waterloo

Airline Linear Grilles

ALN 0° 6mm thick blade, 12.5mm pitch

ALM 15° 6mm thick blade, 12.5mm pitch

ALF 45° 4.5mm thick blade, 12.5mm pitch

ALG 0° 3mm thick blade, 12.5mm pitch

ALJ 15° 3mm thick blade, 12.5mm pitch

Airline Linear Grilles

ALN / ALM / ALF / ALG / ALJ

Introduction

Waterloo Airline Linear grilles have been designed to satisfy air diffusion and engineering requirements as well as architectural specifications. Airline grilles may be used in modular or continuous (ALN, ALM) situations for ceiling, sidewall, cill or bulkhead applications. The range is available with a wide variety of special options and fabrications to suit most project requirements. Grilles may be supplied with or without frames and borders - cores are represented with a suffix "(C)".

Product Description

ALN	0° 6mm thick blade, 12.5mm pitch
ALM	15° 6mm thick blade, 12.5mm pitch
ALF	45° 4.5mm thick blade, 12.5mm pitch
ALG	0° 3mm thick blade, 12.5mm pitch
ALJ	15° 3mm thick blade, 12.5mm pitch
ALG10	0° 3mm thick blade, 10mm pitch
ALJ10	15° 3mm thick blade, 10mm pitch
ALG(2)	As above with a rear set of adjustable blades
ALJ(2)	As above with a rear set of adjustable blades
ALN(2)	As above with a rear set of adjustable blades
ALM(2)	As above with a rear set of adjustable blades
2ALF	2 way cores are available on angled blade designs (Suffix M, F or J)
AFG	3mm border frame (any blade can be specified)
OBSS	Allen Key operated opposed blade damper
ED	Equalising deflector
DT-2M	Adjustable duct turn (Installed in duct)
ALF-RB	Reverse Border (Any blade can be specified)

Finishes

PPG9010 (RAL 9010 Gloss - 80% Gloss White)

PPM9010 (RAL 9010 Matt - 20% Gloss White)

PPM9006 (RAL 9006 Matt - 30% Gloss Silver)

Other colours or anodised finish available on request

Weights

ALG	14 kg/m2 face area
Others	10 kg/m2 face area
OBSS/ED	9.5 kg/m2 face area
DT2M(G)	9.0 kg/m2 face area

Sizes

Minimum size - 150 x 75mm

Maximum sizes for ALG / ALJ / ALF - 2000 x 1500mm

Maximum sizes for ALN / ALM - any x 1500mm

Maximum single section of cores - 2000 x 1500mm

Refer to head office for borders up to 4 meters in one piece
Continuous grilles are supplied in sections for butt jointing on site.

Fixing Options

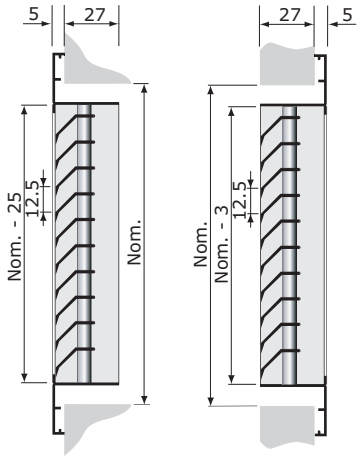
SF	CF	CRB	VS	AFVS
PFVS	RCHS	AFHS	AFCF	RCCF
BSSBD	BSSBP			

The following fixings are not compatible with the ALF blade

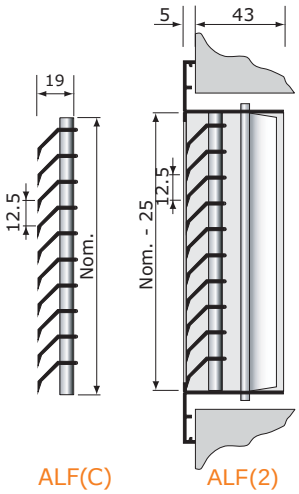
CRB RCHS AFHS BSSBD

BSSBP - Not suitable for grilles with a rear blade or ALF blade

BSSBD - recommended for AFG frame if wall mounted (plasterboard)

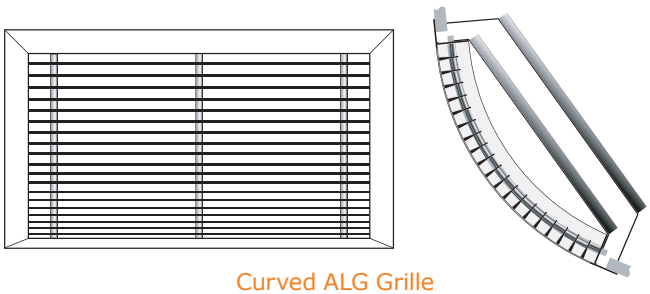


ALF ALF-RB



ALF(C) ALF(2) 2ALF

Special 2 way cores are available for all angled blade, i.e. 2ALF as shown.



Curved ALG Grille

Free Area					
Pitch	Type				
	ALG	ALJ	ALF	ALM	ALN
10mm	68%	68%			
12.5mm	74%	74%	44%	49%	49%

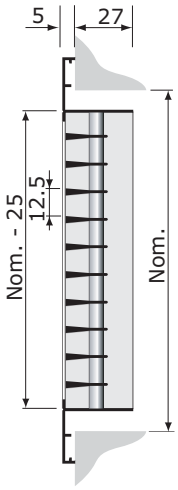
Order Example

ALN/1000/150/R25T32/SF/9010-Matt/OBSS

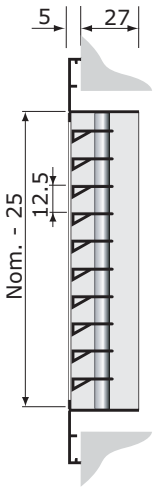
Type
Nominal width
Nominal height
Border
Fixing
Finish
Damper

