

In a space where mixing is not required we can provide a range of passive ventilation products

- Passive Stack Ventilation
- Roof Terminals
- Dampers
- Cross Talk Attenuators
- Window Actuation Control

# Passive Ventilation

Breathing Buildings offers a full range of passive ventilation products, either as standalone products or incorporated into a Breathing Buildings system

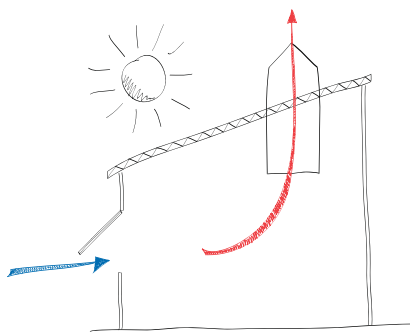
Passive ventilation is an important part of all natural ventilation systems, whether that is providing automated windows in a room, passive acoustic attenuators or high level dampers in an atrium.

Breathing Buildings has a comprehensive range of products to suit any natural ventilation scheme either as standalone products or for integrating into a broader Breathing Buildings system. Whatever the requirements you can be sure that we have an appropriate product.

## Air Flow Strategies

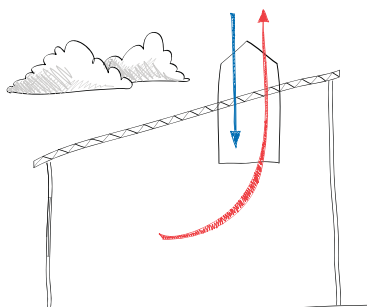
### Summer Mode

When it is warm outside the system operates in upflow displacement mode, using the stack effect to achieve high air flow rates and keep the room at a pleasant temperature.



### Winter Mode

Without low level openings the unit operates in exchange mode providing inflow and outflow through the damper.



## Product Information

### Features

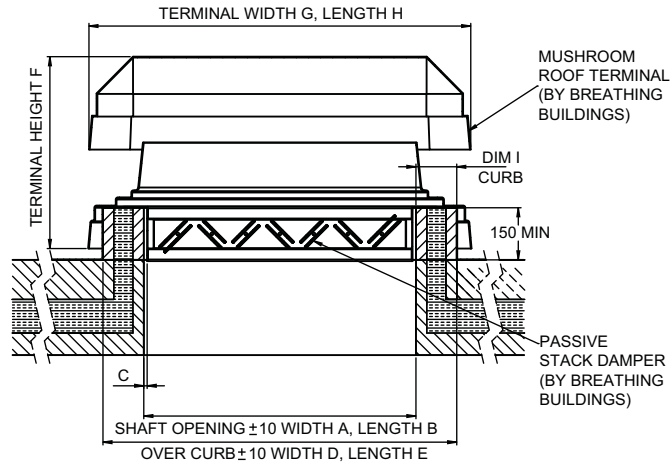
- Upward displacement and wind driven ventilation
- Manual control or Automatic control responding to temperature and CO<sub>2</sub>
- Insulated volume control damper ensures appropriate ventilation rates
- Internal temperature sensor with integrated CO<sub>2</sub> sensor
- Install internal unit from roof or from the room

### Options

- Range of sizes from 600mm square up to 1500mm square
- Penthouse louvre or mushroom terminal
- Integrated noise attenuation unit offering 25dB for noisy sites, more available on request
- Traffic light indicator panel for window opening
- Control signal for automated actuation of low level windows or dampers
- Modbus link for integration into wider Building Management Systems (BMS)
- Eggcrate grilles

