waterloo

High Flow Diffuser Manual

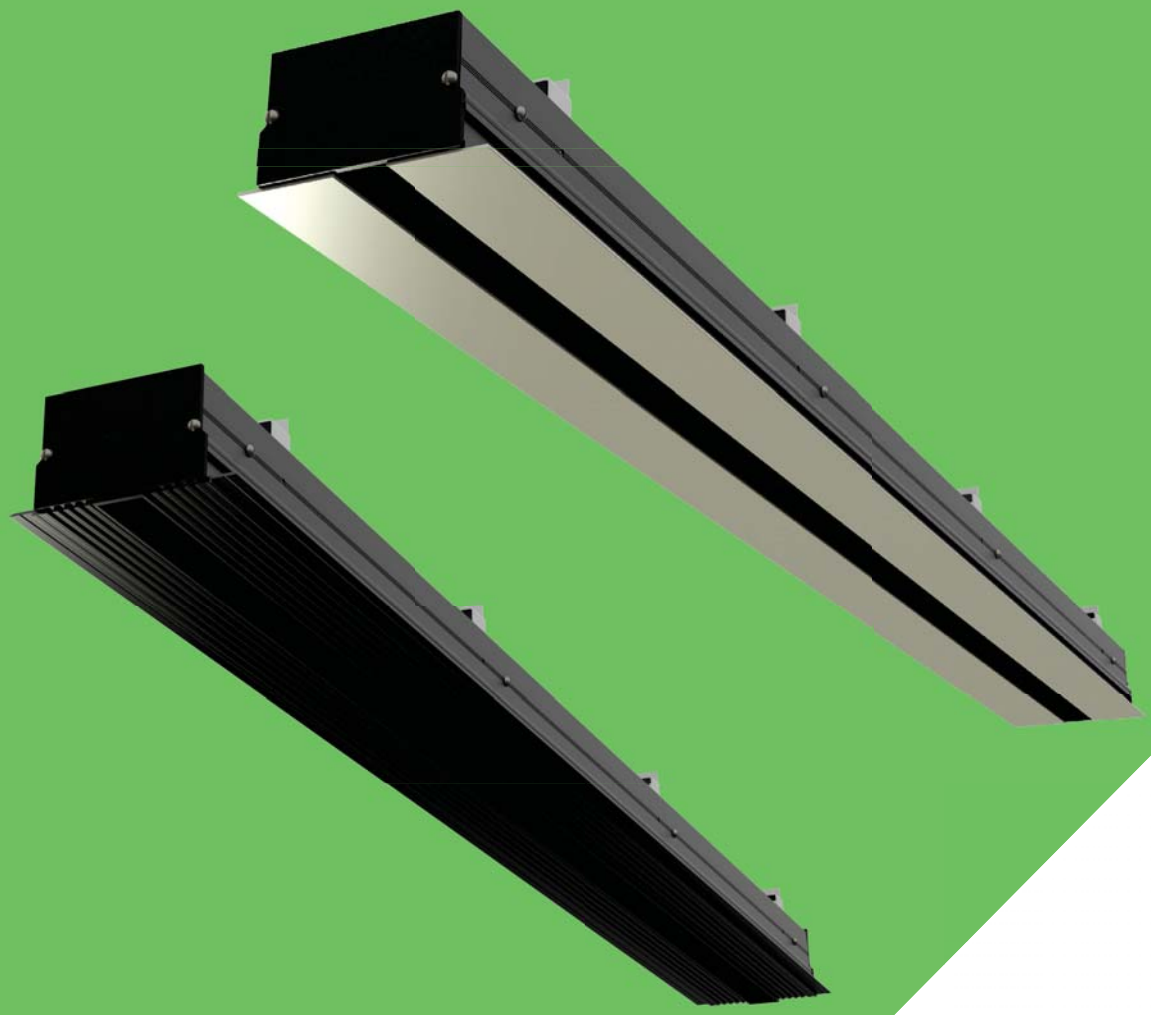
HFC High Flow Coanda

HFD High Flow Directional

HFC-PL High Flow Coanda Plasterline

HFD-PL High Flow Directional Plasterline

Operating and Maintenance Instructions



High Flow Diffuser

HFC / HFD

Introduction

The Waterloo High Flow diffusers are designed to give exceptional performance and the visual appearance of an architectural shadow gap that has become a very desirable design feature within buildings.

High Flow Diffusers are available in two variants: HFC (High Flow Coanda), which is usually ceiling mounted, providing a horizontal throw through the Coanda effect; and HFD (High Flow Directional) which is generally mounted in a wall for directional, horizontal projection of air into a space or provide a coanda throw if positioned close to a horizontal surface.

High Flow diffusers are designed to accommodate a dynamic range of air volume, from high to low. Featuring an excellent air distribution pattern to eliminate draughts in the occupied zone. Available as a single slot and sectional for continuous, linear runs.

HFC and HFD are manufactured using aluminium extrusions and features easily adjustable, hidden air pattern control elements.

The standard bordered version is available with an RAL polyester powder coated border with black anodised internals.

The Plasterline version (PL) is available when a plastered in product is required, the internals of the products have a black anodised finish to maintain the shadow gap appearance.

Product Description

HFC High Flow Coanda

HFD High Flow Directional

HFC-PL High Flow Coanda Plasterline

HFD-PL High Flow Directional Plasterline

Features

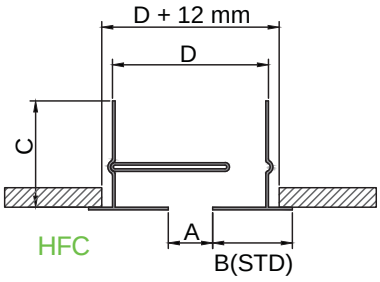
- Dynamic capacity from high to low values
- Strong coanda pattern for best performance
- Hidden control elements
- Continuous joint detail for linear runs
- 3 slot sizes available

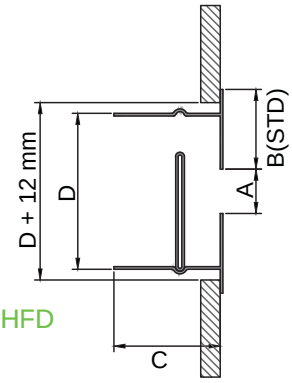
Finishes

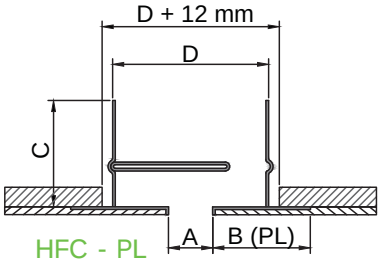
- HFC/D
  PPG9010 (RAL 9010 Gloss - 80% Gloss White)
  PPM9010 (RAL 9010 Matt - 20% Gloss White)
  PPM9006 (RAL 9006 Matt - 30% Gloss Silver)
  Other colours available on request
- HFC/D-PL
  Anodised black only

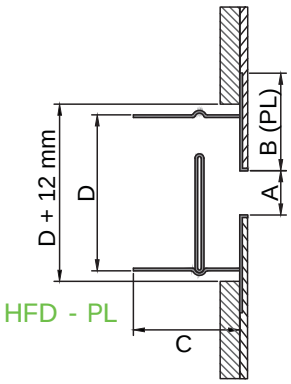
Sizes

3 standard slot sizes are available
25mm, 40mm and 60mm, standard
module lengths are 1500mm.