Airline Linear Grilles

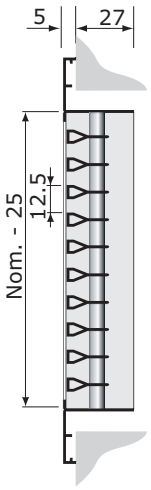
ALN / ALM / ALF / ALG / ALJ



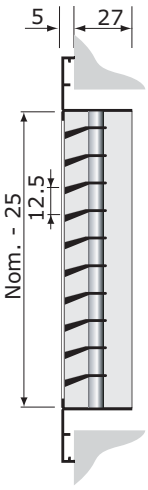
ALG



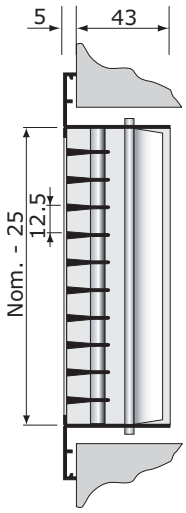
ALM



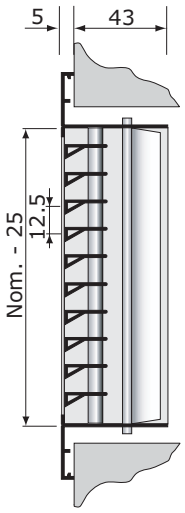
ALN



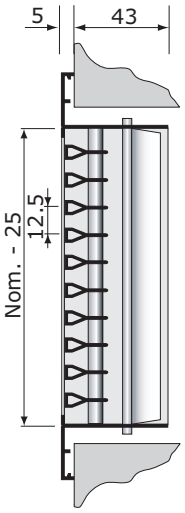
ALJ



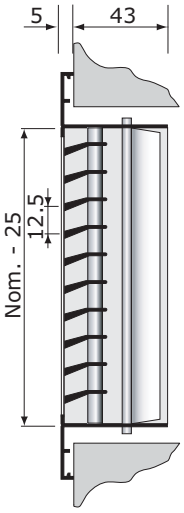
ALG(2)



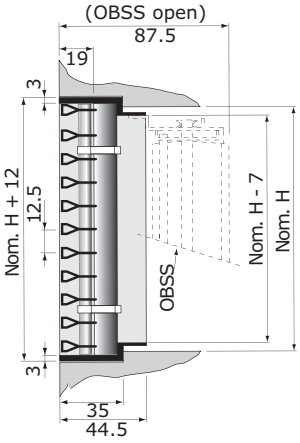
ALM(2)



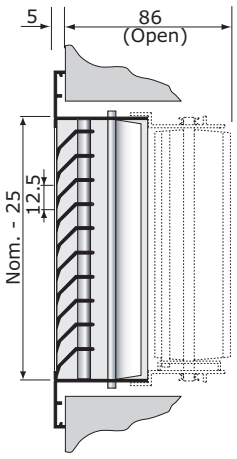
ALN(2)



ALJ(2)



AFG frame shown with
ALN blade + OBSS



ALF(2) + OBSS

Airline Linear Grilles

ALN / ALM / ALF / ALG / ALJ

Selection Criteria

Performance data is derived from tests carried out at isothermal conditions for a 1.25m long grille mounted 0.2m below a ceiling surface. Throw is the horizontal distance to where the envelope velocity equals 0.5m/s.

Correction Factors

Grille Length Correction Factors						
Length (m)	0.25	0.5	1.25	2	2.5	3
L_w	- 6	- 3	0	+2	+3	+5
Throw	x 0.9	x 0.9	x 1.0	x 1.0	x 1.1	x 1.1

Non-isothermal Jet Correction Factors			
Differential	10°c cooling	0°c	10°c warming
Sidewall throw	x 0.9	x 1.0	x 1.1
Cill throw	x 0.9	x 1.0	x 1.1

Terminal Velocity Correction Factors				
V_t (m/s)	0.6	0.5	0.4	0.3
Throw multiplier	x 0.8	x 1.0	x 1.3	x 1.66

Selection Example (Supply)

