



EXTERNAL LOUVRES

External Fixed Blade Louvres

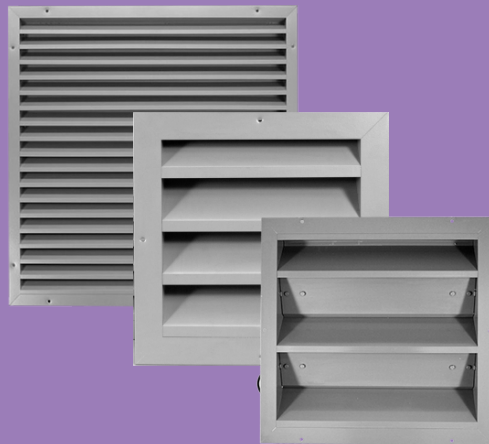
“No Sight” Louvres

Adjustable Louvres

Acoustic Louvres

Penthouse Louvres

Sand Louvres



Reliability

To reliably give your client the service and support they expect, you need confidence that your suppliers will compliment and support your own professionalism. Waterloo's World Class attitudes and beliefs provide this confidence.

World-Class is not a reflection of size or number of employees, it is to do with values such as flexibility, innovation, customer service, integrity, strength of character and good humour. These are the values that separate the outstanding from the ordinary.

Innovation

Some projects are common place, but as the possibilities of building design are pushed to wider and wider boundaries you need to continually search for technically and cost effective solutions to give satisfaction to your client. Waterloo is committed to constant innovation to provide you with those solutions.

We at Waterloo challenge accepted knowledge and use our understanding and learning to sustain our reputation for technical excellence and continually develop one of the widest ranges of air terminal devices in the world. For over 100 years Waterloo have actively pioneered the use of innovative manufacturing techniques, an approach that is still integral to the way we work today.

Quick Delivery

When you are working on fast track projects (or just dealing with unexpected site requirements) you need confidence that your supplier understands and can respond with the required urgency. To give you complete support, Waterloo obsessively maintains high delivery and quality performance.

Waterloo has a well justified reputation throughout the construction industry for very quick service – when others might offer four or six weeks delivery periods, Waterloo prides itself in delivering most small and medium orders in five days.

Flexibility

In an ideal world all projects would commence with the entire design complete and documented. Until then, to give your client maximum confidence and satisfaction, Waterloo's renowned flexibility is at your service.

Unanticipated design issues or site conditions might require complex but timely solutions to exceptional problems. Waterloo's flexibility is founded on our wealth of experience, the fluency and knowledge of our highly-skilled staff and our willingness to explore new ways of working, and our desire to share with you the benefits of our expertise in construction, design, management, planning, procurement and programming.

Specials as Standard

Architectural design is continually developing and the tasks of interpreting the requirements and providing cost effective and practical solutions become more important. Waterloo's complimentary made-to-order programme and fluency with the design and manufacture of bespoke air terminal devices will allow you to realise your vision or solve unanticipated problems on site.

Symbols Used

V_{eff}	Effective Air Velocity [m/s]
L_{WA}	Uncorrected sound power level [dB]
q_v	Air Volume [l/s] or [m ³ /h]
P_s	Static Pressure [Pa]
W	Nominal Width [mm]
H	Nominal Height [mm]



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Large Format Fixed Blade External Louvres

WG-EF / WG-RF

Introduction

WG large format louvres are suitable for most external walling/screening applications. Available systems include horizontal and vertical, continuous or mullion for screens, doors, access panels, penthouse units, mansard roof panels and enclosures.

Product Description

WG-EF External flanged louvre

WG-RF Recessed frame louvre

DC Drip cill

Features

- Continuous effect or mullion style joints
- 65, 75 and 100mm pitches for mansard, standard and sheltered installations
- Blade alignment strips provided on continuous sections

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

Sizes

Nom. W 125 - 2000 mm

Nom. H 200 - 2015 mm

For larger sizes please contact head office

Panel Sizes

From 300mm x 300mm to 2000mm wide x 1500mm high or 1500mm wide x 2000mm high (maximum single section dimension).

Maximum panel width for multiple section continuous louvres is 1000mm.

Maximum height for multiple panel assembly is 4000mm but may be greater if suitable structural support work is available.

Fixing

SF Screw fixing

NF No fixing

LF Rear lug fixing

STS Screw through stack fixing

Screen Options

BS Stainless steel bird screen

IS Aluminium insect screen

Other options available on request

Weights

WG 13 kg/m² panel

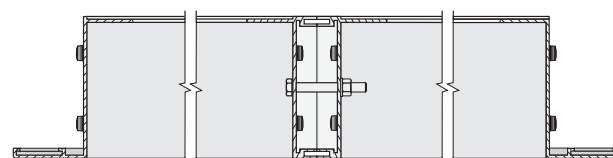
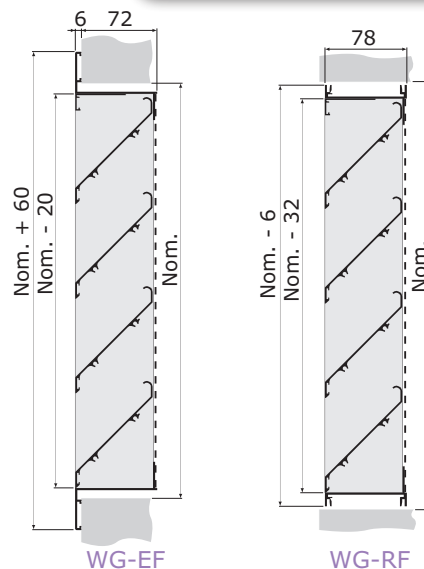
Advantages

- Lightweight, extruded aluminium frame and blade system
- Weather resistant design
- Rear rain trap profile on each blade

Order Example

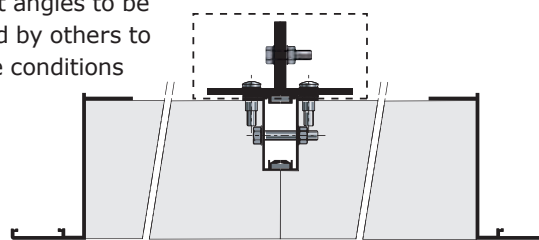
WG-EF/800/500/75/PPM9006/SF/BS

Louvre Type _____
 Nominal Width _____
 Nominal Height _____
 Pitch _____
 Finish _____
 Fixing _____
 Screen Option _____



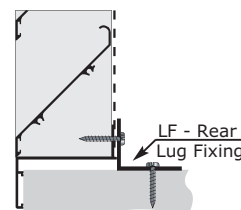
The above drawing shows a multiple WG-EF split along the width - Aluminium strips allow for expansion and contraction, due to changes in temperature.