Order Example

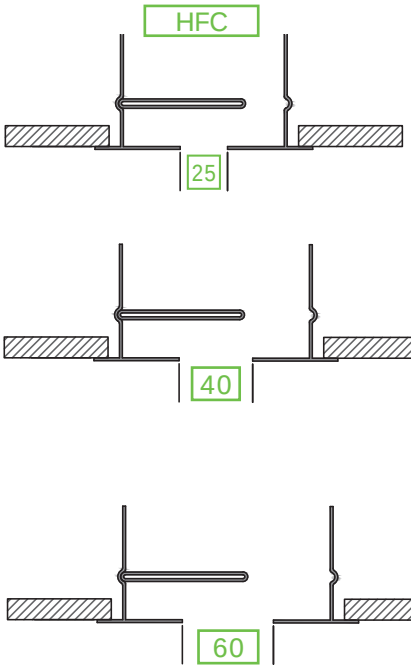
HFC/25/1800/PPM9010/ENDS

Type
Slot size
Length
Finish
Ends caps

Dim Size	25	40	60
A	25	40	60
B (STD)	45	45	45
B (PL)	55	55	55
C	60	60	60
D	88	103	123

High Flow Diffuser - Coanda ceiling

HFC



Selection Criteria

2.7m ceiling height, increase throw by 1m for every increase of 1m in ceiling height.

Horizontal throw is based on 10°c cooling.

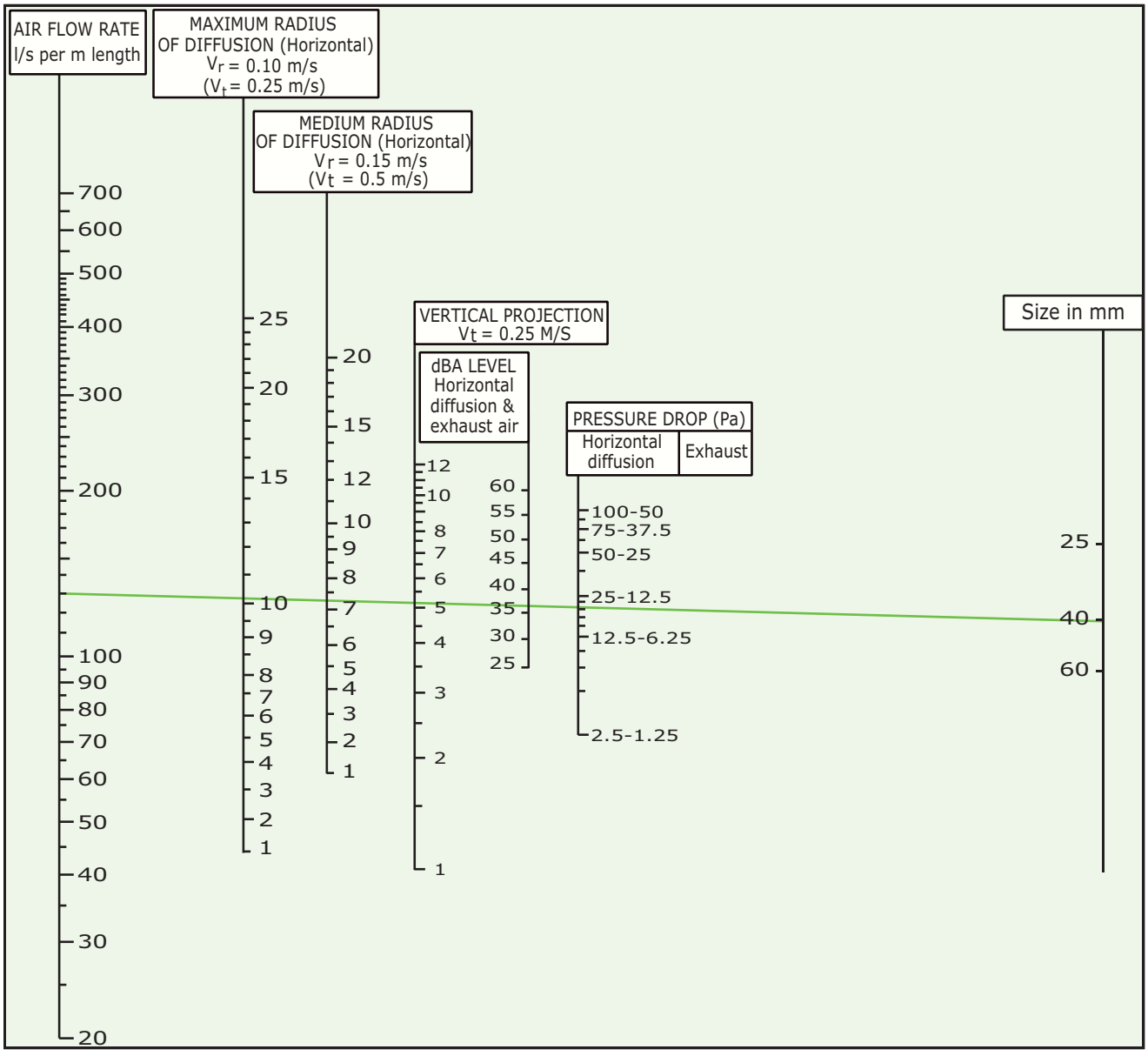
Selection Example

HFC/40/1000

Total air flow rate	= 130 l/s
Maximum throw	= 7.2m
Pressure drop	= 20Pa
Sound	= 36dBA

Length corrections					
Active Length (m)	0.5	1.25	2.0	2.5	3.0
dBA Reduction	-8	-5	-3	-2	0
Throw multiplier	0.45	0.65	0.8	0.9	1.0