150mm high grille supplying 400 l/s/m

- **ALG 10**

P_s = 16 Pa 32 dBA

- **ALG**

P_s = 15 Pa 31 dBA

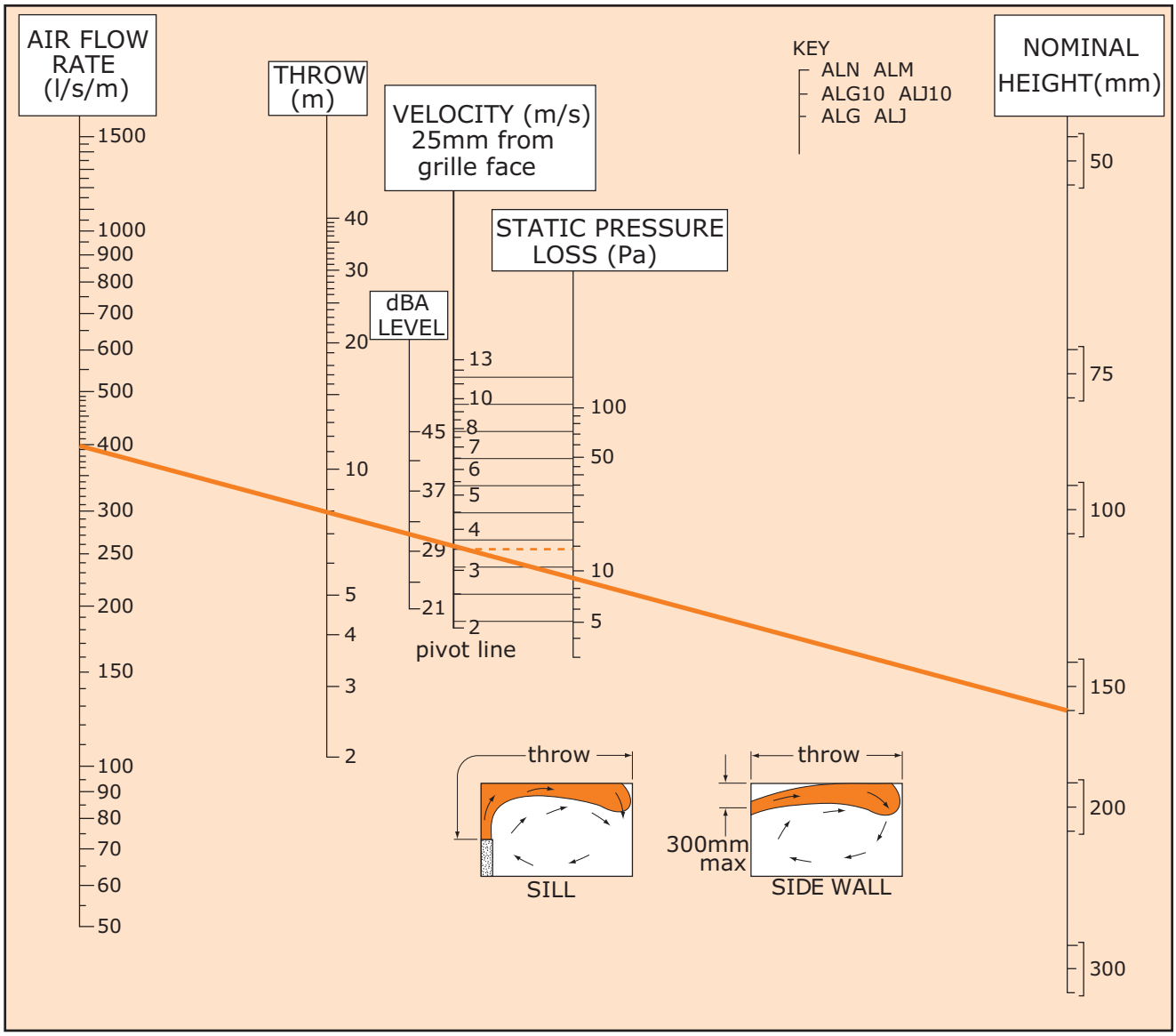
- **ALG 10/OBSS**

P_s = 24 Pa 35 dBA

- **ALG/OBSS**

P_s = 22.5 Pa 34 dBA

Performance Nomogram (Supply)



Airline Linear Grilles

ALN / ALM / ALF / ALG / ALJ

Selection Example (Exhaust)

100mm high grille supplying 200 l/s/m

- **ALF**

P_s = 46 Pa 40 dBA

- **ALN**

P_s = 15 Pa 31 dBA

- **ALF/OBSS**

P_s = 69 Pa 43 dBA

- **ALN/OBSS**

P_s = 23 Pa 34 dBA

Notes

For grilles with OBSS opposed blade damper (open), multiply the pressure loss by 1.5 and add 3dB to the Noise level.

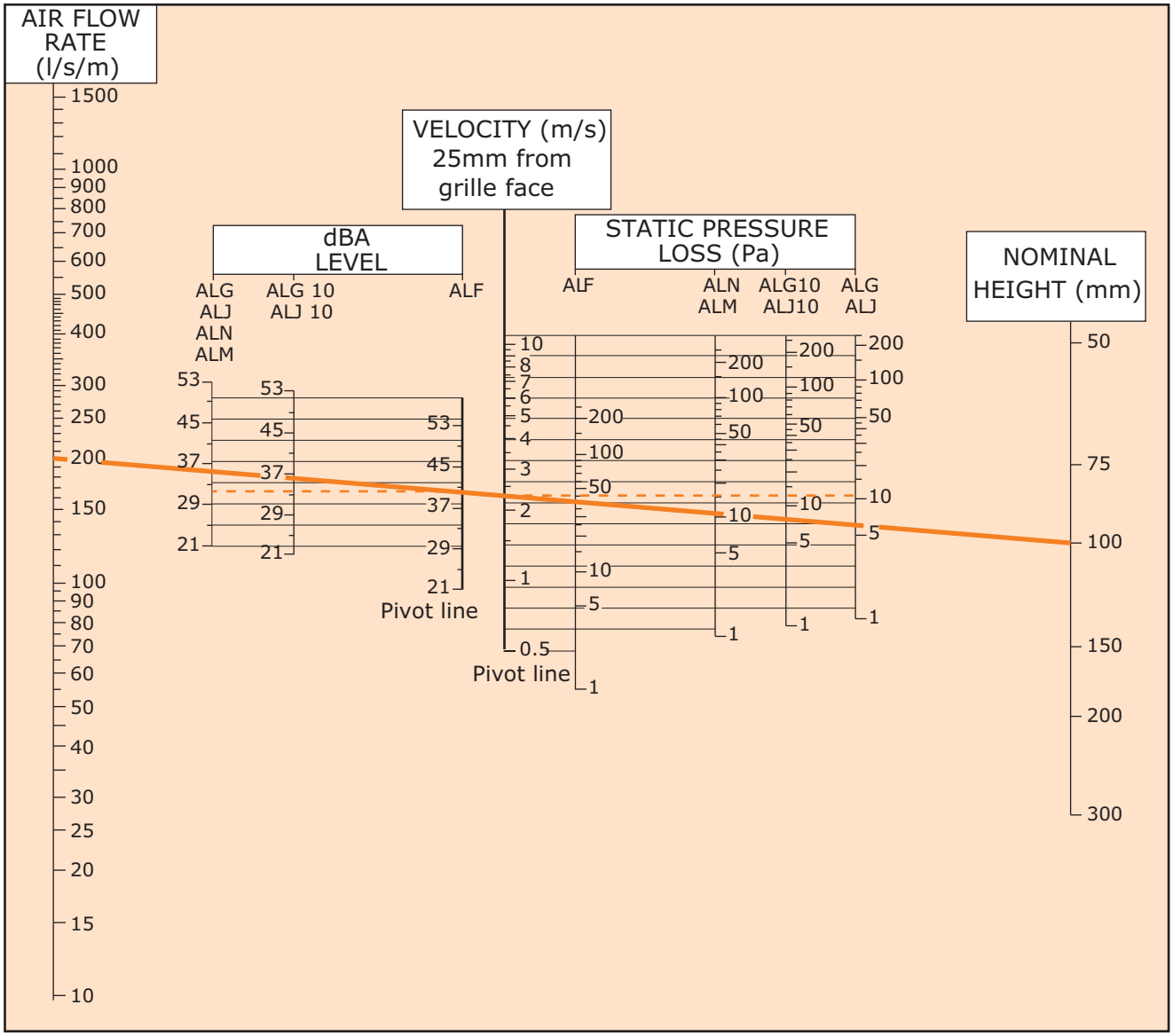
Where AL2 grilles are used multiply P_s x 3.0 and add 6dB to Noise level.

