Width (mm) | Depth (mm) | Weight of Carbon (Kg) | Cell Weight | Capacity @ 0.1 Second Dwell Time |
|----------------|-----------------------|-------------|------------|------------|-----------------------|-------------|----------------------------------|
| DC-CF1-7C      | 24 x 24 x 8           | 594         | 594        | 197        | 10                    | 22          | 800                              |
| DC-CF1-HALF-7C | 24 x 12 x 8           | 594         | 291        | 197        | 5                     | 11          | 400                              |
| DC242412/8-7C  | 24 x 24 x 12          | 594         | 594        | 292        | 13                    | 24          | 990                              |
| DC121212-7C    | 12 x 12 x 12          | 297         | 297        | 297        | 6                     | 12          | 450                              |
| DC181812-7C    | 18 x 18 x 12          | 445         | 445        | 297        | 13                    | 25          | 990                              |
| DC241212-7C    | 24 x 12 x 12          | 594         | 297        | 297        | 13                    | 25          | 990                              |
| DC242412-7C    | 24 x 24 x 12          | 594         | 594        | 297        | 25                    | 36          | 1900                             |
| DC-CF2-7C      | 24 x 24 x 16          | 594         | 594        | 397        | 18                    | 34          | 1370                             |
| DC-CF2-HALF-7C | 24 x 12 x 16          | 594         | 291        | 397        | 9                     | 18          | 685                              |
| DC-WA15-208    | 24 x 6 x 18           | 144         | 600        | 440        | 7                     | 13          | 533                              |
| DC121218-7C    | 12 x 12 x 18          | 292         | 292        | 451        | 10                    | 15          | 761                              |
| DC181818-7C    | 18 x 18 x 18          | 445         | 445        | 451        | 19                    | 26          | 1445                             |
| DC241218-7C    | 24 x 12 x 18          | 594         | 297        | 451        | 18                    | 26          | 1369                             |
| DC242418-7C    | 24 x 24 x 18          | 594         | 594        | 451        | 36                    | 52          | 2740                             |
| DC121224-7C    | 12 x 12 x 24          | 292         | 292        | 597        | 13                    | 19          | 990                              |
| DC181824-7C    | 18 x 18 x 24          | 445         | 445        | 597        | 25                    | 36          | 1900                             |
| DC241224-7C    | 24 x 12 x 24          | 594         | 297        | 597        | 25                    | 36          | 1900                             |
| DC242424-7C    | 24 x 24 x 24          | 594         | 594        | 597        | 50                    | 61          | 3800                             |

LINEAR VELOCITY M/SECOND V'S PRESSURE DROP  
MULTICARB ACTIVATED CARBON CELLS