Performance Nomogram



High Flow Diffuser - Side wall

HFD

Selection Criteria

HFD Side wall

0° Horizontal throw

Selection Example

HFD/40/1000

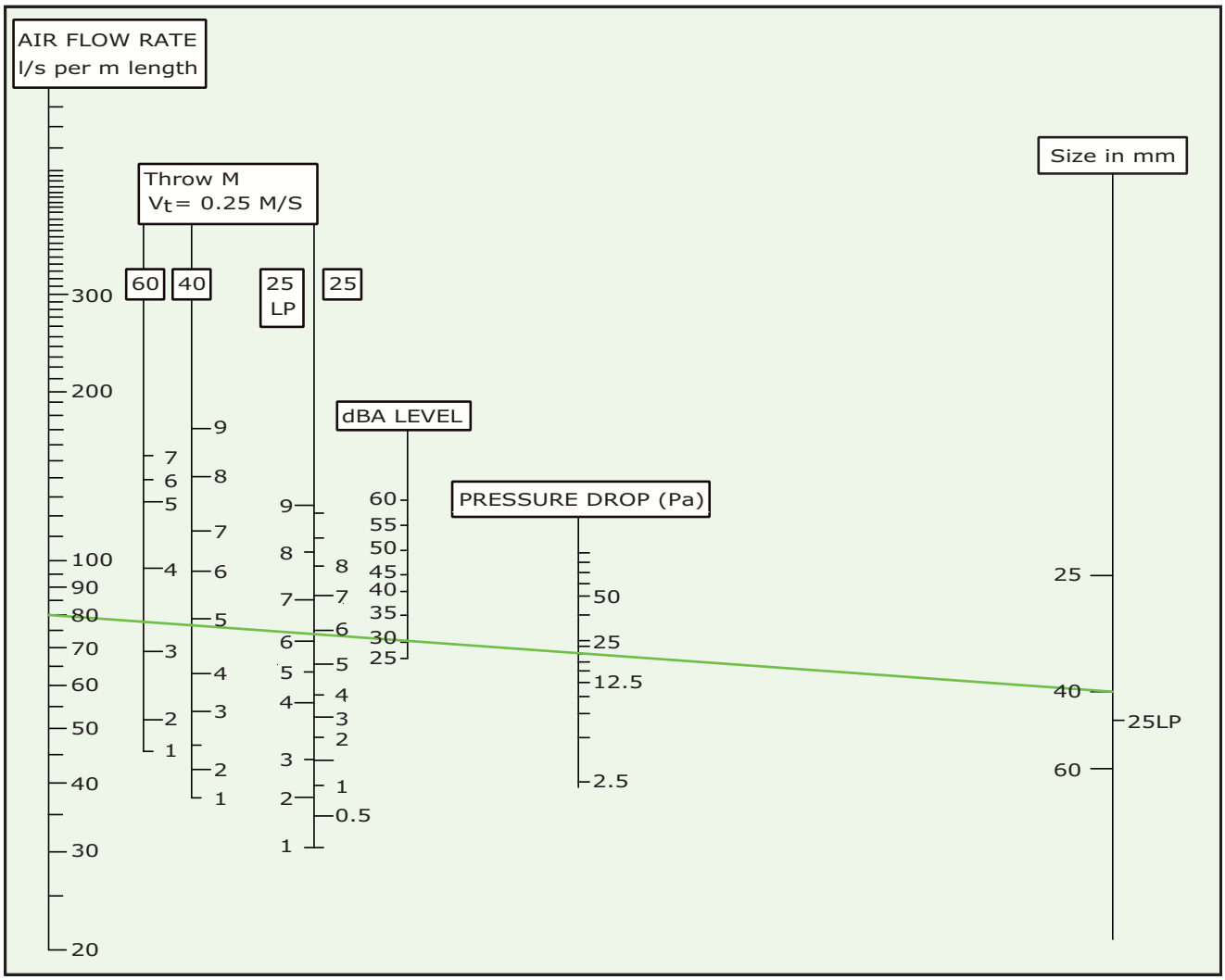
Total air flow rate	= 80 l/s
Maximum throw	= 4.8m
Pressure drop	= 20Pa
Sound	= 30dBA

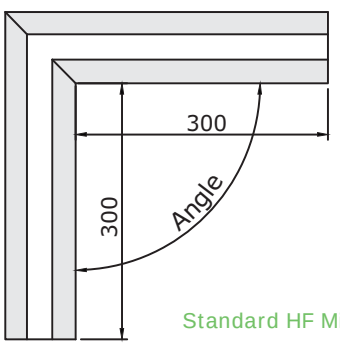
Note: 25LP is a lower pressure model that has very limited control on the direction of the air flow.

If air is directed along the ceiling throw correction will be x 1.25.

Length corrections					
Active Length (m)	0.5	1.25	2.0	2.5	3.0
dBA Reduction	-8	-5	-3	-2	0
Throw multiplier	0.45	0.65	0.8	0.9	1.0