Grille selections for sidewall and cill applications should be based on a minimum discharge velocity of 2m/s.

For sidewall grilles that are to be mounted more than 0.2m from the ceiling, it is preferable to use a 15° blade format.

For sidewall grilles mounted 0.3m or more below ceiling level the throw is reduced by $^1/_3$.

Performance Nomogram (Exhaust)



Airline Linear Grilles

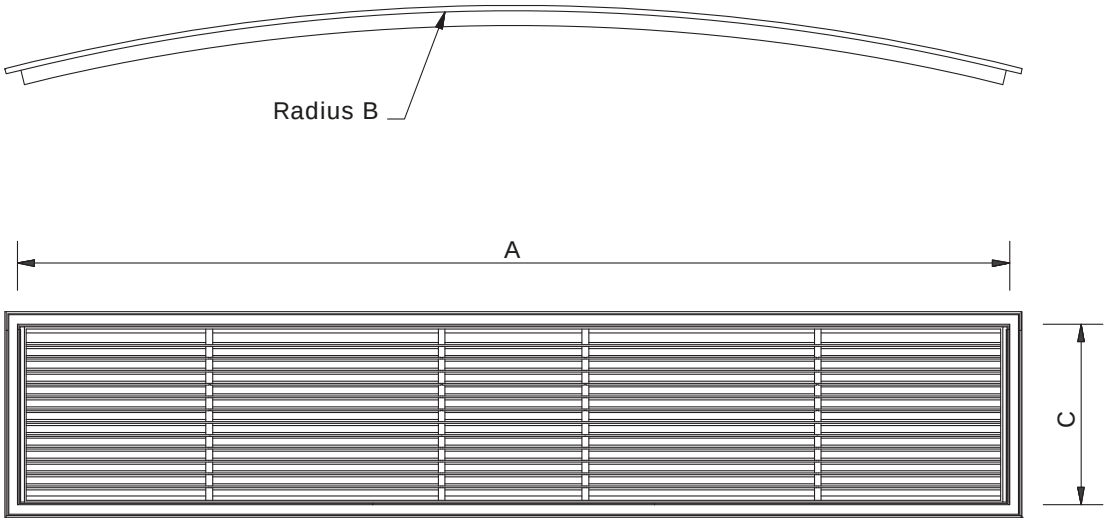
Curved Grilles

Introduction

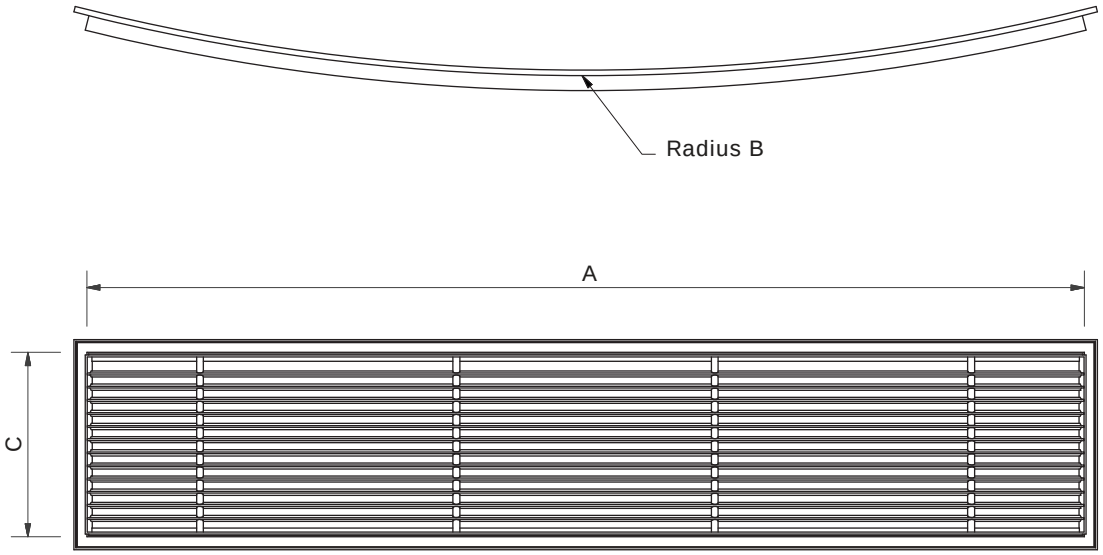
Waterloo Airline Linear grilles are available in 5 curved formats for types: ALG, ALM and ALN. The curved grilles can be manufactured bespoke to any required radius over 1.75mtrs, in any of the following configurations:

- Convex linear curve
- Concave linear curve
- Fanned curve
- Convex barrel curve
- Concave barrel curve

