



Roof Ventilation Terminals

Natural and hybrid ventilation solutions

passivent

passivent

Create better buildings and healthy spaces with Passivent roof ventilation terminals

Passivent offers a range of roof ventilation terminals, primarily for natural ventilation applications in educational, commercial, public and residential sectors.

Manufactured in the UK at its Nottinghamshire facility, Passivent not only offers specifiers and contractors a choice of different types of terminals but also a range of design options to suit the aesthetics of a project.

Further details about our 'Design and technical support service' can be found on the back page.

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Terminal sizing

Passivent is able to provide sizing of roof terminal products for your application using Passivent's bulk airflow calculation software. www.passivent.com/airflowcalculations

Controls

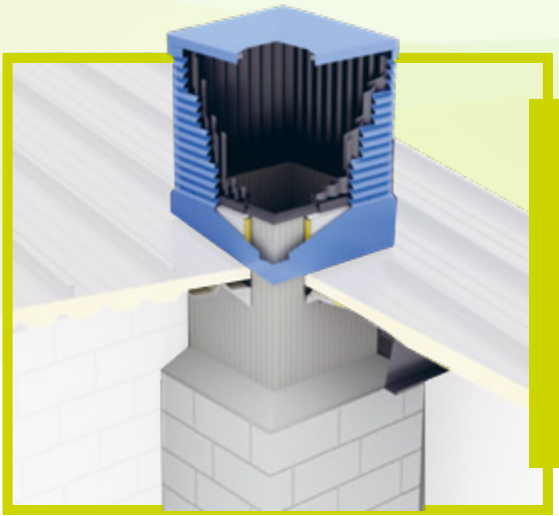
There is a range of control modules for Passivent roof terminals, ranging from simple switches to intelligent control systems incorporating carbon dioxide sensors, weather stations, and BACnet capability. The modulating actuators within the Passivent roof ventilation terminals are virtually silent in operation. See separate 'Controls' brochure for further information or visit www.passivent.com/controls

Weather resistance

Passivent's roof terminals offer excellent weather resistance including Class A, 100% rain rejection in accordance with BSRIA to BS EN 13030: 2001 'Performance testing of louvers subjected to simulated rain'. See page 5 for further information.



Our range



Airstract® terminals

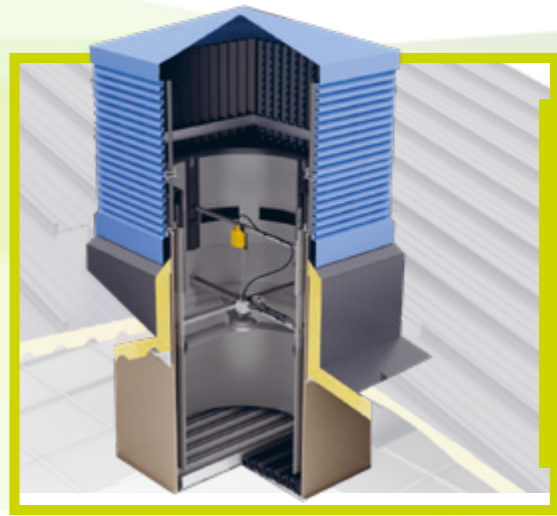
See page 6

Passivent Airstract roof-mounted natural ventilation terminals combine low airflow resistance with high airflow capacity to provide an exhaust outlet for used air.

They use the natural forces of buoyancy, wind and convection to move the air and require minimal power.