Performance Nomogram



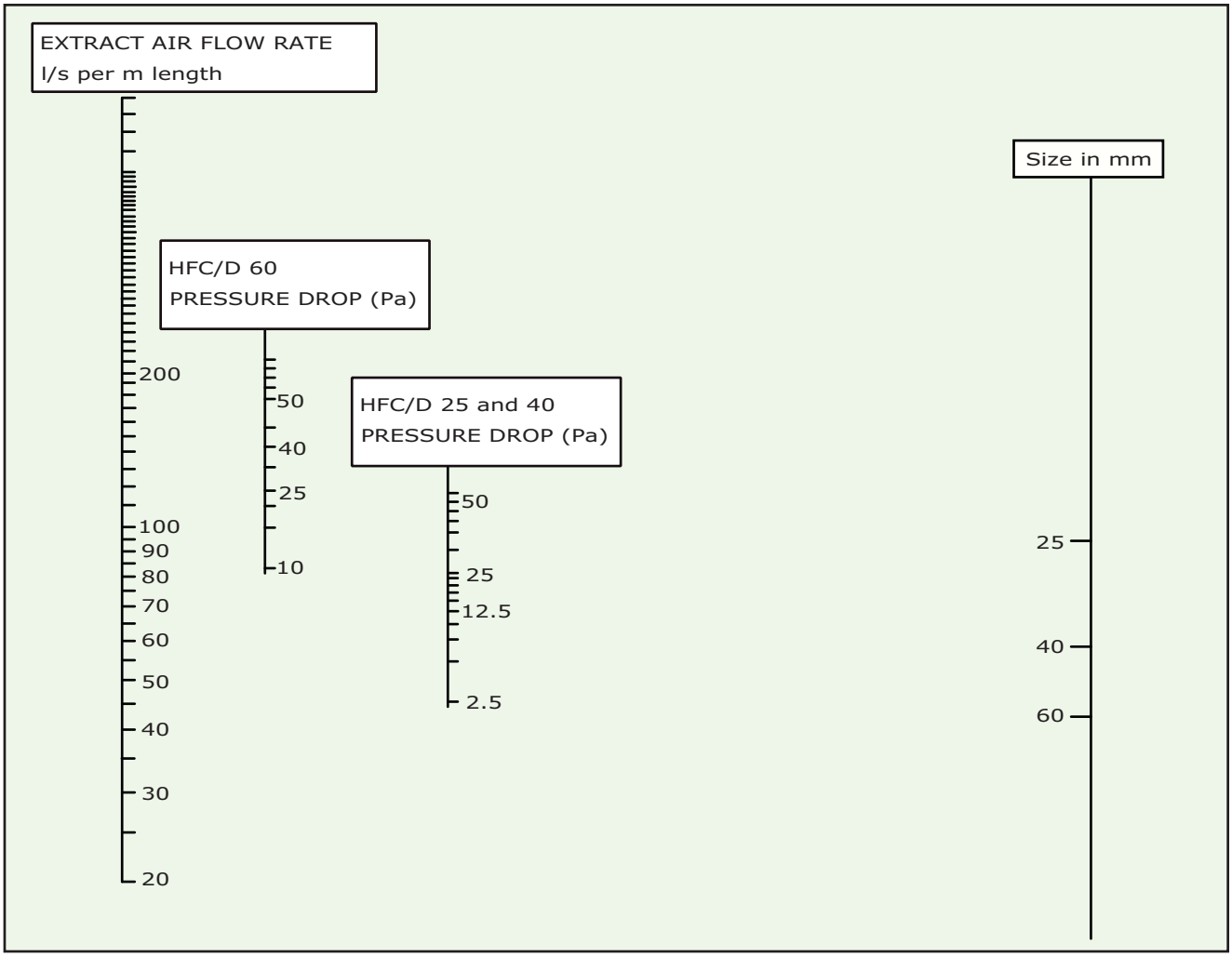


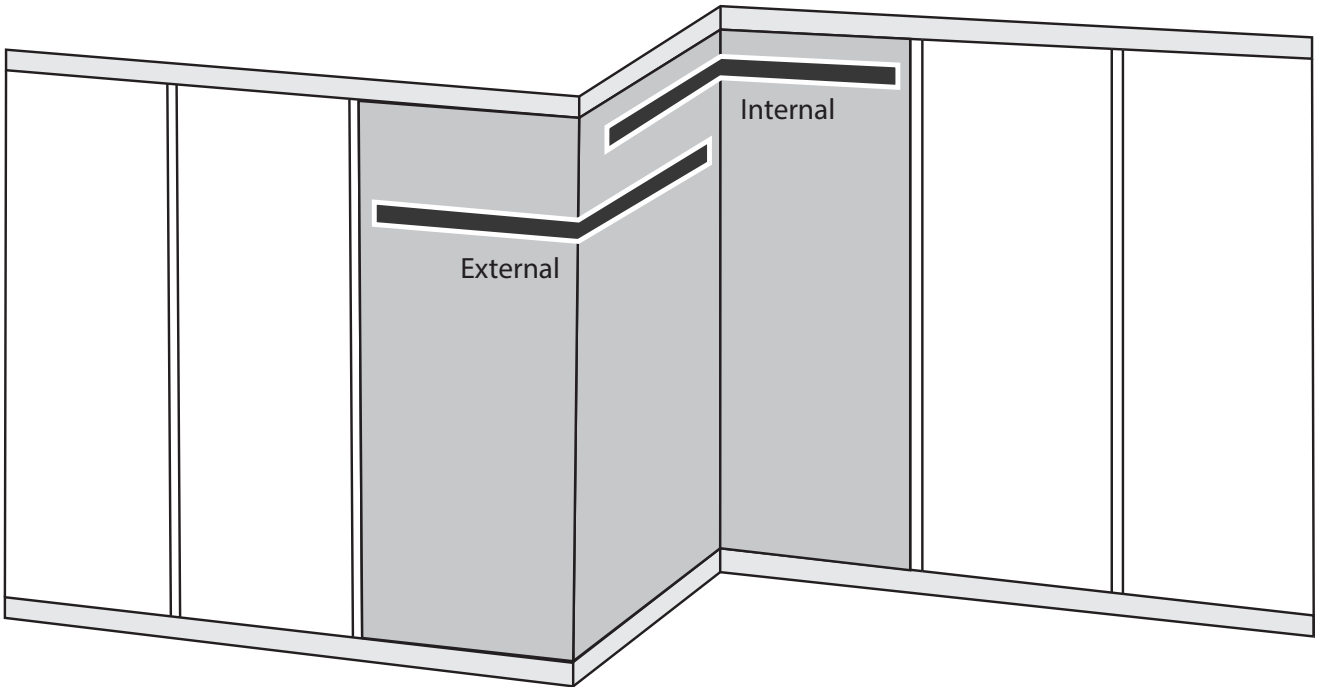
Standard HF Mitred Corner

High Flow Diffuser - Extract

HFC / HFD

Performance Nomogram



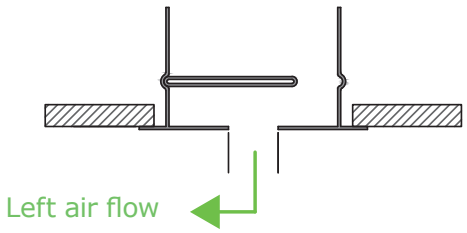


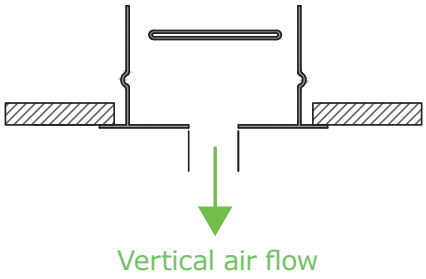
Standard High flow diffuser external and internal