Convex linear curve



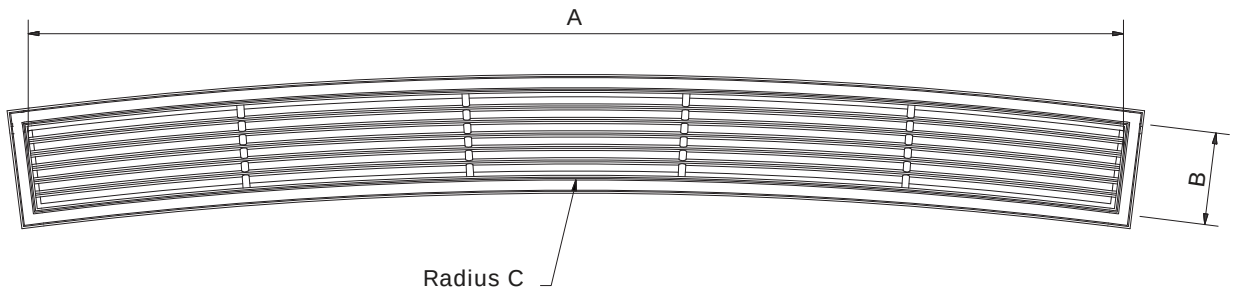
Concave linear curve



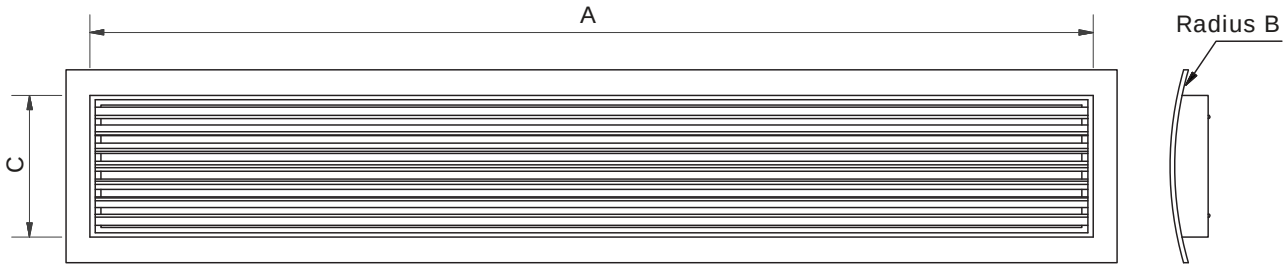
Airline Linear Grilles

Curved Grilles

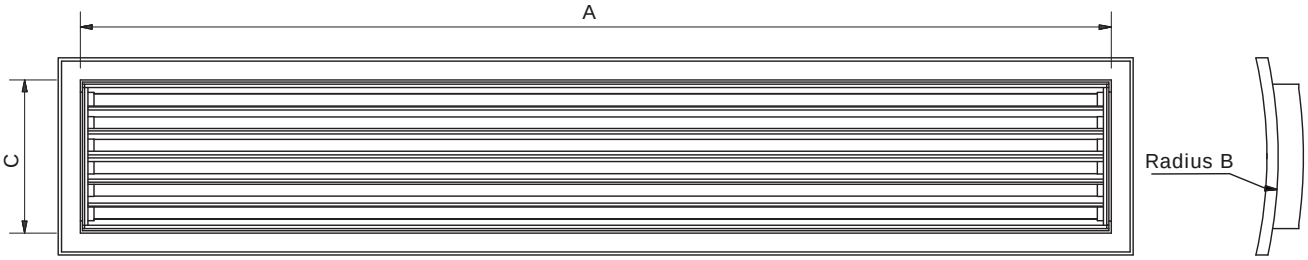
Fanned curve



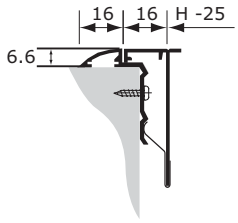
Convex barrel curve



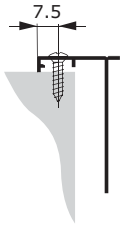
Concave barrel curve



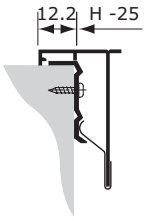
Controls and Fixing Options
Fixing Options



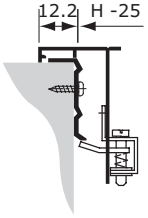
Frame: R16
Mounting: RCCF



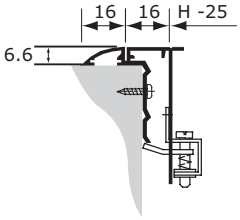
Frame: R25 / R32
Mounting: SF



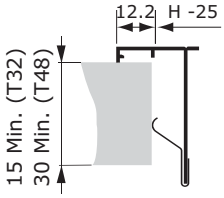
Frame: R25 / R32
Mounting: AFCF



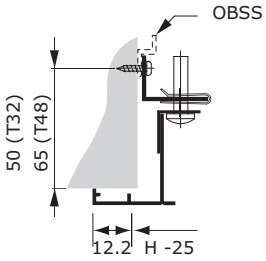
Frame: R25 / R32
Mounting: AFHS



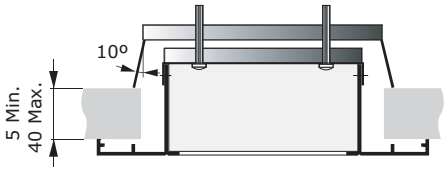
Frame: R16
Mounting: RCHS



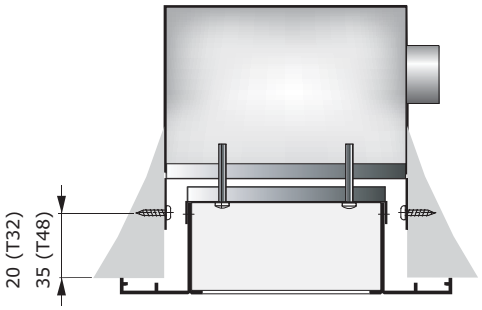
Frame: R16 / R25 / R32
Mounting: CF



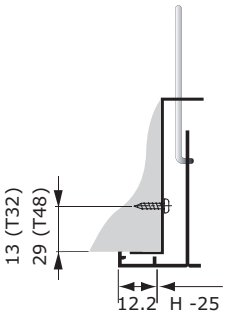
Frame: R16 / R25 / R32
Mounting: CRB



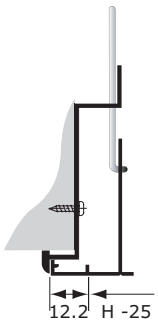
BSSBD (R16 / R25 / R32)
Duct / Plasterboard fixing