Support angles to be supplied by others to suit site conditions



Continuous blade effect is also available for joining multiples

Free Area	
65, 75	24% - 55%
100	80%



Large Format Fixed Blade External Louvres

WG-EF / WG-RF

Selection Example

2000mm wide x 1500mm high louvre with 75 and 100mm blade pitches handling 4000 l/s

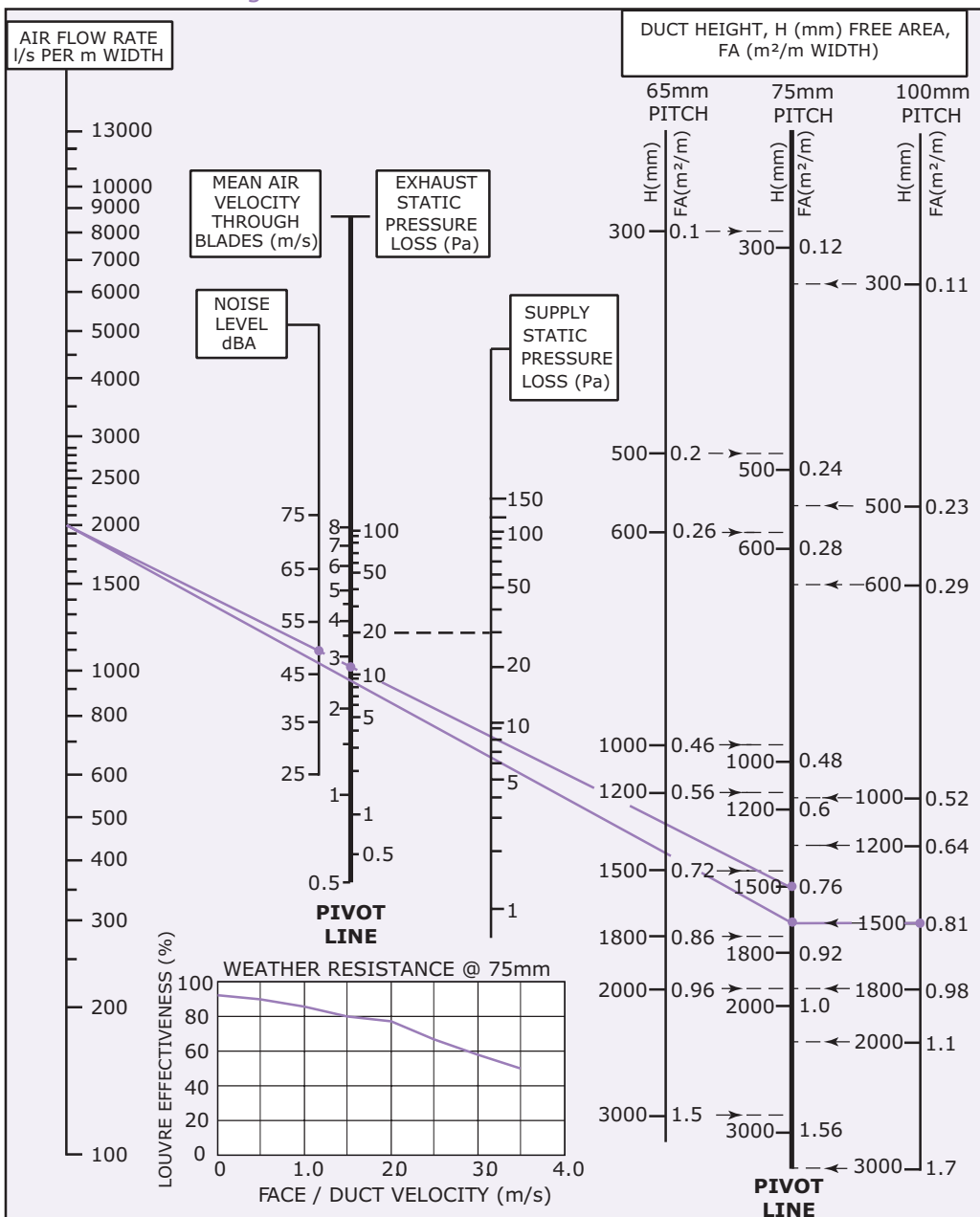
Total air volume/width:	4000/2 = 2000 l/s/m	
From nomogram	75mm pitch	100mm pitch
dBA	50	47
Pa	12	9
Mean Jet Velocity	2.8 m/s	2.6 m/s
Free Area x width	0.76 x 2 = 1.52m ²	0.81 x 2 = 1.62m ²

Frequency Spectrum Corrections (Hz)					
125	250	500	1k	2k	4k
+6	+5	+2	0	-6	-12

Static pressure scale is for exhaust applications with or without birdscreen. A factor of 1.5 should be applied for intake louvres and a factor of 1.1 should be applied for Insect Screen.

dBA is the noise rating of the louvre based on sound power level. To determine octave band sound power levels, apply the correction factors shown to the dBA level.

Performance Nomogram



Bird mesh

- Aperture size 13 x 13mm
- Wire diameter 1.6mm
- Free area 80%
- Material Stainless steel

Insect mesh

- Aperture size 1.31mm x 1.13mm
- Wire diameter 0.28 mm
- Free area 66%
- Material Aluminium

Louvre based on tests to HEVAC Technical Specification - 'Laboratory Testing & Rating of Weather Louvres when subjected to simulated rain'.

Small Format Fixed Blade External Louvres

YG-EF / YG-RF

Introduction

Series YG small format louvres are suitable for intake or exhaust systems where space or cost is at a premium. The design incorporates features of the WG system but at half the scale and this makes the YG ideal for small louvre applications, sheltered situations and even internal screening requirements.