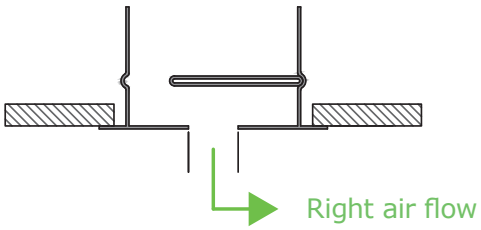
High Flow Diffuser - Side wall

HFC / HFD

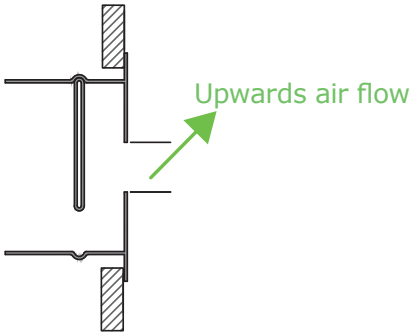
HFC

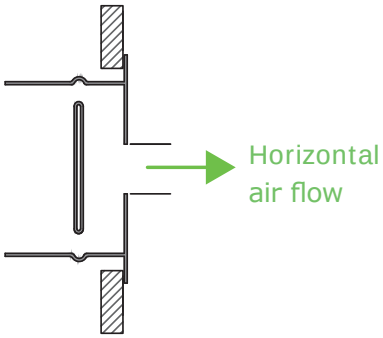


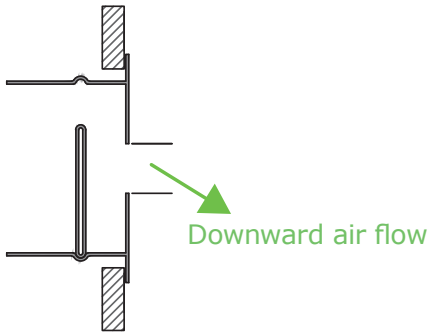




HFD



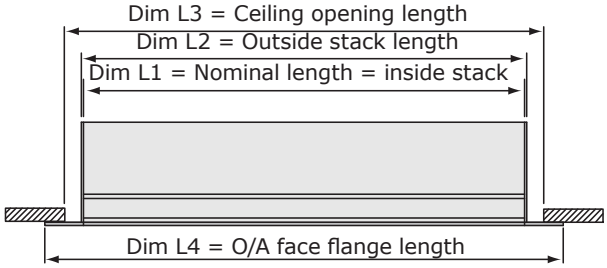




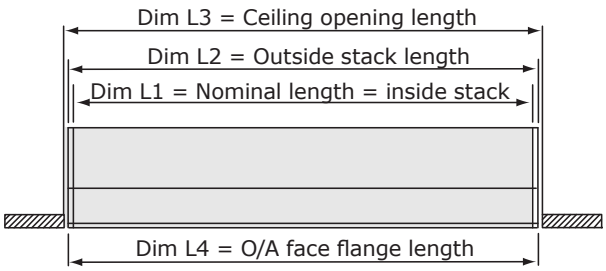
Standard End Caps				
Diffuser style	Dim L1	Dim L2	Dim L3	Dim L4
HFC/HFD	Nominal Length	Nominal Length +3	Nominal Length +19	Nominal Length +56
HFC/HFD-PL	Nominal Length	Nominal Length +6	Nominal Length +8	Nominal Length +6

Nominal length = inside of stack
Note: HFC/HFD has 28mm end caps

HFC/HFD



HFC/HFD-PL



High Flow Diffuser

HF

Tools Required

- 1 x Medium Cross Head Screwdriver
- Impact Driver for Plaster Frame

Note: Power tools are not recommended for connecting the diffuser to the plenum due to the risk of damage caused by the over-tightening of the Hanging Bracket Screws.

Plenum Box Installation

1- Align the centreline of the plenum box with the centre of the ceiling opening

2- Install the plenum box, suspending it from its mounting holes with Drop Rods (supplied by others). Use locknuts and washers above and below the mounting holes to set the plenum box height. If using gripple wire, 4 No. lengths must be used to fix the plenum to individual fixings in the soffit, located vertically, in line with the plenum mounting holes.

3- Check that the plenum box is level and aligned with the ceiling opening, ensuring that the distance from the bottom of the hem to the ceiling face is within the 45 to 55mm range (**Figure 1**). When this has been achieved, tighten the locknuts to secure the plenum position.

It is essential that all the plenums be installed in the ceiling void prior to the diffuser installation.

For continuous diffuser runs, Waterloo recommend that longitudinal angle (supplied by others) are attached to the sides of the plenums to prevent the plenum boxes pulling the diffuser out of alignment.

Waterloo also recommends that all mitre sections be installed prior to the fitting of continuous runs of active or dummy diffusers.

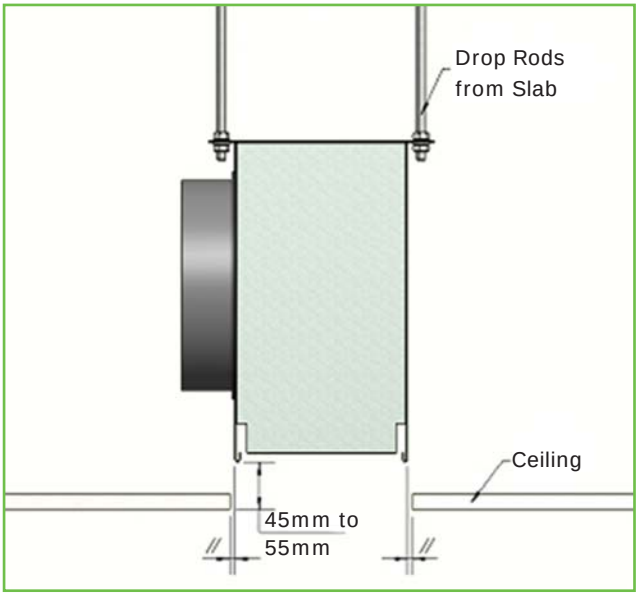


Figure 1- Plenum installation detail

High Flow Diffuser Installation (Standard and Plaster Line)

Installation examples are shown as Plasterline for ceiling installation or the standard High Flow for the wall mounting, although either can be used for each location.

The installation of the High Flow Slot Diffuser as follows:

1- Make sure that the sliding paddle is positioned centrally within the diffuser. (**Figure 2 & 2a**), and fix saddle loosely onto back-strap on rear of diffuser, adjusting via the screw head, through the access hole in the front of the paddle.

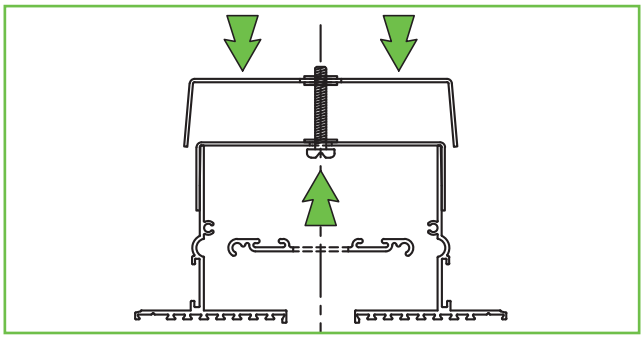


Figure 2

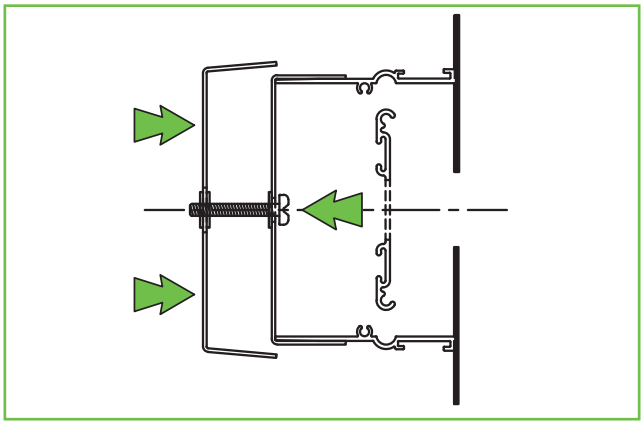


Figure 2a

2- Push diffuser through the ceiling/wall cutout, into the plenum. Apply force to the screw head, through the access holes using a crosshead screwdriver, until the saddles spring past the hem of the plenum, locking the diffuser to the plenum (**Figure 3 & 3a**).