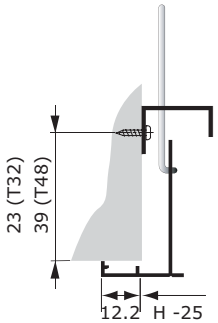
BSSBP (R16 / R25 / R32)
Plenum fixing (-15mm)



Frame: R25
Mounting: AFVS



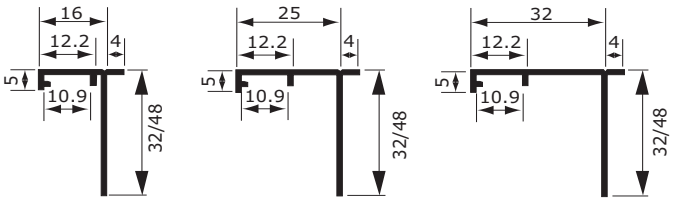
Frame: R25
Mounting: PFVS



Frame: R16 / R25 /R32
Mounting: VS

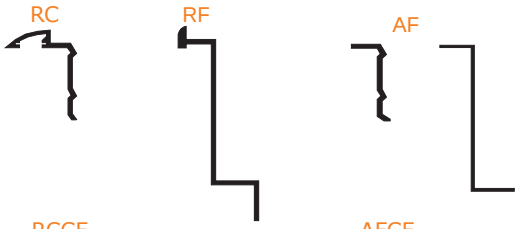
Standard Frames

Standard Frames



R16 R25 R32

Sub Frames



RCCF RCHS PFVS AFCF AFHS AFVS

Overall Grille Sizes
Grille with R16 = Nominal W/H + 7mm
Grille with R25 = Nominal W/H + 25mm
Grille with R32 = Nominal W/H + 39mm
Grille with RC = Nominal W/H + 39mm
Grille with PF = Nominal W/H + 21mm

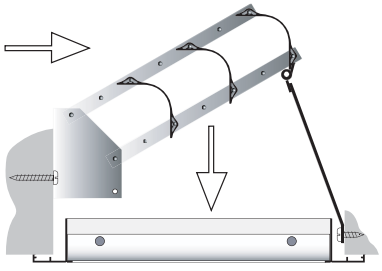
Note:
AF and RC subframes can be made to a maximum size of 800mm in any direction in one piece. For sizes above that, we supply in parts for assembly on site by others.

DT-2M - Duct Fitted

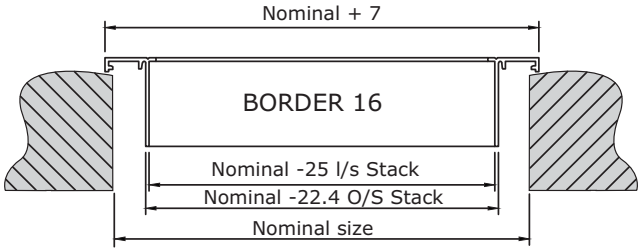
The hinged strip is used to calibrate the amount of air desired, by altering the angle of the blades and therefore altering the amount of disruption to the airflow.

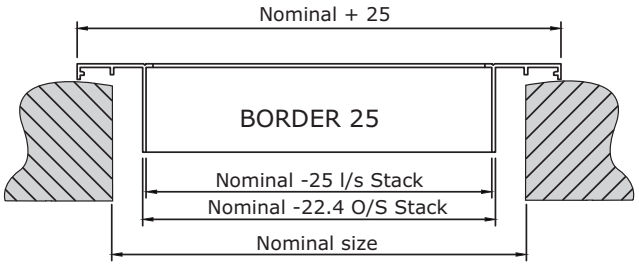
Sizes for DT-2M
Width = 100 - 1225
Height = 75 - 425

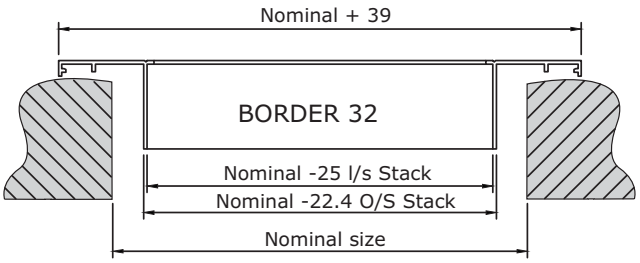
Correction for Grille + Damper		
Supply 0° spread	dBA + 2	P_s x 1.3
Supply 45° spread	dBA + 2	P_s x 1.1
Exhaust	dBA + 2	P_s x 1.2