Other options:

Aluminium Airstract, Airstract iAT or Hybrid Plus Airstract

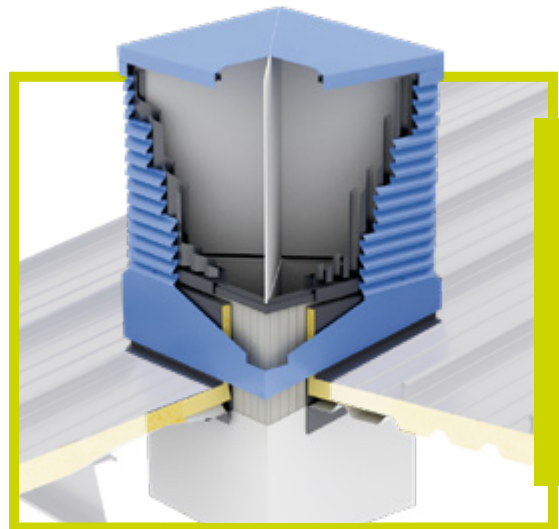


Hybrid Plus Airstract® terminals

See page 10

Passivent Hybrid Plus Airstract roof-mounted terminals have all the features and benefits of the standard Airstract terminal but also have an innovative air tempering and mixing unit utilising a single low-power sweep fan.

They can operate in three modes which allows for the most energy efficient mode to be used as and when required – natural or passive mode, enhanced or boost mode and recirculation or mixing mode.

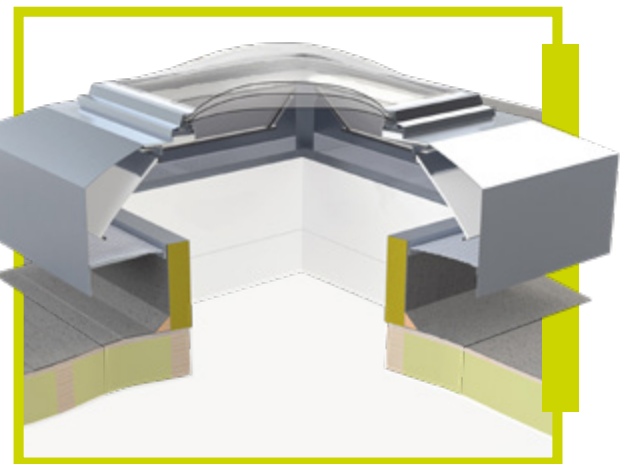


Airscoop® terminals

See page 12

Passivent Airscoop roof-mounted natural ventilation terminals provide top-down or displacement ventilation using wind power.

Each unit is divided into four separate chambers internally so that wind from any direction is channelled down through the windward chamber(s).



Litevent Airstract® rooflight/ventilator

See page 14

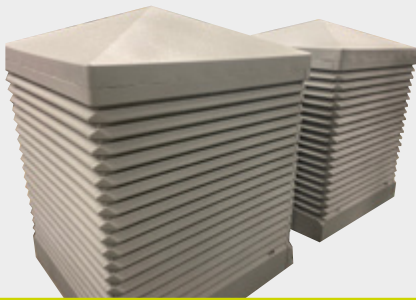
Passivent Litevent Airstract combines a controllable ventilator and a rooflight in one unit providing both natural ventilation and natural daylighting at the same time.

It requires minimal energy consumption and helps to reduce the need for artificial lighting thereby reducing further energy expenditure.

Design options

Passivent Airstract® and Airscoop® terminals are available in a variety of shapes, finishes, colours and lid options.

Modern *Square and rectangular*



Modern terminals combine functionality and clean lines in a simple contemporary look. Alternatively they can be contrasted with a range of top designs to create a traditional or bespoke appearance. Suitable for all roof types from flat to 45° pitch.

Traditional *Square*



© Keith Hunter Photography

Traditional terminals feature a decorative top making them suitable for long established buildings. Suitable for all roofs from flat to 45° pitch.

Aluminium



Aluminium Airstract roof terminals are available in a larger range of sizes than the standard Airstract.

Bespoke *Mono-pitch*



A mono-pitch style of roof terminal is also available as a bespoke offering.

Bespoke



Bespoke designs are available to complement the roof finish and accentuate the roof design without affecting the performance or weatherability of the terminals.

Circular



Circular terminals are suitable for all roofs from flat to 30° roof pitch. They use standard square base units for ease of flashing and to ensure weather integrity.