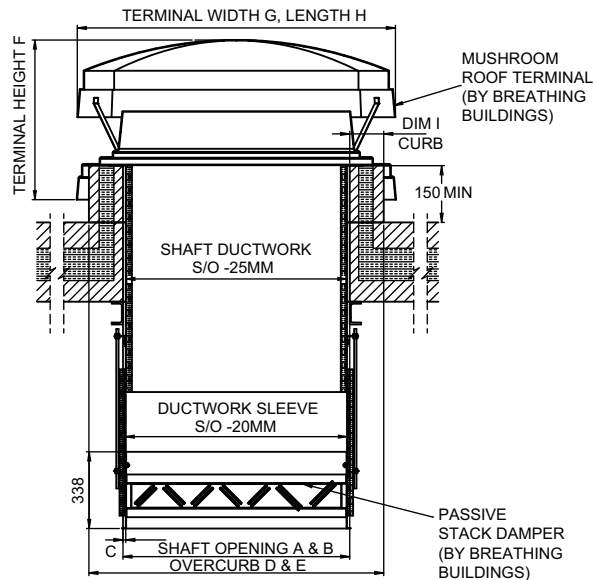
# Passive Ventilation continued

## Type 1 - PS600 to PS1500 Dimensional Drawing



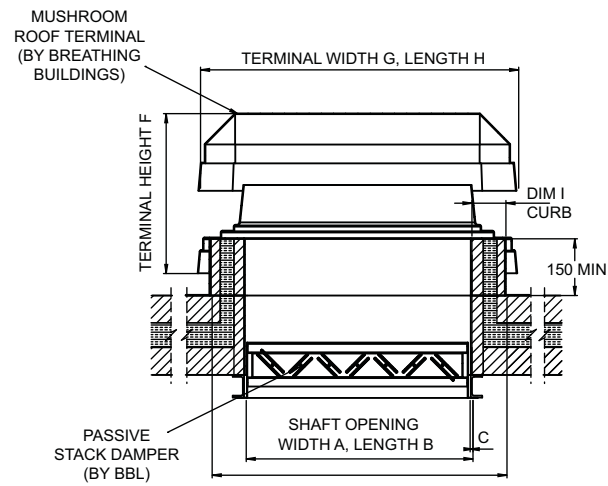
Unit Type	A	B	C	D	E	F	G	H	I	Damper Mass [kg]	Terminal Mass [kg]
PSS600	600	600	12.5	890	890	550	1000	1000	145	TBC	18
PSS800	800	800	12.5	990	990	650	1100	1100	95	TBC	25
PSS1000	1000	1000	12.5	1340	1340	750	1403	1403	170	TBC	40
PSS1200	1200	1200	12.5	1500	1500	875	1869	1869	150	TBC	150
PSS1500	1500	1500	12.5	1800	1800	875	2169	2169	150	TBC	160
PSR-SERIES	1550	900	12.5	1850	1200	945	2080	1600	150	TBC	150

## Type 2 - PS600 to PS1500 Dimensional Drawing



Unit Type	A	B	C	D	E	F	G	H	I	Damper Mass [kg]	Terminal Mass [kg]
PSS600	600	600	12.5	890	890	550	1000	1000	145	TBC	18
PSS800	800	800	12.5	990	990	650	1100	1100	95	TBC	25
PSS1000	1000	1000	12.5	1340	1340	750	1403	1403	170	TBC	40
PSS1200	1200	1200	12.5	1500	1500	875	1869	1869	150	TBC	150
PSS1500	1500	1500	12.5	1800	1800	875	2169	2169	150	TBC	160
PSR-SERIES	1550	900	12.5	1850	1200	945	2080	1600	150	TBC	150

## Type 3 - PS600 to PS1500 Dimensional Drawing



Unit Type	A	B	C	D	E	F	G	H	I	Damper Mass [kg]	Terminal Mass [kg]
PSS600	600	600	12.5	890	890	550	1000	1000	145	TBC	18
PSS800	800	800	12.5	990	990	650	1100	1100	95	TBC	25
PSS1000	1000	1000	12.5	1340	1340	750	1403	1403	170	TBC	40
PSS1200	1200	1200	12.5	1500	1500	875	1869	1869	150	TBC	150
PSS1500	1500	1500	12.5	1800	1800	875	2169	2169	150	TBC	160
PSR-SERIES	1550	900	12.5	1850	1200	945	2080	1600	150	TBC	150



## Roof Terminals

### R Series Terminations

Breathing Buildings offer two roof terminations, the penthouse louvre or the mushroom.

The penthouse louvre is most frequently associated with a natural ventilation system. We offer a double bladed system as standard which offers class A weather performance with a triple bladed system for sites where better weather performance is required. The standard terminal comes in RAL 7035 (Light Grey) with corner posts and gabled roof but other options and sizes are available.

The mushroom terminal is an unobtrusive alternative to the traditional bladed metal louvre and has better standard noise attenuation properties. The terminal is RAL 7035 (Light Grey) as standard but other colours are available on request.

Both terminals offer optional acoustic attenuation.