Grille Nominal Sizes







Grille Fixing Selection

Types	SF	CF	CRB	VS	AFVS	PFVS	BSSB	AFCF	AFHS	RCCF	RCHS
1H / 2H / 1V / 2V	A/C	A	A/C	A/C	A/C	A/C	A/B/C	A	A/C	A	A/C
1KH / 2KH	A/C										
1KV / 2KV	A/C										
1HM / 2HM	A/C										
1VM / 2VM	A/C										
PER / 3HF	A/C	A		A/C	A/C	A/C		A		A	
GC5 / 3HG / 3HJ	A/C	A	A/C	A/C	A/C	A/C	A/B/C	A	A/C	A	A/C
ALF / 2ALF	A/C	A		A/C	A/C	A/C		A		A	
ALN / ALM / ALG / ALJ	A/C	A	A/C	A/C	A/C	A/C	A/B/C	A	A/C	A	A/C
ALG2 / ALJ2	A/C	A	A/C	A/C	A/C	A/C		A	A/C	A	A/C
ALM2 / ALN2	A/C	A	A/C	A/C	A/C	A/C		A	A/C	A	A/C
2ALM / 2ALJ / ALG10 / ALJ10	A/C	A		A/C	A/C	A/C		A		A	A/C
NSA / NSB / DVA / DVB	A/C										
DVC / NSC	A/C	A		A/C	A/C	A/C		A		A	
RTC / 2RTC	A/C										
BORDER STYLES	25T/32T	16T/25T/32T	16T/25T/32T	16T/25T/32T	25T/32T	25T	RTC/16T 25T/32T	25T/32T	25T/32T	16T/RTC-R16	16T/RTC-R16

A = SUITABLE FOR DUCTING AND WALL
B = SUITABLE FOR PLASTERBOARD
C = SUITABLE FOR CEILING

Removable Cores

Types	Removable	RCCF	RCHS	PFVS	AV	AFCF	AFHS	RTC	RCG - GC5	Special
1H/2H/1V/2V	Grille	B	B	B	N	N	N			
PER/GC5	Grille	B	B	B	N	N	N			
RCG - GC5	Core								B	
3HG/3HJ	Grille	B	B	B	N	N	N			
3HG/3HJ	Core							B		B
3HF/ALF	Grille	B		B	N	N				
3HF/3HJ	Core							B		B
ALN/ALM/ALG/ALJ	Grille	B	B	B	N	N	N			
ALN/ALM/ALG/ALJ	Core							B		B
APN/APM/APG/APJ	Core									
ALG10/ALJ10	Grille	B		B	N	N				
ALG10/ALJ10	Core							B		B
NSC/DVC	Grille	B		B	N	N				
RTC/2RTC	Grille	B								
RTC/2RTC	Core							B		

B = BEADED FRAME
N = NON BEADED FRAME
RTC = R5 OR R16 FRAME WITH CORE AND PACKERS
SPECIAL = PART 6200001 FRAME WITH CORE AND BRACKET INCORPORATING TERRY CLIP
Note: If OBSS or ED are selected access to the duct work will not be possible.

Control Options - Grille Mounted

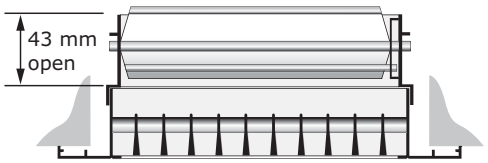
OBSS Opposed Blade Damper (Volume Control Damper)

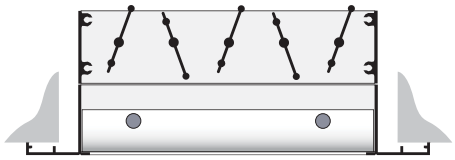
Introduction

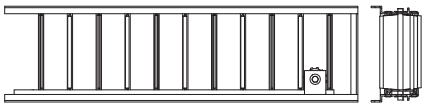
Waterloo OB Opposed Blade Dampers are manufactured to suit virtually the whole of our square / rectangular Air Terminal range and can be fitted to the neck of the terminals or inside plenum box.

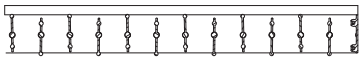
They are adjustable from the front of the Grille or Diffuser with a screwdriver as standard, but are also available with cord- or lever-operation.

Manufactured with linked aluminium extruded blades, in sizes to suit any Waterloo Grille or Diffuser, they are useful for fine airflow regulation and can be adjusted from fully open to closed low-leakage position.









Product Description

OBSS	Opposed Blade Damper, Screwdriver operated
OBCO	Opposed Blade Damper, Cord operated
OBSL	Opposed Blade Damper, Short Lever operated
OBLL	Opposed Blade Damper, Long Lever operated
BLACK	Painted black to prevent through vision

Features

- Linked aluminium extrusions for limited extra weight
- Large choice of adjustments to suit any configuration
- Can be fitted to virtually any Waterloo Grille or Diffuser

Finishes

Extruded aluminium blades

Sizes

Minimum Size - 100 x 75

Minimum Size for Plasterline - 100 x 50

Maximum Size - single section 800x600mm

Multiple sections will be banked to accommodate larger terminal sizes.

Order Example

OBSS/300/300/Black/ To suit a 1H

- Damper type
- Terminal length
- Terminal width
- Options
- Terminal type

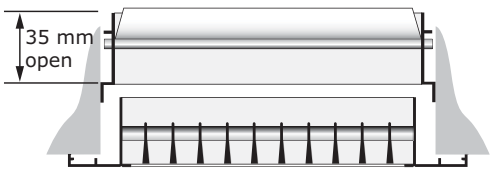
ED Equalising Dampers (Directional Blades Incapable of Shut Off)

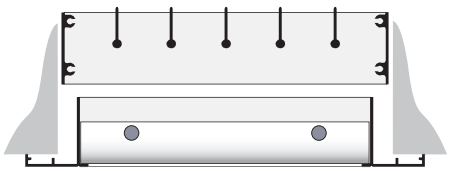
Introduction

Waterloo ED Equalising Dampers are manufactured to suit virtually the whole of our square / rectangular Air Terminal range and can be fitted to the neck of the terminals or inside plenum box.

They are individually adjustable to control air direction and may be used for localised blanking.

Manufactured with aluminium extruded blades, in sizes to suit any Waterloo Grille or Diffuser, they can be adjusted manually by removing the Grille or Diffuser core.