Wind can pass around smooth cylindrical shapes relatively uninterrupted, leading to a low ventilation effectiveness. Passivent circular terminals have vertical airflow deflector posts which project slightly from the louvres so as to disrupt the airflow around the terminal and cause early flow separation. This helps to increase the negative pressure on the leeward side, drawing more air through the louvres and thus improving the overall ventilation performance of the terminal.

Circular terminals

Circular terminals feature integral wind deflection posts to maximise their aerodynamic performance and ventilation effectiveness.

Performance

Passivent's roof terminals offer excellent performance features including their weather resistance and Class A, 100% certified rain rejection as detailed below.

Weather resistance

Passivent's roof terminals with patented double-bank louvres provide excellent weather resistance and Class A, 100% certified rain rejection so that a building can be fully ventilated regardless of weather conditions.

Effectiveness to BS EN 13030: 2001	Velocity airflow rate	Airstract, Hybrid Plus Airstract and Aircscoop terminals incorporating patented double-bank louvres	Aluminium Airstract incorporating patented double bank louvres
	at 0.00m/s	Class A	Class A
	at 0.50m/s	Class A	Class A
	at 1.00m/s	Class A	Class A
	at 1.50m/s	Class A	Class B

100% rain rejection

External weather louvres have been independently tested at BSRIA to BS EN 13030:2001 'Performance testing of louvres subjected to simulated rain'.



Coefficients of discharge (Cd value)

Based on double-bank louvres with base dampers

Airstract square/rectangular	0.57
Hybrid Plus Airstract	0.57
Airstract circular	0.54
Aircscoop	n/a

Wind resistance

Resistant to continuous wind loads at 51m/s demonstrated by independent BRE tests.

Airtightness

Approx 9.7m³/hr/m² at 50 Pa.

Biological resistance

4mm insect screen behind the louvres excludes large insects. Louvres exclude most birds in compliance with BRE Digest 415.

Acoustic performance

Air intakes sited at roof level generally allow in less noise. Acoustic treatment can be applied to Airstract and Aircscoop systems to deliver planned acoustic attenuation performance, based on independent testing by Salford University.

Durability and sustainability

External components are manufactured from aluminium or ABS, a robust and durable material proven in use on other exposed roofing products. Airstract and Aircscoop base units are produced from marine grade plywood sourced from managed forests.

Surface finish and colours

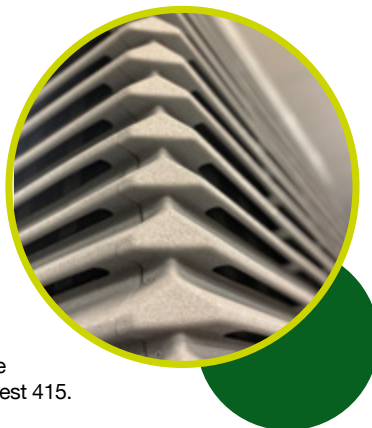
All exposed ABS surfaces are treated with UV-stable polymeric resin. Aluminium terminals are powder coated. All terminals can be colour matched to standard BS and RAL colours. Textured or smooth finishes are available that will complement most roof finishes.

Fire performance

The aluminium Airstract terminal has an EXT SAAX classification, independently tested to BS 476: Part 3.

Performance data

Data from independent testing is available on request.



Airstract[®] Terminal

Passivent's Airstract[®] roof-mounted natural ventilation terminal combines low airflow resistance with high airflow capacity providing an exhaust outlet for used air.



Features and benefits

- Can be used as part of a sustainable, low-energy natural ventilation strategy.
- The natural forces of buoyancy, wind and convection move the air and minimal power is required.
- Robust two-part construction of terminal and base unit which together provide a maintenance-free and wind-load resistant design.
- Motorised base dampers control the airflow and are available with excellent thermal performance and airtightness levels.
- Excellent weather resistance and 100% rain rejection as described in more detail on [page 5](#).
- Circular terminals are mounted on a square base to make for ease of flashing and ensure weather integrity.
- Flexible installation: Airstract terminals are suitable for use on flat and pitched roofs covered with profiled or standing seam sheeting, tiles or slates, and 'green roofs'.