### Installation

A weathered builders curb around the perimeter of the roof penetration and shaft to the E-Stack supports the roof termination which is usually a minimum height of 150mm above the finish roof surface.

Once in place the roof terminal is fixed to the curb using suitable fixings. Once installed a bead of mastic or similar is laid around the perimeter of the overcurb.



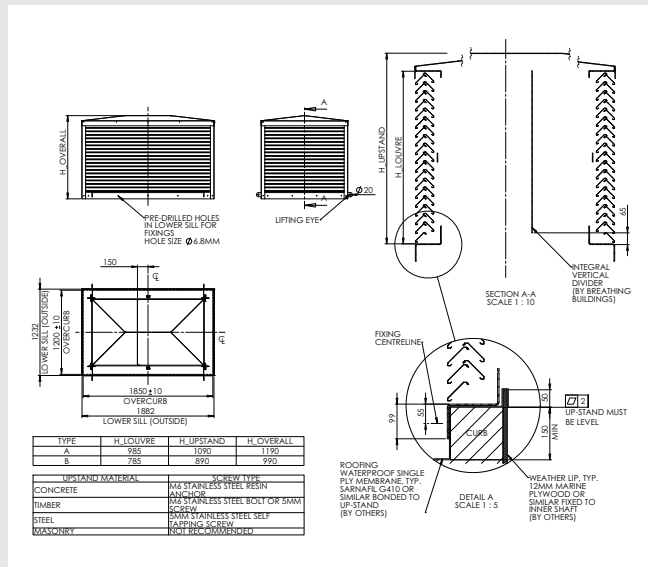
### Shaft

An insulated shaft is required between the bottom of the roof termination and the R Series indoor unit. Breathing Buildings can provide this, or else it can be constructed by others. A rubber seal is provided on the top of the E-Stack indoor unit to ensure air tightness with the bottom edge of the shaft. Breathing Buildings has no preference as to the material of the shaft. Previous examples have utilised the concrete soffit, plywood, plasterboard, and ductwork. This is sized to fit the damper (1550mm x 900mm). The terminal height is pre-fitted with a divider.

The shaft is to be divided into two pathways vertically for separation of inflow and outflow. Usually this is constructed from either plywood, plasterboard or galvanised steel etc. and does not require insulation. Note that the split is not equal, with the larger section above the E-Stack fans in winter.

The vertical divider extends from just above the dampers (typ. 25mm above) on top of the E-Stack unit to the underside of the acoustic attenuator or the penthouse louvre roof terminal.

## Penthouse Louvre Dimensioned Drawing



### Physical Properties

Typical weight	180 Kg
Finish standard	MILL Finish
Finish options	Standard RAL
Lifting points	Eyes supplied as standard
Standard attenuation	11 dB D <sub>new</sub>
Optional attenuation	33 dB D <sub>new</sub>

### Shaft Dimensions

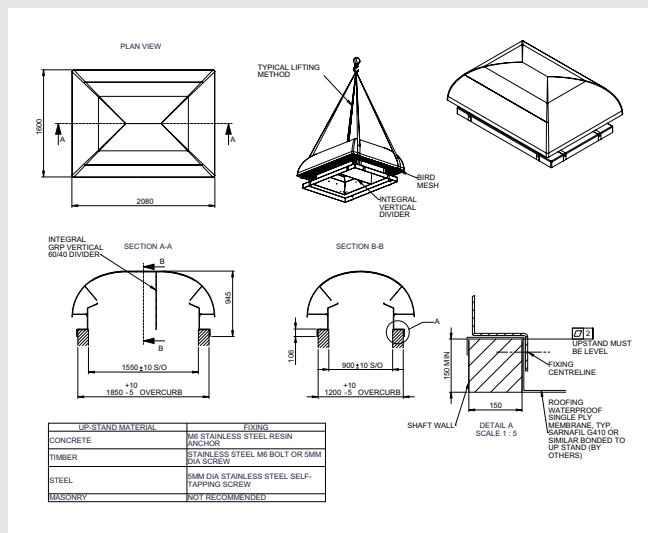
W	1550 mm
D	900 mm

### Weather Performance

	Double blade	Triple blade
Performance	Class A up to 1 m/s airflow face velocity	Class A up to 2 m/s airflow face velocity

Test involves simulated rainfall of 75/h at a wind speed of 13m/s (29 mph). Full BSRIA weather performance test data available on request