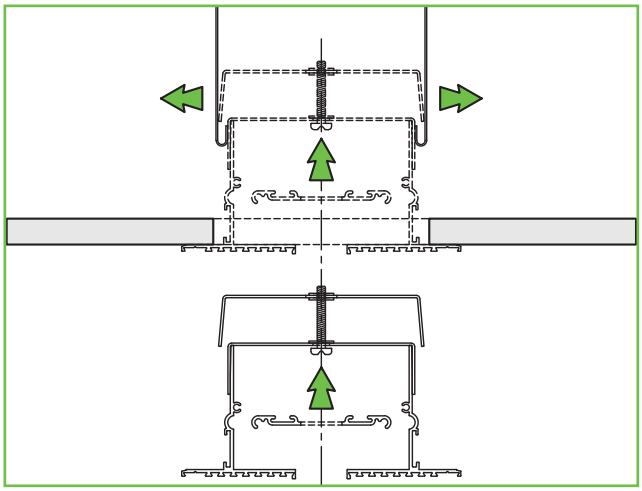


Figure 3

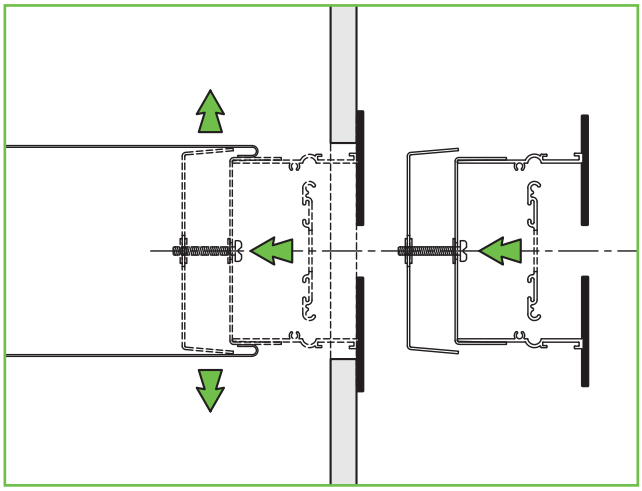


Figure 3a

High Flow Diffuser Installation (Standard and Plaster Line)

The installation of the High Flow Slot Diffuser as follows:

3- Using a crosshead screwdriver, tighten the adjustment screw until the diffuser is tight against the ceiling and screw has increased resistance when tightening (once again, power tools are not recommended at this stage (**Figure 4 & 4a)**.

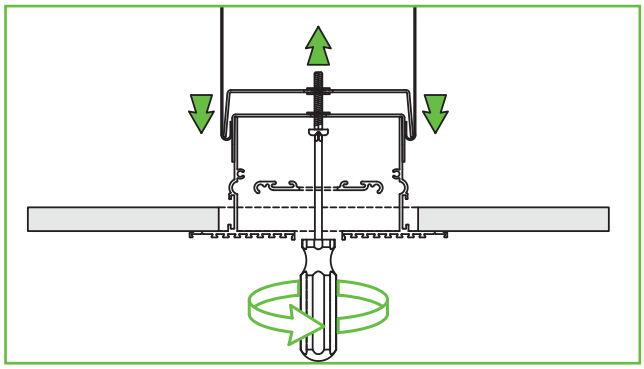


Figure 4

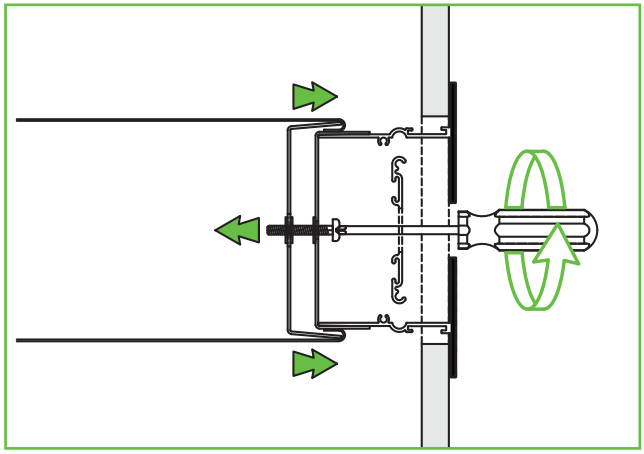


Figure 4a

4-

1- If using the plaster line version - once the diffuser is fixed into position, use either self-drilling screws and an impact driver, or holes and plasterboard screws at no greater than 300mm centres fixed into a timber frame behind the plasterboard.

2- For all types, the 20mm hole caps are clipped into the paddle holes & the blade moved into the desired position to give the air pattern required (**Figure 5 & 5a**). If the paddle is slid to the left the air flow will be to the left and if it is slid to the right the air flow will be to the right.

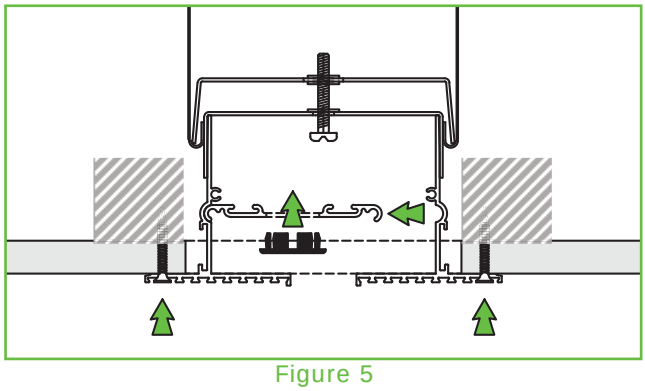


Figure 5

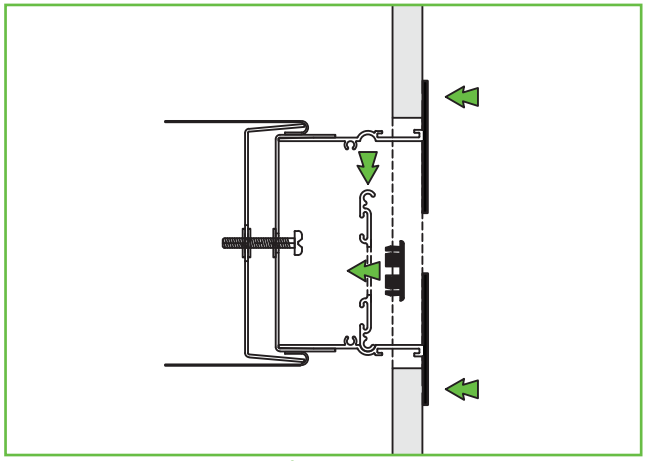


Figure 5a

High Flow Diffuser Installation (Standard and Plaster Line)

The installation of the High Flow Slot Diffuser is as follows:

5- Once the diffuser has been installed, the extrusion will require either skim tape or PVA applying the plasterers should make a recommendation as to the most effective method to achieve the best finish. Plaster can be skimmed up to the prevailing edge of the diffuser opening against the lip. Any plaster that goes in to the diffuser must be cleaned out to avoid effecting the diffusers performance (**Figure 6**).