Product Description

YGA-EF External flanged louvre 38mm pitch

YGA-RF Recessed frame louvre 38mm pitch

YGB-EF External flanged louvre 45mm pitch

YGB-RF Recessed frame louvre 45mm pitch

YGC-EF External flanged louvre 50mm pitch

YGC-RF Recessed frame louvre 50mm pitch

Note: The YGB/YGC are for sheltered locations only

Features

- Small format compact design
- Weather resistant design
- Lightweight aluminium extrusions
- Flanged and recessed frame options
- Provision for blade alignment on continuous installations

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

Sizes

Nom. W 125 - 1200 mm

Nom. H 115 - 1985 mm

For larger sizes please contact head office

Fixing

SF Screw fixing

LF Rear lug fixing

STS Screw through stack fixing

NF No Fixing

Screen Options

BS Stainless steel bird screen

IS Aluminium insect screen

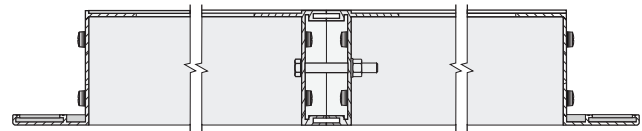
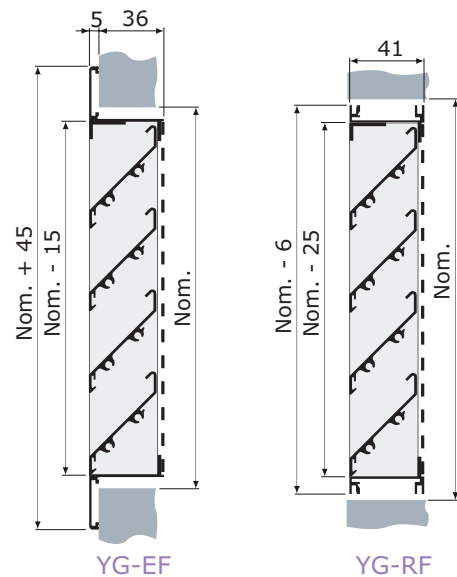
Other options available on request

Weights

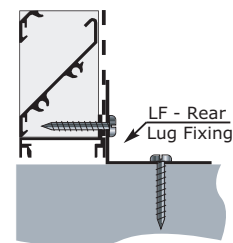
YG 10 kg/m² panel

Advantages

- Lightweight, extruded aluminium frame and blade system
- Rear rain trap profile on each blade



The above drawing shows a multiple YG-EF split along the width - Aluminium strips allow for expansion and contraction, due to changes in temperature.



Free Area
YG
19%- 47%

Bird mesh

- Aperture size 13 x 13mm
- Wire diameter 1.6mm
- Free area 80%
- Material Stainless steel

Insect mesh

- Aperture size 1.31mm x 1.13mm
- Wire diameter 0.28 mm
- Free area 66%
- Material Aluminium

ORDER EXAMPLE

YGA-EF/1500/600/PPM9006/SF/BS

Louvre Type

Nominal Width

Nominal Height

Finish

Fixing

Screen Option

Small Format Fixed Blade External Louvres

YG-EF / YG-RF

Selection Example

1500mm wide x 600mm high YG louvre handling 1200 l/s

Total air volume/width: $1200/1.5 = 800$ l/s/m

From nomogram YGA (38mm pitch) YGB (45mm pitch)

dBA 45 44

Pa 11 9

Mean Jet Velocity 3.3 m/s 3.0 m/s

Free Area x width $0.21 \times 1.5 = 0.32\text{m}^2$ $0.22 \times 1.5 = 0.33\text{m}^2$

Frequency Spectrum Corrections (Hz)					
125	250	500	1k	2k	4k
+6	+5	+2	0	-6	-12

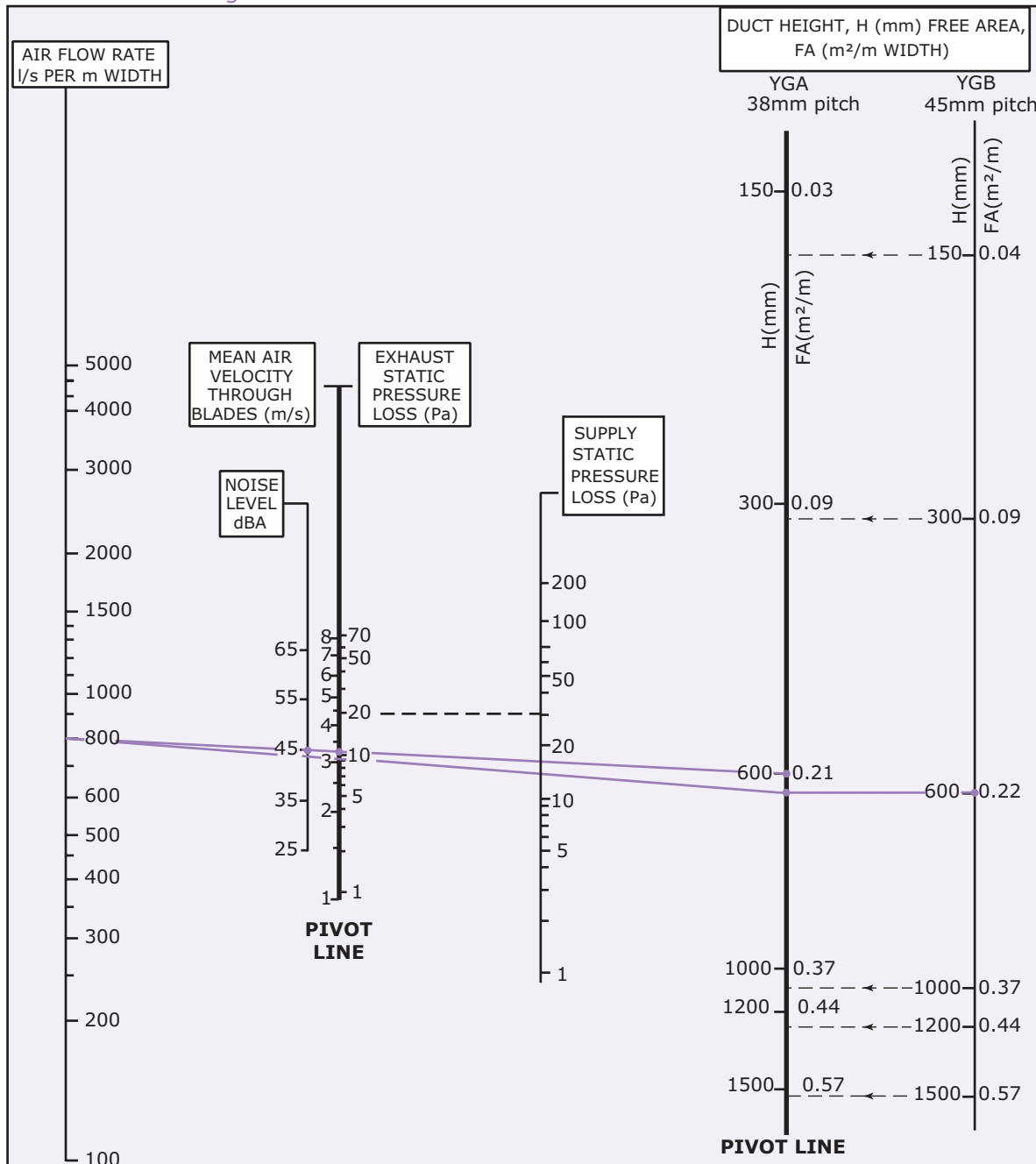
Static pressure scale is for exhaust applications with or without birdscreen.