## Mushroom Terminal



### Physical Properties

Height (Inc. base)	945 mm
Curb dimensions	1850 (l) x 1200 (w) x 150 (h)
Typical weight	150 Kg
Finish standard	RAL 7035
Finish options	Standard RAL
Standard attenuation	17 dB D <sub>new</sub>
Optional attenuation	21 - 28 dB D <sub>new</sub>

### Shaft Dimensions

W	1550 mm
D	900 mm

### Weather Performance

Water testing has been carried out at the BRE using test method *prEN 15601—Hygrothermal performance of buildings—resistance to wind driven rain coverings with discontinuously laid small elements*. The terminal was subject to 75mm/hr/m<sup>2</sup> at a wind speed of 30mph (13.4 m/s). Water ingress during the tests was too small to measure in meaningful terms. Terminal has also been tested under storm conditions at BRE with 60 mph wind.

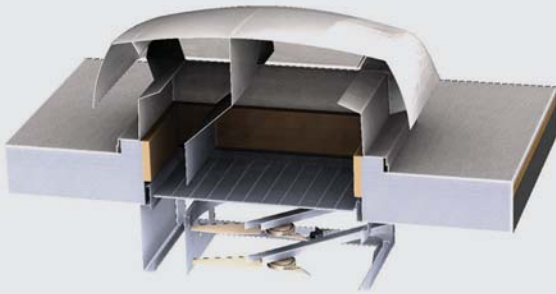
## Roof Terminals

### S Series Terminations

An insulated shaft is required between the bottom of the roof termination and the S Series indoor unit. Breathing Buildings can provide this, or else it can be constructed by others. The penthouse louvre units are offered in both double and triple blade arrangements and we now have mushroom terminations available across the product range.

### Installation

A weathered builders curb around the perimeter of the roof penetration and shaft to the E-Stack supports the roof termination which is usually a minimum height of 150mm above the finished roof surface. Once in place the roof terminal is fixed to the curb using suitable fixings. Once installed a bead of mastic or similar is laid around the perimeter of the overcurb.