Applications

Used for passive stack ventilation applications in conjunction with Passivent's Aircool[®] façade ventilators, they can ventilate deep plan spaces and provide night cooling. They can also be used for multiple extract applications and mechanical extract outlets.

Other options

Airstract terminals can be manufactured in a range of larger sizes in aluminium, [see page 8](#). These provide even greater airflow performance whilst still featuring the patented double-bank louvres for maximum weather protection.

Airstract terminals with energy efficient mechanical assistance – these include **Airstract iAT**, [see page 9](#) and **Hybrid Plus Airstract**, [see page 10](#).

Image courtesy of LTE Group



Modern and traditional design terminals up to 45° roof pitch

Terminal size (mm)	Roof opening required (mm)	Free area - terminal (m ²)	Free area - terminal & base louvre (m ²)	Height** (mm)	Weight† (kg)
575 x 575*	485 x 485	0.157	0.064	818	40
575 x 800	485 x 710	0.246	0.101	818	52
575 x 1025	485 x 935	0.319	0.139	818	68
575 x 1250	485 x 1160	0.368	0.176	818	76
800 x 800*	710 x 710	0.386	0.182	1109	63
800 x 1025	710 x 935	0.525	0.249	1109	79
800 x 1250	710 x 1160	0.625	0.316	1109	91
1025 x 1025*	935 x 935	0.716	0.331	1350	95
1025 x 1250	935 x 1160	0.906	0.421	1350	105
1250 x 1250*	1160 x 1160	1.030	0.561	1391	116
Circular terminals up to 30° roof pitch (mounted on a square base)					
1400	935 x 935	0.716	0.331	1363	134
1700	1160 x 1160	1.030	0.561	1583	162

* Traditional terminals are only available in these sizes.

** Height figures are based on 0° roof pitch.

† Weight figures are based on 0° roof pitch and include the weight of the standard double-banked terminal and square base of 1000 mm in length. Weights are correct at time of going to print, but contact Passivent for current figures.

Circular terminals have a square roof opening.

Coefficient of discharge: see performance section on page 5.

Note: The weights do not include the optional base damper.

Robust terminal with cladding and louvres manufactured from high-impact ABS on an aluminium frame

Unique patented double-bank louvre arrangement including insect mesh combines maximum rain rejection with good airflow performance

Drain channel

Structural support and fixing point

Brickwork or blockwork duct, built on site. Galvanised steel extension ductwork can be supplied by Passivent

Base unit constructed from marine grade plywood from renewable forests with an aluminium frame to mount Airstact terminal on; can be insulated if required

Fixed to roof structure (steelwork or timber) for maximum rigidity, and made weathertight with flashings (by others) before the terminal is fitted

Aluminium Airstract® Terminal

Passivent's Aluminium Airstract® is a roof-mounted natural ventilation terminal which provides an exhaust outlet for used air. It is available in a larger size range than the standard Airstract® terminal.