A factor of 1.5 should be applied for intake louvres and a factor of 1.1 should be applied for Insect Screen.

dBA is the noise rating of the louvre based on sound power level.

To determine octave band sound power levels, apply the correction factors shown to the dBA level.

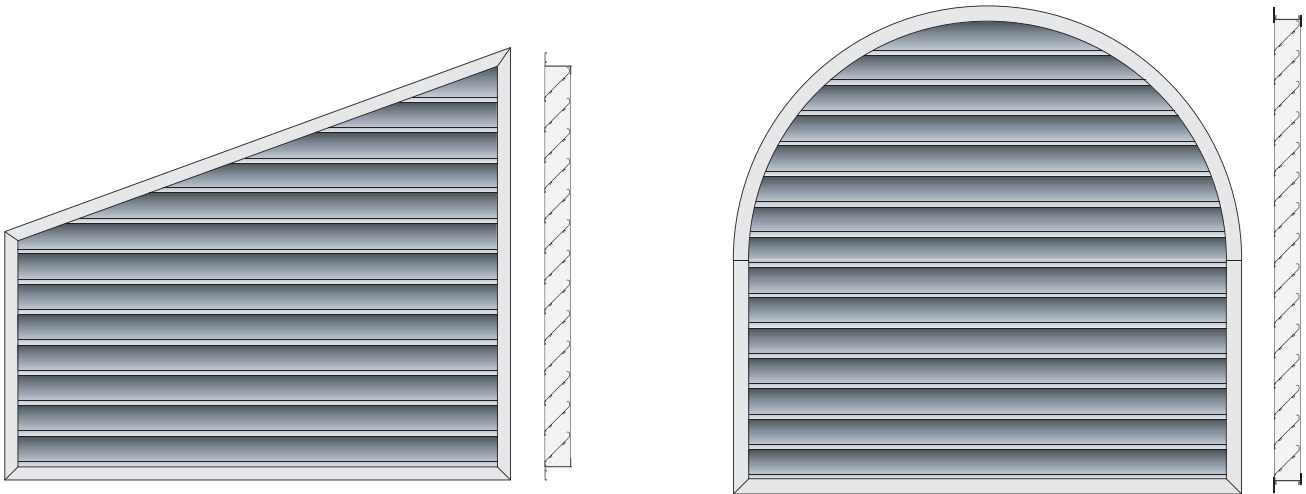
Performance Nomogram



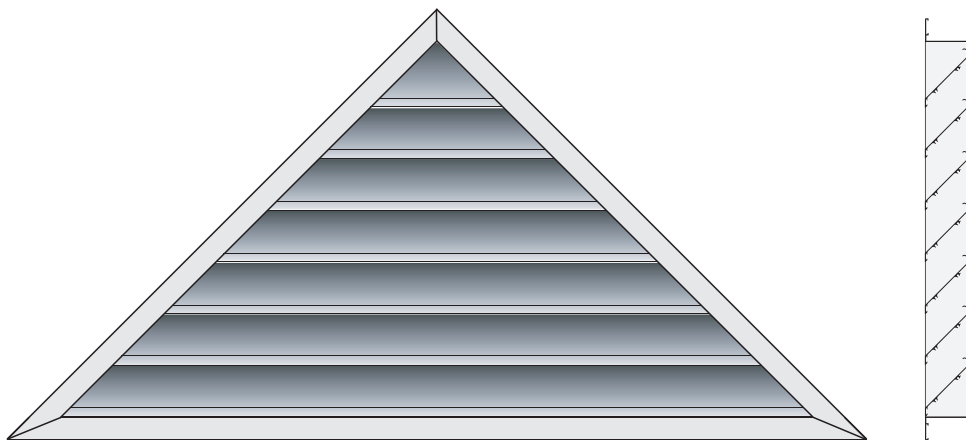
Bespoke Designs

Introduction

We at Waterloo pride ourselves in our ability to meet customer requests - no matter how far from the normal that request may be! A common request is for a reverse border, so that the flange is on the inside of the fixing wall. This is useful for situations where the product can be more easily installed from the inside of the building.