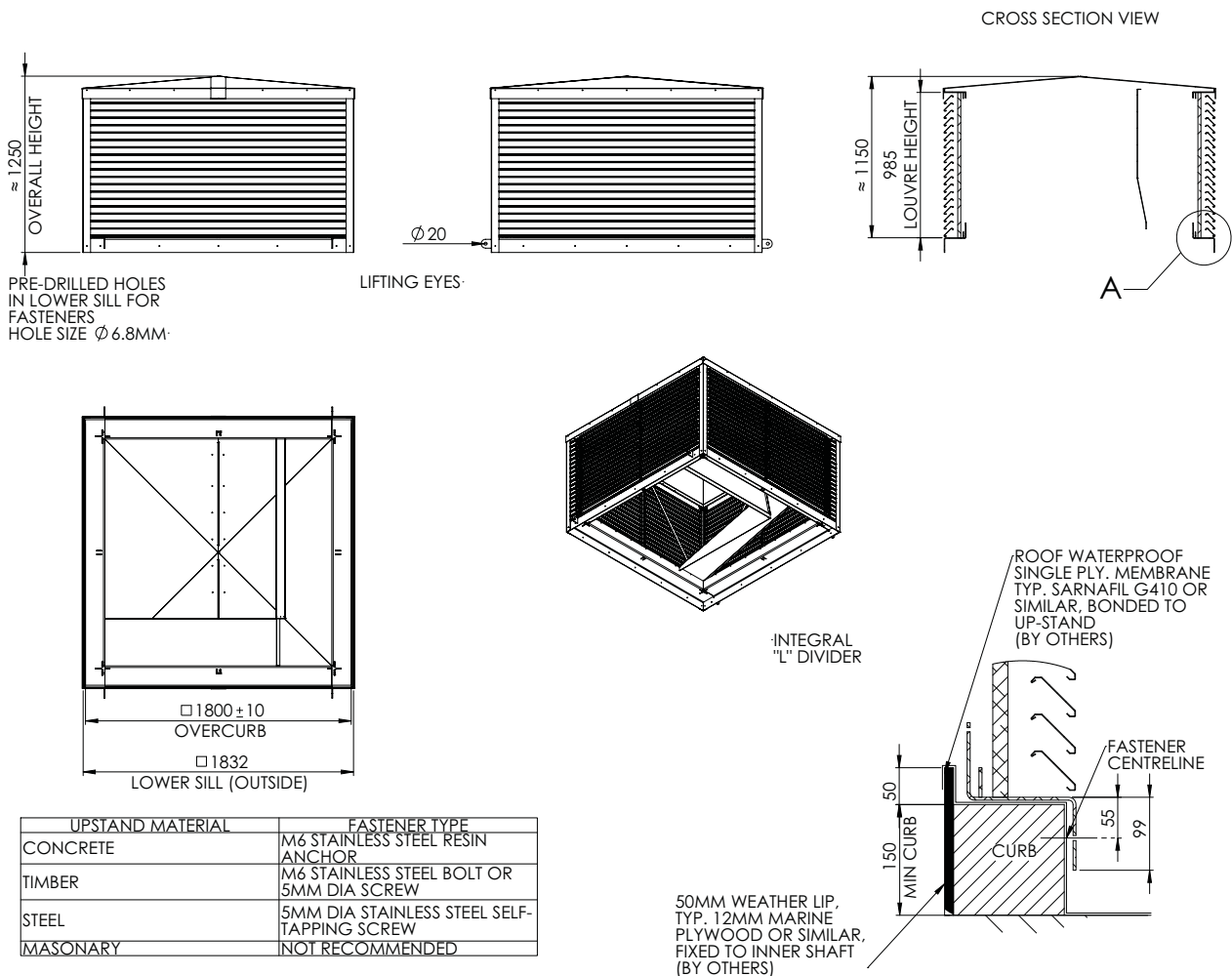


### Shaft

An insulated shaft needs to be constructed by others between the bottom of the roof termination and the S series. A rubber seal is provided on the top of the e-stack to ensure air tightness with the bottom edge of the shaft wall. Breathing Buildings has no preference as to the material of the shaft. Previous examples have utilised the concrete soffit, marine plywood, plasterboard, and ductwork. This is sized to fit the damper (1500mm x 1500mm or 1200mm x 1200mm).

An L divider is required in the shaft (by others or by Breathing Buildings). The L divider is located to form a smaller square section in the corner of the square shaft, thereby creating an L shape division. The L divider is orientated so that it matches similar dividers in the mushroom or penthouse termination and the S series unit. The shaft divider commences just above the top of the S series unit (typically 25mm above) and extends up through the shaft to mid-way to the curb level (just underneath the roof terminal).

## S1500 Penthouse Louvre Dimensioned Drawing



### Physical Properties

Typical weight	220 Kg
Finish standard	MILL Finish
Finish options	Standard RAL
Lifting points	Eyes supplied as standard
Standard attenuation	11 dB $D_{new}$
Optional attenuation	33 dB $D_{new}$