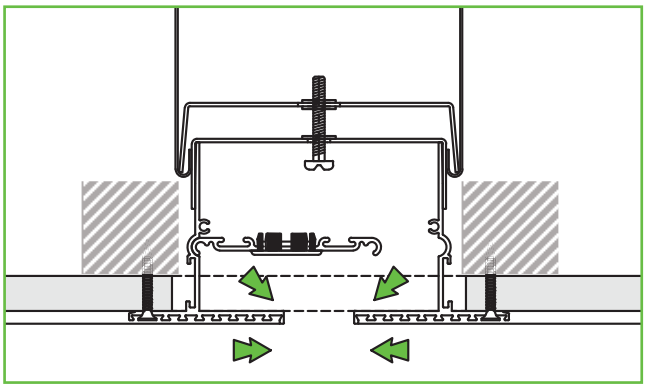


Figure 6

The diffuser sections can, be joined by screwing or riveting the alignment strips in position using the pre-punched holes in the outer frames on continuous runs (**Figure 7**).

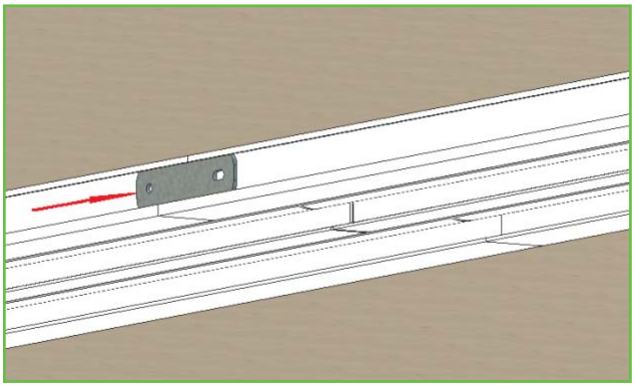


Figure 7: Position alignment

Product set up

To achieve a directional throw, the deflector must be moved to the side that the air is required to travel in once it leaves the diffuser (**Figure 8**)

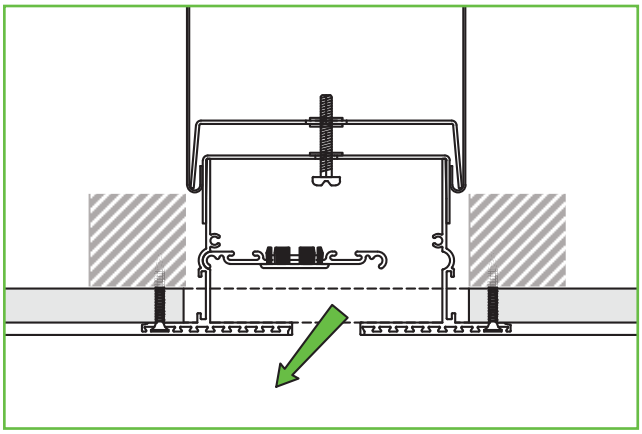


Figure 8

Cleaning and Maintenance

Waterloo recommend that the diffuser faces are cleaned with warm soapy water. For regular cleaning, a simple wipe down of all accessible faces will suffice, taking care not to damage the paint or anodised finish. Abrasive cleaners must not be used.

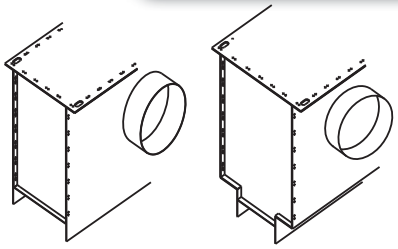
Plenum Boxes

Introduction

Our High- / Low- Line plenum boxes are designed to guarantee a good distribution of the air prior to diffusion through the terminals. Available with Side or Top Entry connections to customer-specific diameter/shape, these can be fitted with Spigot Flap Dampers, cord- / quadrant-operated, as well as 6mm acoustic lining (optional) reaction to fire class C-s3-d0 to EN 13501-1: 2007 to avoid noise generation. Also available with rivet fix (hem fix as standard).

Product Description

PBHL	High-Line Plenum box to suit CS / LCS / DSL / HF Linear Slot Diffusers
PBLL	Low-Line Plenum box to suit CS / LCS / DSL / HF Linear Slot Diffusers
PBHLB	High-Line Plenum box to suit CSB Barrel Slot Diffusers
PBLLB	Low-Line Plenum box to suit CSB Barrel Slot Diffusers
PBHLH	High-Line Plenum box to suit FCD Fan Coil Diffusers
PBLLH	Low-Line Plenum box to suit FCD Fan Coil Diffusers
SE	Side Entry spigot
TE	Top Entry spigot
CC	Circular Connection
RC	Rectangular Connection
FO	Flat Oval Connection
FDC	Cord-operated Flap Damper (optional)
FDQ	Quadrant-operated Flap Damper (optional)
LINED	6mm acoustic lining (optional) reaction to fire class C-s3-d0 to EN 13501-1: 2007
BFL	Internal perforated plate for Supply air diffusers (optional)
BLACK	Plenum painted black to prevent through vision (optional)

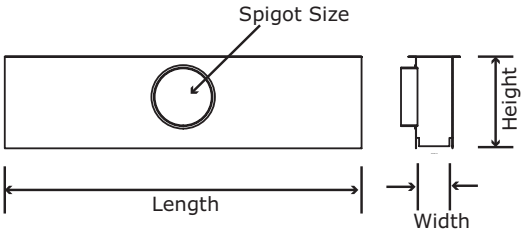


High-Line plenum box

Low-Line plenum box

Features

- Galvnised steel, stitch fixed
- Available in High-Line or Low-Line to accommodate larger spigot sizes
- 1 to 4 connections – Circular, Rectangular or Flat Oval (reduced plenum height)
- Side or Top Entry spigots with optional airflow control damper
- Slotted holes on top plate for easy drop rod installation

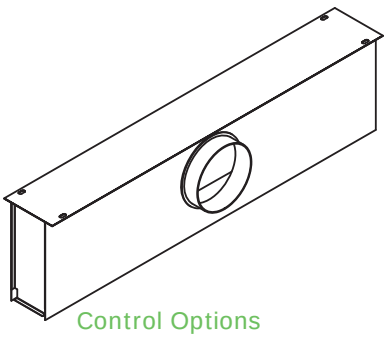


Finish

Galvanised sheet steel

Dimensions

Length	PBHLH / Fan Coil Diffuser length PBHL, PBHLB / Linear Slot diffuser length
Width	PBHLH / Fan Coil Diffuser width PBHL, PBHLB / Number of slots
Height	SE – Spigot diameter or height + 100mm as standard TE – as specified by customer (200mm minimum recommended)



Order

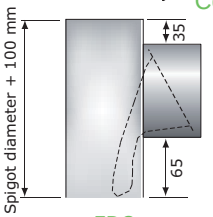
When ordering plenum boxes please specify length, width & height, spigot size and position (Top or Side Entry) and control options. Please note that the plenum height should in general be 100mm greater that the spigot diameter (Side Entry applications).

Order Example

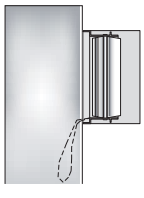
PBHL/HF/2/1200/250/250/SE/147/2CC/OBSS/LINED

- Type
- Diffuser type
- Number of slots
- Plenum box Length
- Plenum box Width
- Plenum box Height
- Entry position
- Spigot Size
- Spigot Number / Shape
- Option
- Option

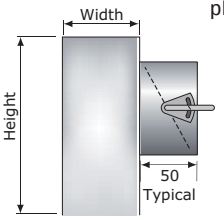
Control Options



FDC
Cord operated flap damper for mounting within circular spigots to plenum boxes.