Product Description

ED	Equalising deflector
BLACK	Painted black to prevent through vision

Features

- Aluminium extrusions for limited extra weight
- Individually adjustable for fine airflow regulation
- Can be fitted to virtually any Waterloo Grille or Diffuser

Finishes

Extruded aluminium blades

Sizes

Minimum Size - 100 x 50

Maximum Size - single section 800x600mm

Multiple sections will be banked to accommodate larger terminal sizes.

Order Example

ED/300/300/Black/ To suit a 1H

- Damper type
- Terminal length
- Terminal width
- Options
- Terminal type

Grille Plenum Chambers

Introduction

Correct selection and sizing of distribution plenum chambers is critical because grille air resistance is very low relative to the distribution ductwork resistance. It is therefore recommended that whenever possible grilles are served by low velocity stub ducts from branch ducting systems fitted with correct balancing controls.
Where it is necessary to specify and use grille plenums a generous allowance for commissioned noise generation should be made.

Product Description

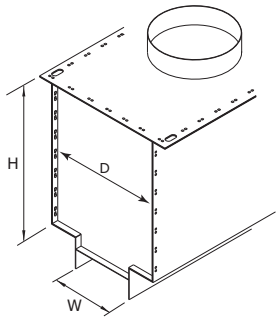
PBG	Individual grille plenum
PBG/LL	Low line grille plenum
NRG	Neck reducer
PBLG	Linear grille plenum
PBLG/LL	Low line linear grille plenum
PBSG	Security grille plenum

Spigot Options

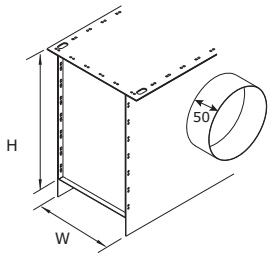
SE	Side Entry
TE	Top Entry
1CC	1- Circular Connection
1RC	1- Rectangular/Square Connection
1FO	1- Flat Oval Connection

Features

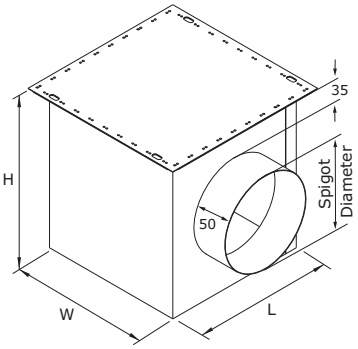
- Plated steel with stitched seam joints.
- Standard circular connection diameters: 97, 122, 157, 197, 247, 312 and 397 Ø
- Available with circular, square,rectangular or flat oval spigots in either top or side entry applications
- Standard or Low-line configurations
- Optional 6mm internal thermal/acoustic lining



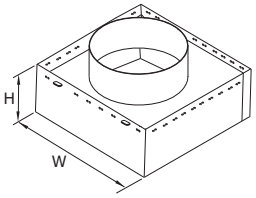
PBLG/LL - Top entry Low-line linear grille plenum box.



PBLG - Side entry Linear grille plenum box.

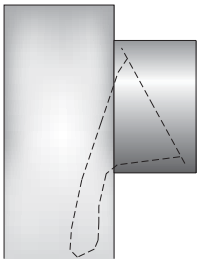


PBG - Side entry grille plenum box



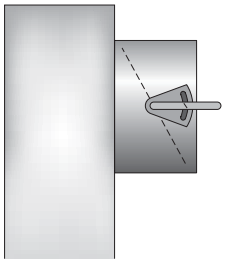
NRG - Neck Reducer

Control Options



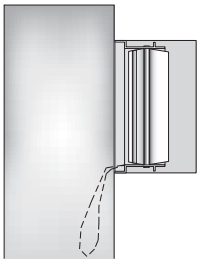
FDC

Cord operated flap damper for mounting within circular spigots to plenum chambers. The cord should be fed through the air terminal device ready for commissioning.



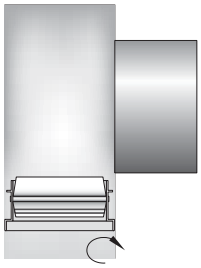
FDQ

Flap damper with external quadrant control for mounting within circular spigots to plenum chambers. The quadrant is accessible from outside the duct and the damper can be locked in any position.



OBCO

Cord operated opposed blade damper for installation within square or rectangular spigots to plenum chambers. The cord should be fed through the air terminal device ready for commissioning.



OBSS / ED

Standard opposed blade damper for diffuser or duct mounting. Adjustable by screwdriver inside the duct or through the face of the air terminal device. The ED is an individually adjustable blade device for equalising airflow across the diffuser.

Finish

PBG/NRG	Galvanised sheet steel

Dimensions

Length	Extract Grille length
Width	Extract Grille width
Height	SE – Spigot diameter or height + 100mm as standard
	TE – as specified by customer (200mm minimum recommended)

Order

When ordering plenum chambers 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).

Plenum Order Example

PBG-1H/570/570/400/SE/1CC/157dia/Lined

- Type
- Plenum box length
- Plenum box width
- Plenum box height
- Spigot position
- Spigot type
- Spigot size
- Acoustic lining

Waterloo Product Range

GRILLES

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

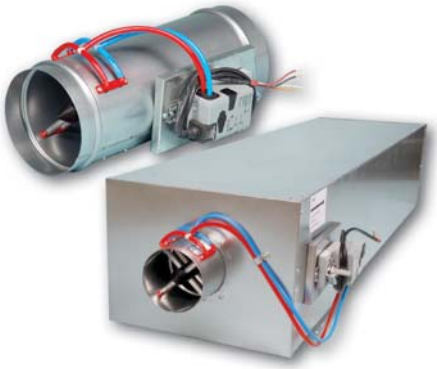
DIFFUSERS

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

ACTIVE AND PASSIVE CHILLED BEAMS

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

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



AIR VOLUME CONTROL DAMPERS

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

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

EXTERNAL LOUVRES

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

DISPLACEMENT

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

waterloo

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bsi. ISO 9001 Quality Management
FM 27823

bsi. ISO 14001 Environmental Management
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.

October 2018