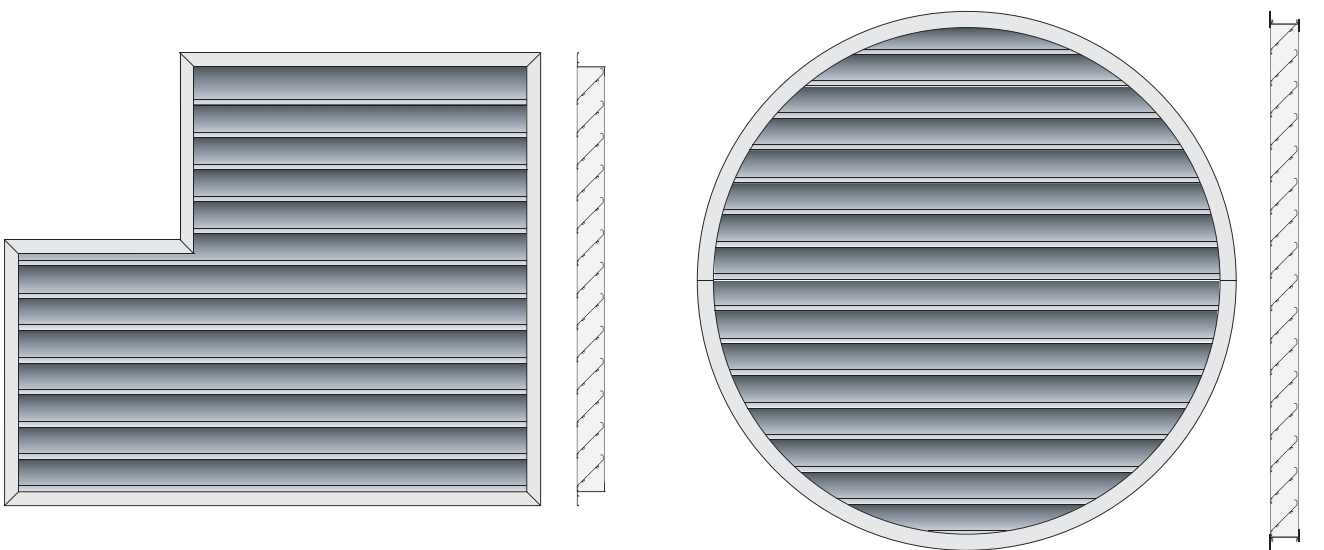
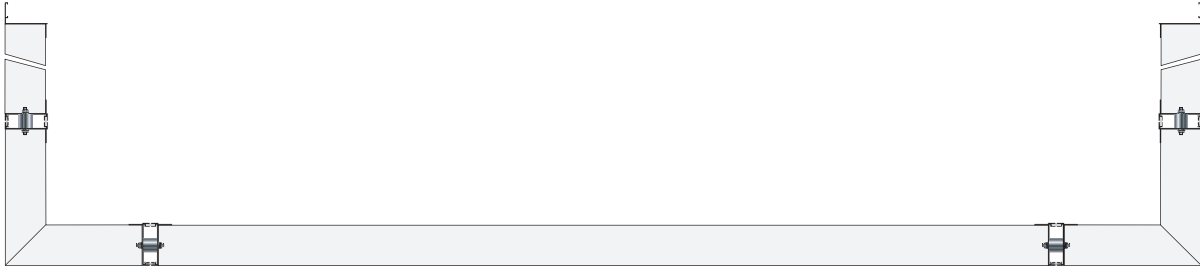


These are some examples of louvres designed and manufactured for customers in the past.



Bespoke Designs

As with all of our products, if you do not see what you are looking for please contact head office.



Large Format Adjustable Louvres

WGK-EF / WGK-RF

Introduction

The Waterloo WGK large format adjustable louvres are manufactured from aluminium extrusion, with alternating fixed and adjustable blades. This means that for applications where volume control is important there is no need for an additional damper. Saving in the cost, the installation and the space required.

Options include manual, hand winch or electric motor actuators, two types of frame, with or without a drip cill, and optional bird screen.

Product Description

- WGK-EF** Manually operated, externally flanged, large format adjustable louvre with open or closed blade adjustment.
- WGK-RF** Manually operated, recessed frame, large format adjustable louvre with open or closed blade adjustment.
- W** Hand winch operated, externally flanged, large format adjustable louvre with continuous adjustment.
- S** Electric motor (Different types can be fitted)

Features

- Weather resistant design
- Adjustable blades
- A selection of actuation methods

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

WGK 15.0 kg/m² panel

Sizes

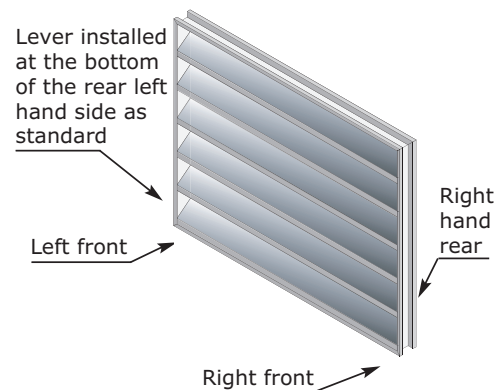
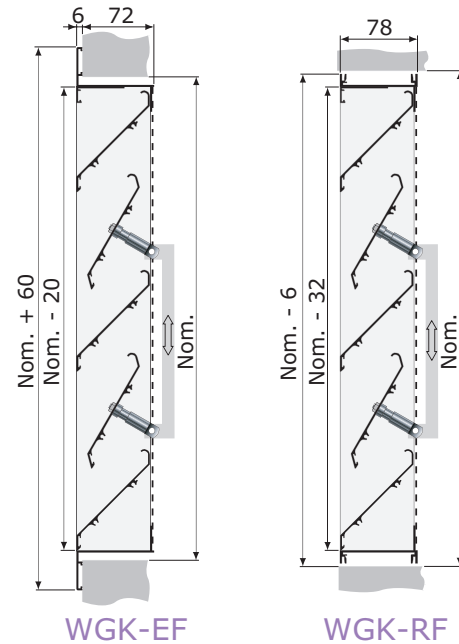
- Nom. W 400 - 1200 mm
- Nom. H (WGK-EF) 305 - 1925 mm 180 mm Pitch
- Nom. H (WGK-RF) 315 - 1935 mm 180 mm Pitch
- For larger sizes please contact head office

Fixing

- SF Screw fixing
- LF Rear lug fixing
- NF No fixing

Screen Options

- BS Stainless steel bird screen
- Please contact head office to select an order



ORDER EXAMPLE

WGK-EF/800/665/PPM9006/LF/BS

- Louvre Type _____
- Nominal Width _____
- Nominal Height _____
- Finish _____
- Fixing _____
- Screen Option _____

Bird mesh

- Aperture size 13 x 13mm
- Wire diameter 1.6mm
- Free area 80%
- Material Stainless steel

Insect mesh

- Aperture size 1.31mm x 1.13mm
- Wire diameter 0.28 mm
- Free area 66%
- Material Aluminium

Small Format Adjustable Louvres

YGK-EF / YGK-RF

Introduction

The Waterloo YGK are small format adjustable louvres manufactured from aluminium extrusion, with adjustable blades. This means that for applications where volume control is important there is no need for an additional damper. Saving in the cost, the installation and the space required.

The mechanism can be installed on the front or rear, left or right hand side. The YGK comes as standard with a rectangular aluminium perforated plate on the rear side. Options include two different frames, a drip cill and a selection of fixings.