Features and benefits

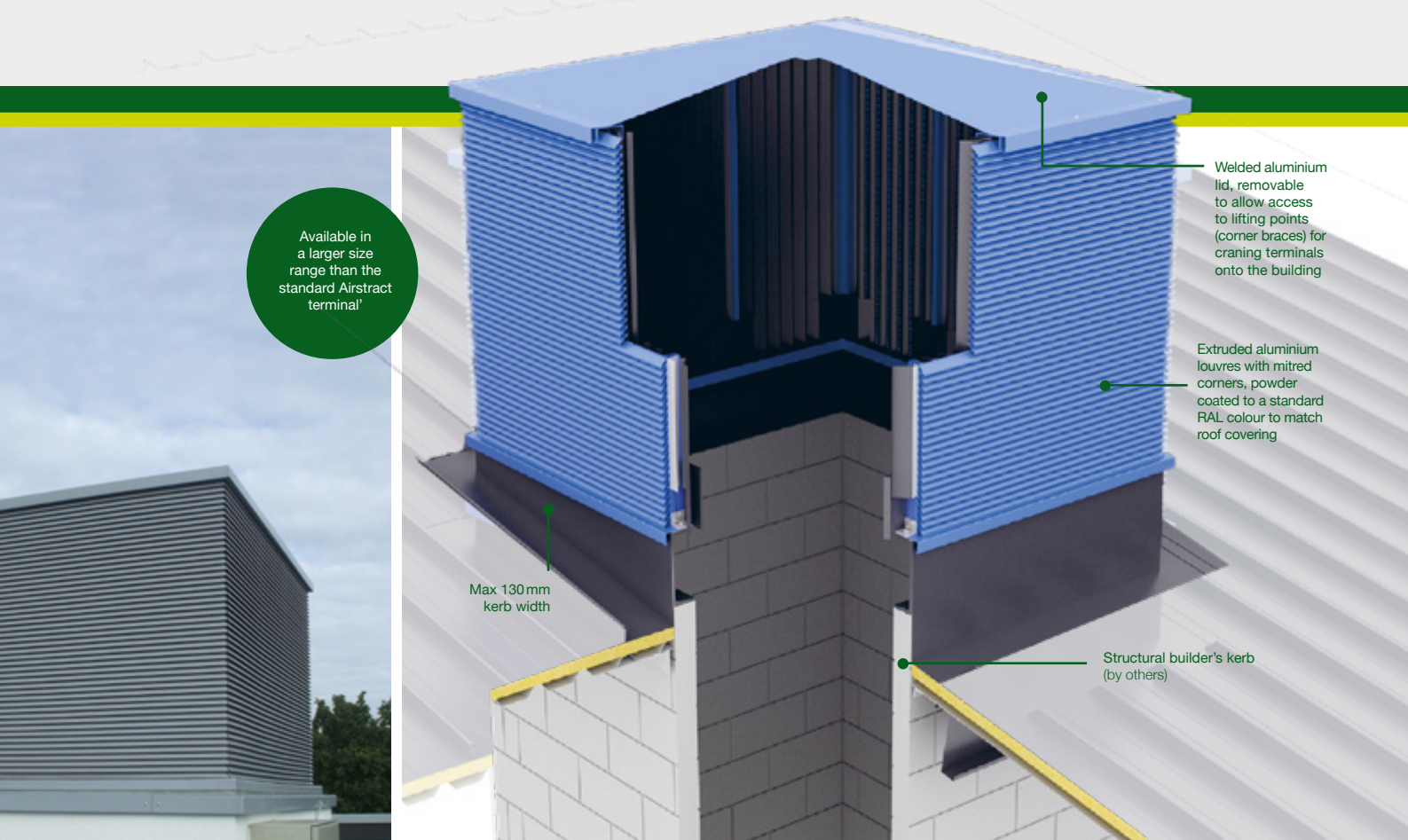
- Combines high airflow capacity with low airflow resistance.
- Excellent weather resistance and 100% rain rejection as described in [more detail on page 5](#).

Sizes	Terminal size (mm)	Free area - terminal (m ²)	Equivalent free area (m ²)	Height* (mm)	Builder's kerb dimensions	
					Internal (mm)	External (mm)
	813 x 813	0.33	0.36	680	577 x 577	837 x 837
	813 x 1113	0.50	0.55	680	577 x 877	837 x 1137
	1113 x 1113	0.76	0.85	900	877 x 877	1137 x 1137
	1113 x 1412	1.03	1.13	900	877 x 1176	1137 x 1436
	1412 x 1412	1.38	1.51	1208	1176 x 1176	1436 x 1436
	1412 x 1787	1.82	2.00	1208	1176 x 1551	1436 x 1811
	1787 x 1787	2.41	2.64	1582	1551 x 1551	1811 x 1811
	1787 x 2012	2.75	3.02	1582	1551 x 1776	1811 x 2036
	2012 x 2012	3.15	3.46	1740	1776 x 1776	2036 x 2036

* Heights are based upon a flat builder's kerb (by others).