### Shaft Dimensions

W	1,500 mm
D	1,500 mm

### Weather Performance

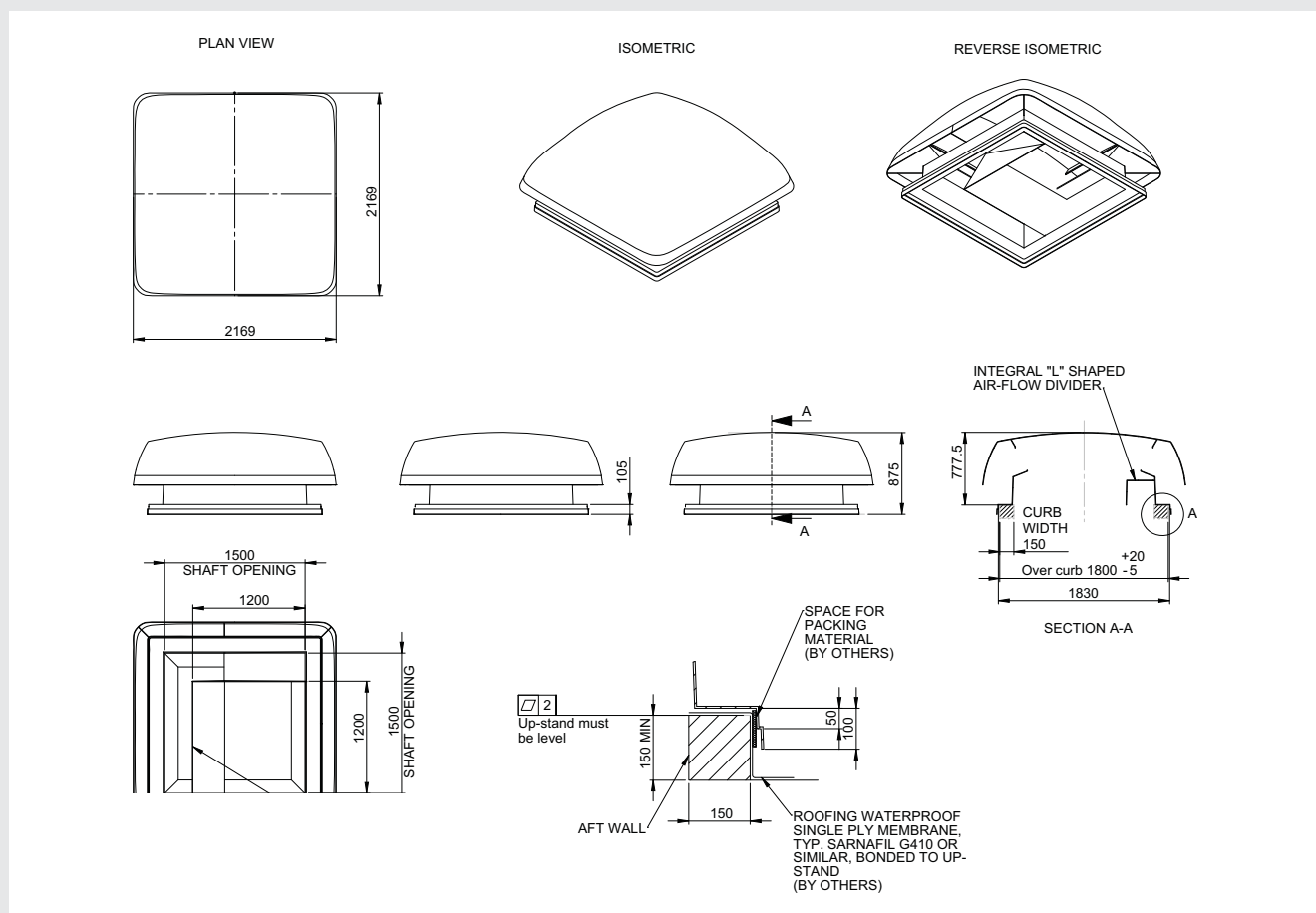
	Double blade	Triple blade
Performance	Class A and 99.9% rejection at face velocity up to 0.5 m/s	Class A and 99.9% rejection at face velocity up to 2 m/s

Test involves simulated rainfall of 75l/h at a wind speed of 13m/s (29 mph).  
Full BSRIA weather performance test data available on request



## Roof Terminals continued

### S1500 Mushroom Terminal Dimensioned Drawing



#### Physical Properties

Max Height (Dome to sill bottom)	875 mm
Max Length (across dome)	2170 mm
Max Width (across dome)	2170 mm
Height above curb	780 mm
Typical weight	<140 Kg
Finish Standard	RAL 7035
Finish Option	Standard RAL
Lifting points	Not fitted

#### Key Dimensions

Overcurb	1800 x 1800 mm
Shaft	1500 x 1500 mm
Curb Height	150 mm
Curb Thickness	150 mm

#### Weather Performance

Water testing has been carried out at the BRE using test method *prEN 15601—Hygrothermal performance of buildings—resistance to wind driven rain coverings with discontinuously laid small elements*.

The mushroom profile terminal was subject to 75mm/hr/m<sup>2</sup> at a driving wind speed of 30mph (13.4 m/s). Water ingress during the tests was too small to measure in meaningful terms. Terminal has also been tested under storm conditions at BRE with 60 mph wind.



## Dampers

Many natural ventilation systems incorporate façade dampers to provide air pathways where it isn't desirable or possible to have windows. We provide a large range of variable control dampers and associated weather louvres. The dampers are insulated and have seals to minimise the air leakage from them when closed. The dampers are supplied with fully modulating actuators

In noisy locations, acoustic linings or acoustic attenuators are provided so that sufficient attenuation is provided. The extent of attenuation depends on the specific site conditions.