OBCO
Cord operated opposed blade damper for installation within square or rectangular plenum spigots.



FDQ
Flap damper with external quadrant control for mounting within circular spigots to plenum boxes.

Plenum Chambers

Selection Criteria (Using the Nomogram)

By way of example, referring to the data in the CS section, consider a diffuser handling 180 l/s total with a pressure drop of 25Pa. Projecting from this volume through the diffuser pressure loss, then pivot on the plenum dimensions to suit the diffuser 2 slot width, which gives a minimum plenum height of approx 280mm. Draw a line from the air flow selection point through the required spigot air velocity and read off the nearest standard spigot size. In this example the spigot diameter exceeds the selected plenum height, so the height now becomes 315 + 100 = 415mm.
Alternatively, to maintain the original height, select a suitably sized rectangular spigot (300 x 200 in the example) or use multiple circular spigots.

Recommended max air volume for 3 m/s, 35 dBA based on recommended spigot sizes							
Diameter	97	122	157	197	247	312	397
l/s	22	35	58	92	144	229	370

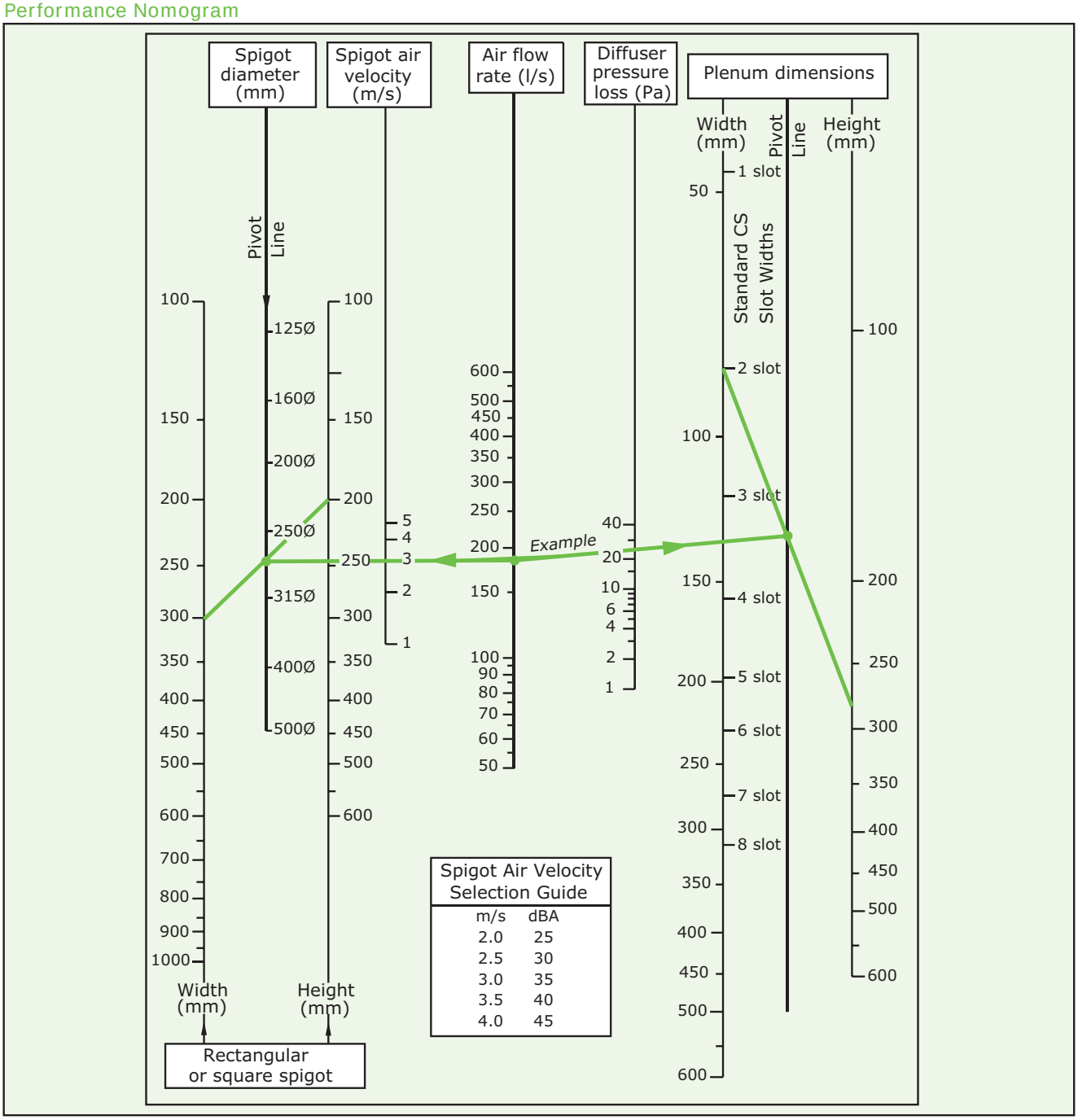
Installation

The plenum boxes and neck reducers are supported by four drop rods through a locating hole positioned near each corner.

Note: Actual spigot diameter is nominal - 3mm (i.e. 200mm is 197mm actual).

Note: Plenum length is determined by linear diffuser selection.

Performance Nomogram



Waterloo Product Range

GRILLES

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

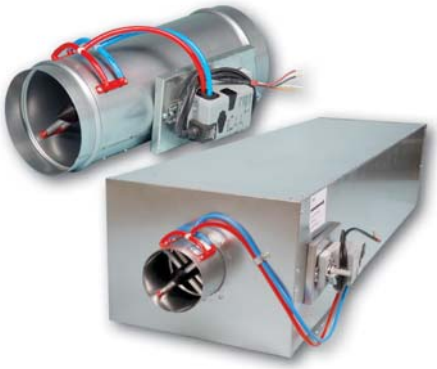
DIFFUSERS

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

ACTIVE AND PASSIVE CHILLED BEAMS

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

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



AIR VOLUME CONTROL DAMPERS

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

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

EXTERNAL LOUVRES

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

DISPLACEMENT

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

waterloo

Waterloo Air Products plc

Head Office:

Mills Road, Aylesford,
Maidstone, Kent ME20 7NB
Tel: +44 (0)1622 711500
Fax: +44 (0)1622 710648
email: sales@waterloo.co.uk
internet: www.waterloo.co.uk

Northern Office:

Hyde Park House, Cartwright Street,
Newton, Hyde SK14 4EH
Tel: +44 (0)161 367 1264
Fax: +44 (0)161 367 1262
email: sales@waterloo.co.uk
internet: www.waterloo.co.uk

bsi. ISO 9001 Quality Management
FM 27823

bsi. ISO 14001 Environmental Management
EMS 590755

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

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