Coefficient of discharge, see Performance section. Contact Passivent for Aluminium Airstract terminal weights.

Other sizes are available on request. Please email projects@passivent.com for more information.



Airstract® iAT Terminal

Passivent Airstract® iAT (intelligent Airflow Technology) roof mounted ventilation terminal has all the features and benefits of the standard Airstract® terminal in addition to energy efficient mechanical assistance.



Features and benefits

- During peak summer temperatures the minimal temperature difference between indoors and outdoors can result in low flow rates for passive stack ventilation, especially on still, windless days.
- These changes in internal conditions and ultimately, air quality, as a result of peak temperatures, high occupancy levels or unusual heat gains are identified by the intelligent control system.
- The control system activates the low energy fan and maintains the ventilation system performance until either the temperature or CO₂ levels have achieved the targeted set point.

Sizes available

1025 mm x 1025 mm

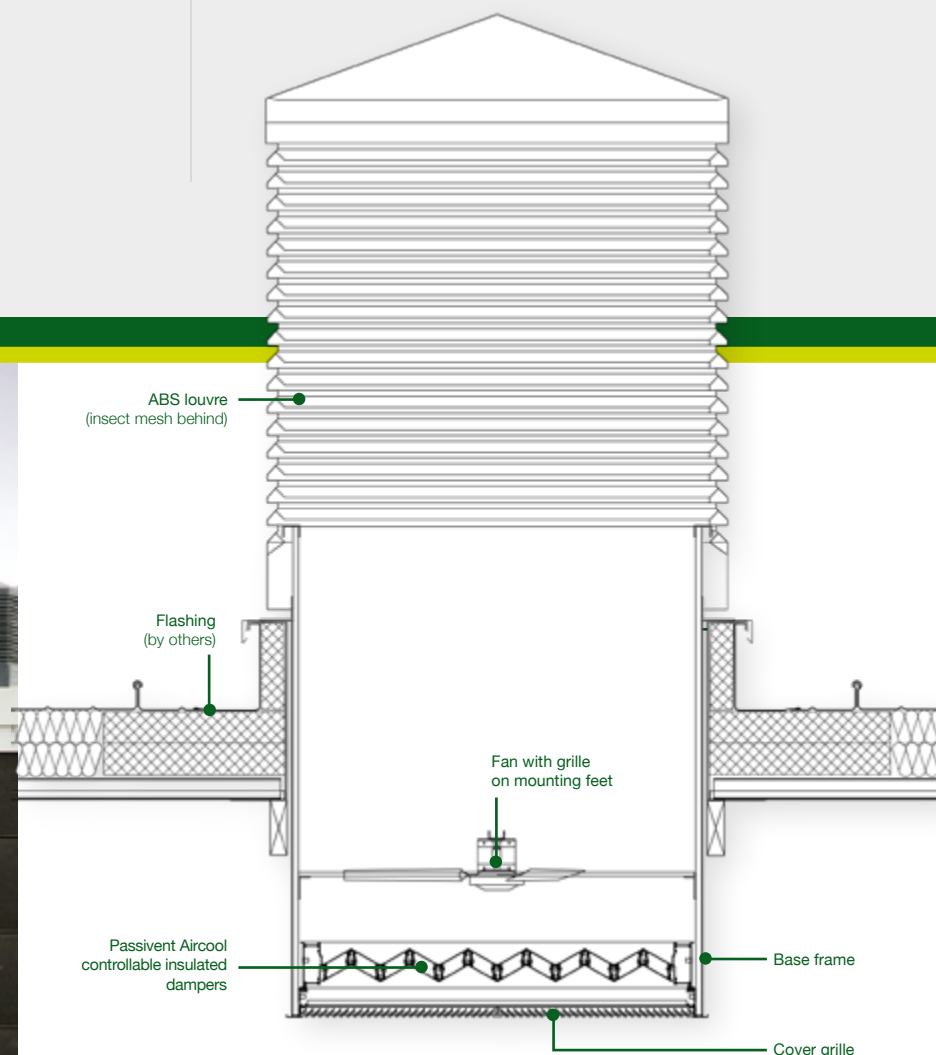
1250 mm x 1250 mm

Performance

Maximum flow rate when inlet and outlet resistances are equal and fan is in operation:

1025 mm x 1025 mm = 530 l/s

1250 mm x 1250 mm = 580 l/s



Hybrid Plus Airstract® Terminal

Passivent Hybrid Plus Airstract® roof-mounted terminal has all the features and benefits of the standard Airstract® terminal as well as an innovative air tempering and mixing unit utilising a single low-power sweep fan.