Product Description

YGK-EF Externally flanged small format adjustable louvre

YGK-RF Recessed frame small format adjustable louvre

Features

- Weather resistant design
- Adjustable blades
- Rear side perforated plate attached as standard

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

YGK 12.0 kg/m² panel

Sizes

Nom. W 125 - 800 mm

Nom. H(YGK-EF) 187.5 - 975.0 mm in 37.5 mm increments

Nom. H(YGK-RF) 197.5 - 985.0 mm in 37.5 mm increments

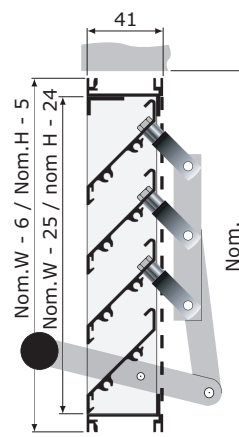
Fixing

SF Screw fixing

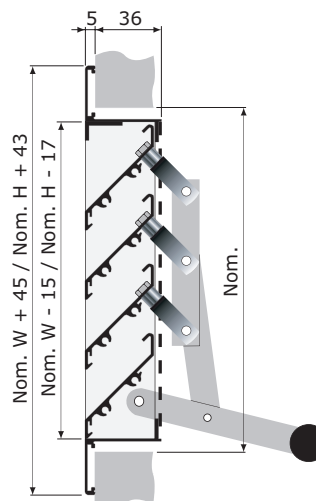
LF Rear lug fixing

NF No fixing

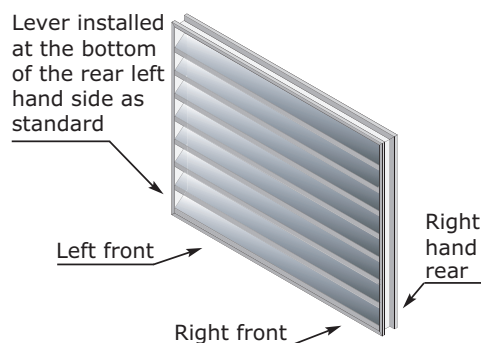
Please contact head office to select an order



YGK-RF



YGK-EF



ORDER EXAMPLE

YGK-EF/800/525/PPM9006/LF

Louvre Type _____

Nominal Width _____

Nominal Height _____

Finish _____

Fixing _____

Acoustic Louvres

WGA / WSR

Introduction

The Waterloo WGA louvres are sound attenuation louvres made from galvanised steel or aluminium plate, and are designed for applications where ventilation is important but "cross-talk" is undesirable.

There are two types of louvres that come with an additional back louvre for increased sound attenuation properties.

Product Description

- WGA-150** Acoustic louvre with 150 mm pitch. 75 mm acoustic lining.
- WGA-175** Acoustic louvre with 175 mm pitch. 75 mm acoustic lining.
- WSR-150** Additional acoustic louvre for WGA-150
- WSR-175** Additional acoustic louvre for WGA-175

Features

- Good acoustic and air supply characteristics.

Finishes

- 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

Weights

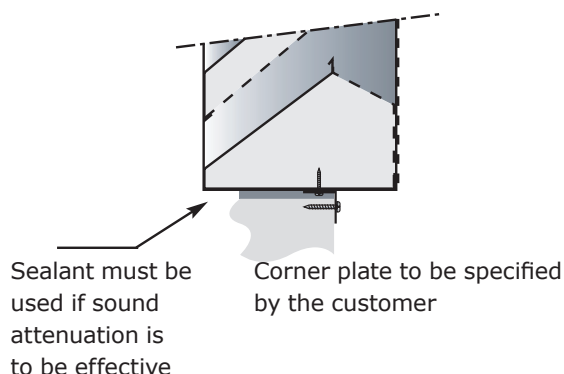
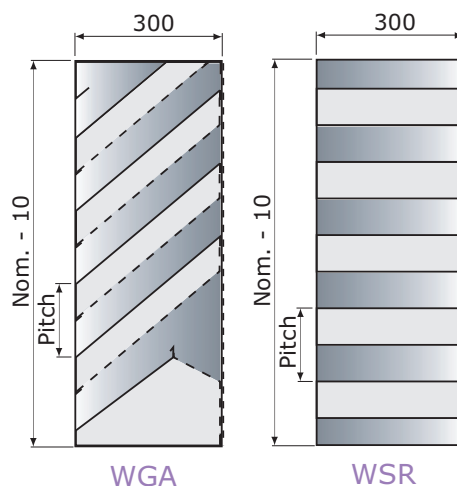
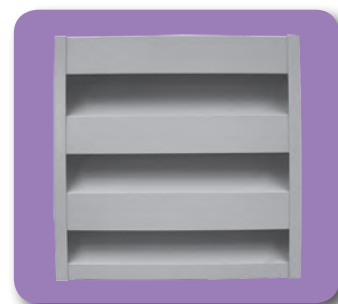
- WGA-150 20 kg/m² panel
- WGA-175 18 kg/m² panel

Sizes

- Nom. W 500 - 1200 mm
- Nom. H See table below

Fixing

- NF No fixing as standard
- EP Non-standard customer specified Edge Plate for installation in ductwork.



Free Area	
WGA-150	WGA-175
25 - 40%	30 - 45%

Nom. H WGA-150	Nom. H WGA-175	No. Blades
500	550	1
650	725	2
800	900	3
950	1075	4
1100	1250	5
1250	1425	6
1400	1600	7
1550	1775	8
1700	1950	9
1850	2125	10

ORDER EXAMPLE

WGA-150/800/650/PPM9006

Louvre Type

Blade Pitch

Nominal Width

Nominal Height

Finish

Acoustic Louvres

WGA / WSR

Sound Attenuation Properties

The effect of the louvre on external noise, i.e. the reduction of "cross-talk".

WGA / WSR	WGA Acoustic Louvre							WGA + WSR						
Frequency (Hz)	125	250	500	1k	2k	4k	8k	125	250	500	1k	2k	4k	8k
WGA-150	6	7	10	17	19	17	16	6	8	14	24	29	28	26
WGA-175	5	6	9	14	15	14	13	5	7	12	18	22	22	21

Sound Level

This is noise made by the air passing through the louvre (values are taken with an approach (nominal) air velocity of 1m/s)

Frequency (Hz)	125	250	500	1k	2k	4k
WGA-150	27	28	28	21	11	-
WGA-175	28	26	24	15	6	-

Corrections

These figures need to be corrected based on the approach (nominal) air velocity and face area.