The actuators can be controlled using the Breathing Buildings range of ventilation controllers, or if supplied as product-only they can be controlled by the Building Management System.

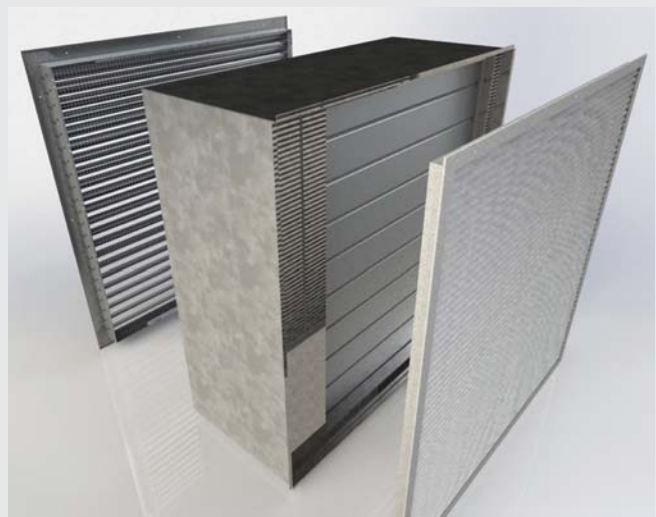
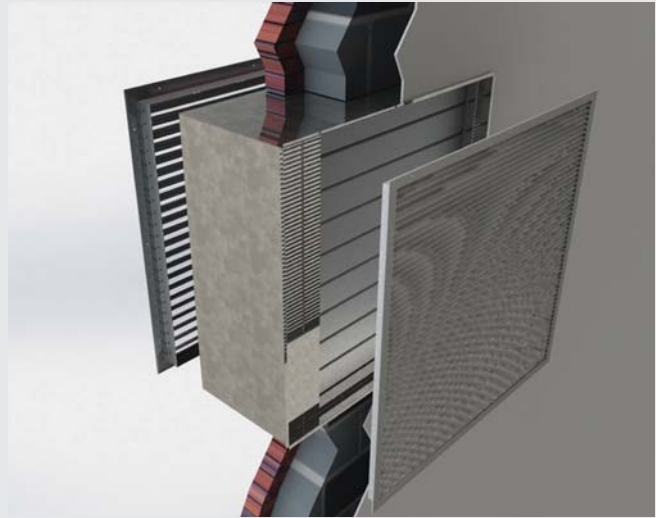
### U-Value

Part L2a requirement	3.5 (W/m <sup>2</sup> K)
Passive Stack	<0.8 (W/m <sup>2</sup> K)

### Damper Air Leakage

Part L2a requirement	10 m <sup>3</sup> /h/m <sup>2</sup>
Passive Stack	1.26 m <sup>3</sup> /h/m <sup>2</sup>

Tested at 50 Pa across whole damper unit



## Passive Stack Ventilation

### Passive Stack Ventilation

There are climates and building types when controlled natural mixing ventilation is not required. For example, if a building is located in a zone where the external temperature is consistently above 15°C then it is not necessary to pre-mix the incoming fresh air with room air in order to mitigate cold draughts. Alternatively, if the building is a factory with doors open a lot for loading, then the building may be ventilated adequately in winter through the loading doors and no winter mixing system is required. Finally, if the high level dampers are sufficiently high away from occupants in an occupied room, then it may be possible to achieve sufficient ventilation and natural mixing of the incoming plumes of cold air with the warm room air to prevent cold draughts in winter.

In all of these scenarios the most cost effective means of providing natural ventilation is via a damper in a shaft or a damper in a wall. The high level damper will be used to provide outflow and a cooling effect in warmer weather. In colder weather, the damper can be used to provide both the inflow and outflow if necessary, but in this case it is necessary to ensure that low level openings (such as doors) are closed.

We provide a full range of roof and façade based dampers, penthouse louvres, mushroom terminals, façade louvres and grilles.

#### U-Value

Part L2a requirement	3.5 (W/m <sup>2</sup> K)
Passive Stack	<0.8 (W/m <sup>2</sup> K)

#### Damper Air Leakage

Part L2a requirement	10 m <sup>3</sup> /h/m <sup>2</sup>
Passive Stack	2.9 m <sup>3</sup> /h/m <sup>2</sup>

Tested at 50 Pa across whole damper unit