Features and benefits

- A number of different modes can be programmed to allow the most energy efficient option to be used as and when required.
- In natural or passive mode when the fan does not operate, it acts as a passive stack.
- In peak summer temperatures to avoid overheating, enhanced (or boost) mode allows for high levels of air movement. It can also purge the space more rapidly at times of unusual high building occupancy when there are excessive CO₂ levels or heat gains.
- In low winter temperatures to avoid draughts, the recirculation (or mixing) mode mixes incoming fresh air with interior warm air to provide tempered fresh air to the space.
- High-level inlets in summer allow the system to operate a night-cooling strategy, using cooler night time air to reduce the temperature of the building's thermal mass.
- A single low-power fan uses minimal energy only when required during peak summer and low winter temperatures.
- The unique terminal design does not require a vertical internal divider, and therefore the flow performance is independent of wind direction. This ensures the system flow performance does not stall with changing wind directions.
- Controlled through an intelligent Passivent iC8000 Control System. iC8000 ensures the system operates in the correct mode according to factors such as CO₂ concentrations, internal and external temperatures.
- Based primarily on natural ventilation strategy so does not require large and costly mechanical plant.

Dimensions

Terminal: 1250mm x 1250mm

Roof opening required: 1160mm x 1160mm

Height, standard modern terminal: 1391mm

Weight: Terminal: 50kg | Louvre: 50kg
Terminal base with mixing chamber: 100kg

Applications

Used for a range of ventilation applications, particularly on upper floors of buildings where direct perimeter ventilation is limited or undesirable. Also suitable for large open buildings such as sports halls and auditoriums.

Unique patented double-bank louvre arrangement including insect mesh combines maximum rain rejection with good airflow performance