Nominal Velocity - Sound Level Correction							
Velocity (m/s)	0.5	1.0	1.2	1.4	1.6	2.0	2.5
Correction (dB)	-18	0	+5	0	+12	+18	+24

Face Area = Nominal Width x Nominal Height

Face Area - Sound Level Correction						
Face Area (m ²)	0.25	0.5	1.0	1.5	2.0	3.0
Correction (dB)	-3	0	+3	+5	+6	+8

Penthouse Louvres

WGD / WGPH

Introduction

The Waterloo Penthouse Louvre range are made from aluminium, and as with all standard Waterloo louvres have proven to be weather resistant. The WGD is a ready assembled louvre made from a stack of complete frames mitred in the corners. WGPH is easily assembled from WG louvres connected with corner sections, it is delivered in flat pack sections for ease of transporting the product on site.

Separator plates are available to allow one louvre to be used for both supply and extract. Blanking plates are also options for boxing splits or controlling draughts.

For the best installation, Penthouse Louvres should be fitted onto a roof stack.

Product Description

WGD Premium Penthouse Louvre (assembled)

WGPH Penthouse Louvre (flat pack)

Features

- Weather resistant design
- Separator plates are an option that allow the same louvre to be used for supply and extract
- 65, 75 and 100mm pitches (100mm is for sheltered locations only)

Finishes

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

Weights

WGD/WGPH 15 kg/m² panel

Sizes

Nom. L 300 - N/A mm

Nom. W 300 - N/A mm

Nom. H 300 - 999mm (75mm standard pitch)

For larger sizes please contact head office

Fixing

WGD: Comes with fixing strips to attach to a roof stack.

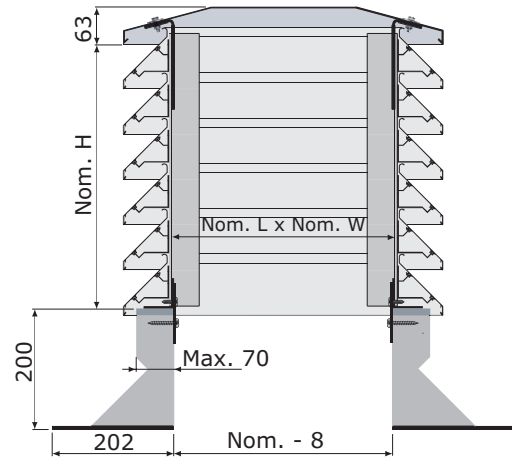
WGPH: Comes with fixing angles of a customer specified length to fix to either a roof stack or the roof construction.

Screen Options

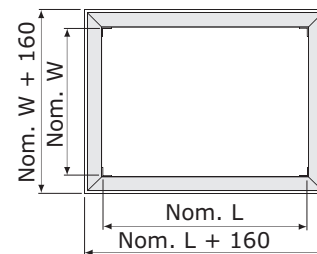
BS Stainless steel bird screen

IS Aluminium insect screen

Other options available on request



WGD



Nom. H	Free Area
210	33%
285	36%
360	38%
435	40%
510	41%
585	41%
660	42%
735	42%
810	43%

Nom. H	Free Area
885	43%
960	43%
1035	43%
1110	44%
1185	44%
1260	44%
1335	44%
1410	44%
1485	44%

Bird mesh

- Aperture size 13 x 13mm
- Wire diameter 1.6mm
- Free area 80%
- Material Stainless steel

Insect mesh

- Aperture size 1.31mm x 1.13mm
- Wire diameter 0.28 mm
- Free area 66%
- Material Aluminium

ORDER EXAMPLE

WGD-1500/800/660/PPM9006

Louvre Type

Nominal Length

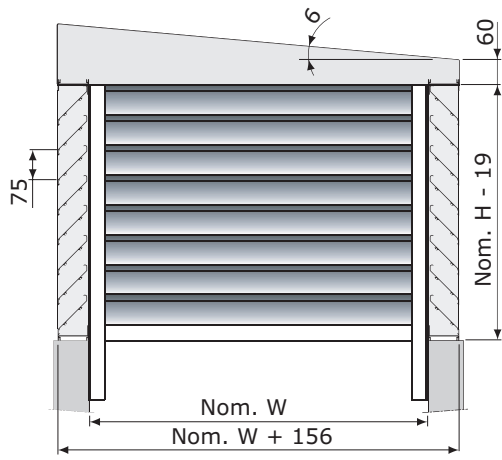
Nominal Width

Nominal Height

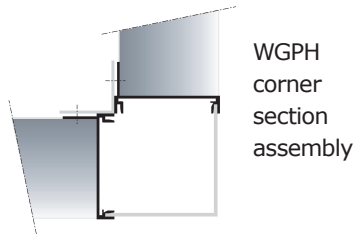
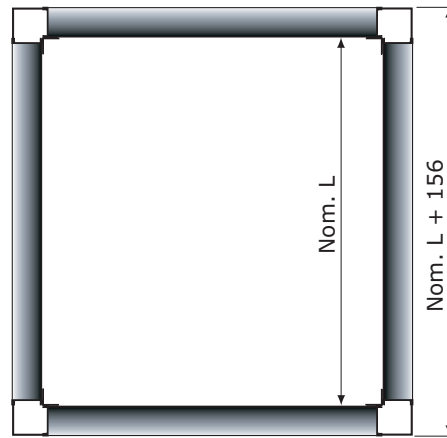
Finish

Penthouse Louvres

WGD / WGPH



WGPH



Separator and Blanking Plates

Figure A: Separator plate splitting
Nom. L

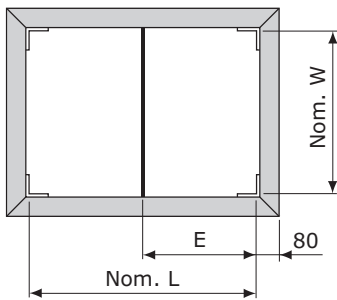


Figure B: Separator plate splitting
Nom. W

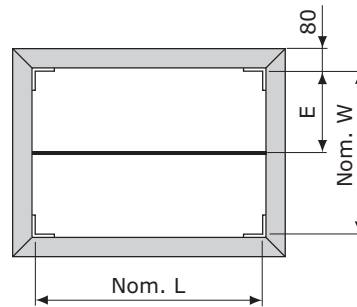


Figure C: Separator plate splitting
Nom. L with blanking plates

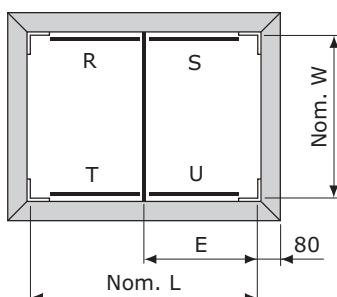
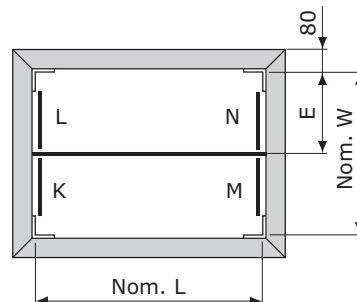


Figure D: Separator plate splitting
Nom. W with blanking plates



Sand Louvres

SL-EF / SL-RF

Selection Example

Flanged louvre 1520mm wide x 1500mm high louvre handling 2280 l/s

Total air volume/area: $2280/(1520 \times 1500) = 2280/2280 = 1 \text{ m/s}$

From charts:

dBA = 46

Pa = 58

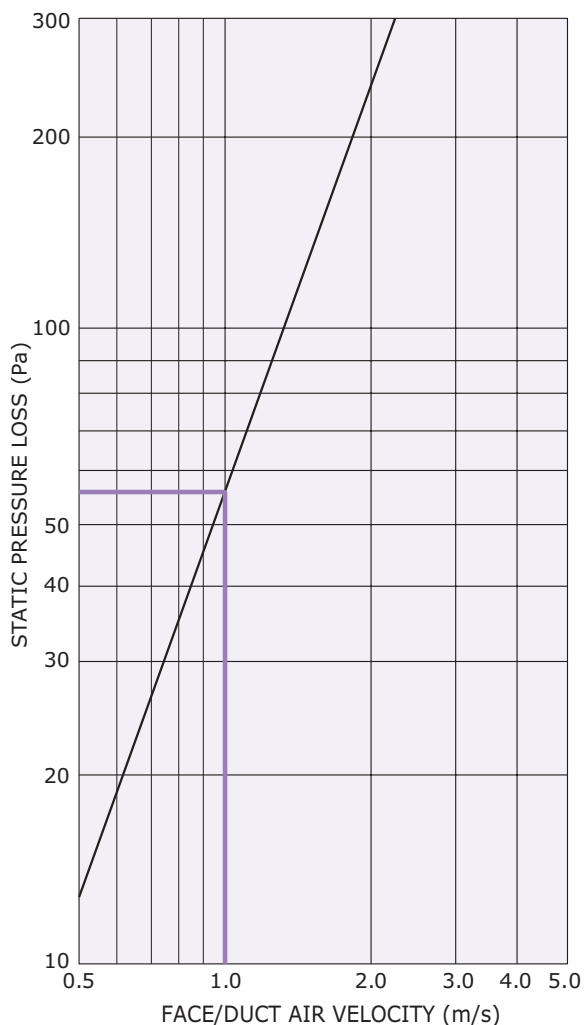
Efficiency = 67%

Frequency Spectrum Corrections (Hz)					
125	250	500	1k	2k	4k
+6	+5	+2	0	-6	-12

Permissible Sizes							
Min & Max Nominal Opening Width							Min & Max Opening Height
Single Panel		2 Panel		3 Panel			
	EF Frame	RF Frame	EF Frame	RF Frame	EF Frame	RF Frame	
Min	320	333	1605	1618	3130	3143	Min 300
Max	1520	1533	3045	3058	4570	4583	Max 1500

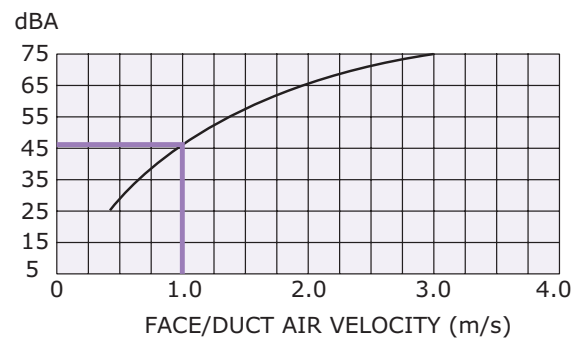
PRESSURE LOSS

The graph below gives static pressure loss across the louvre for intake or exhaust applications.



NOISE GENERATION

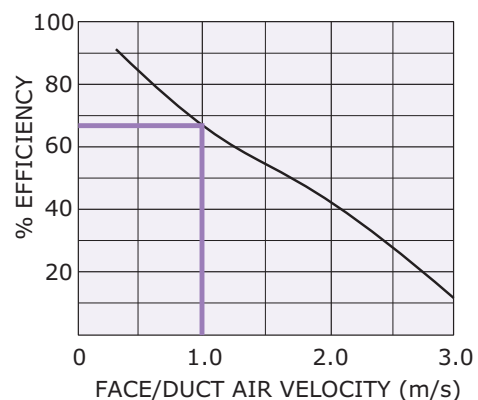
The graph below gives dBA levels based on peak sound power level plotted on noise rating (dBA) curves. To obtain octave band sound power levels apply the spectrum corrections shown to the dBA level.



EFFICIENCY

Sand rejection efficiency using a standard sand having grains sized between 100 and 1000 microns with 90% between 150 and 425 microns. Sand collected by the double channel construction drops to the base of the louvre and a chute directs the sand back to the face.

$$\text{Efficiency} = \frac{\text{weight of sand rejected}}{\text{weight of sand injected}} \times 100$$



External Louvres

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

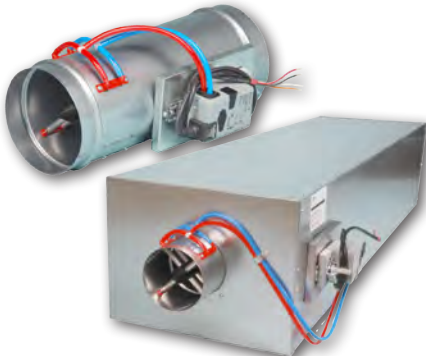
Designed to be installed in various ceiling systems, we have a complete range to suit both performance and aesthetical requirements. Most diffusers are made from aluminium and can be ordered with or without plenum boxes for easy duct work. Diffusers can be ordered in customer specified colours (PPM/G); 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.



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