Actuator to modulate duct position for different ventilation modes

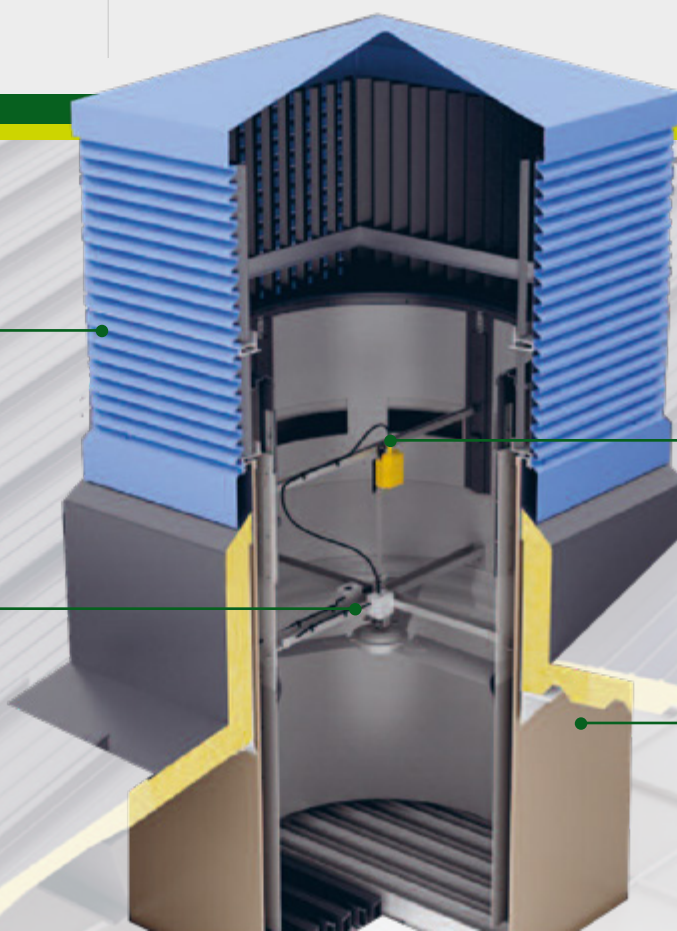
Low-energy sweep fan

Base unit constructed from marine grade plywood from renewable forests

Colour

Base unit:
white clad below roof line

Ceiling cover grille:
white as standard, or any standard RAL/BS colour



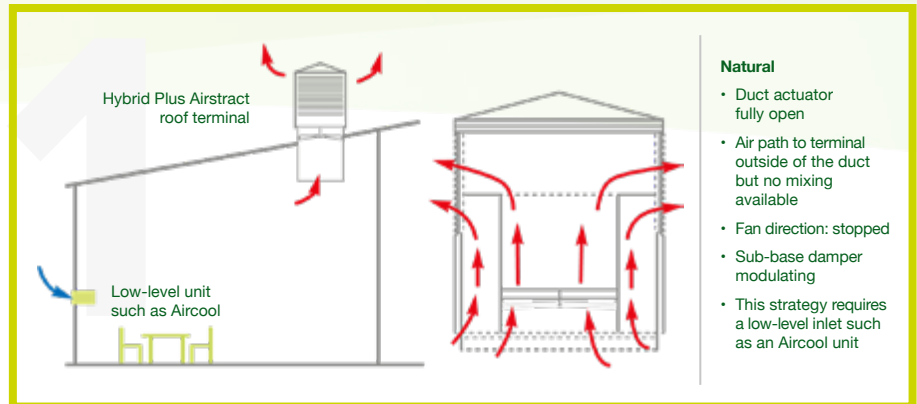
Single-space system - 3 operating modes

This system uses one of three operating modes depending on the needs of the building and outside temperatures.

Mode 1: Natural *Most of the year*

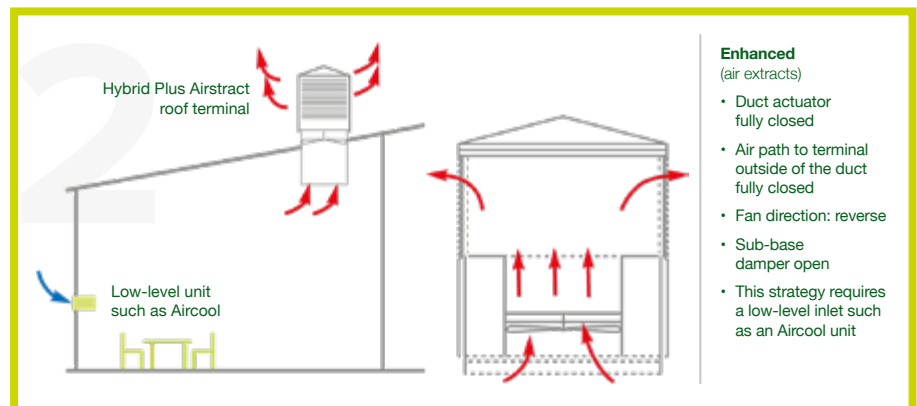
In natural mode the Hybrid Plus Airstract roof terminal acts as a passive stack. Fresh air enters the space via low level air inlets, for example Passivent Aircool ventilators, or opening windows. Warm air rises and is exhausted at high level through the Hybrid Plus Airstract Roof Terminal.

This is a purely passive mode and the fan does not operate. This mode enables control over indoor air quality and temperatures.



Mode 2: Enhanced *Peak summer temperatures*

To avoid overheating within the room, the single low power fan in the Hybrid Plus Airstract terminal extracts high volumes of air from the space and exhausts it to the outside. Fresh air is brought in through low-level air inlets. This mode allows the ventilation rate to be increased to control peak summer temperatures.

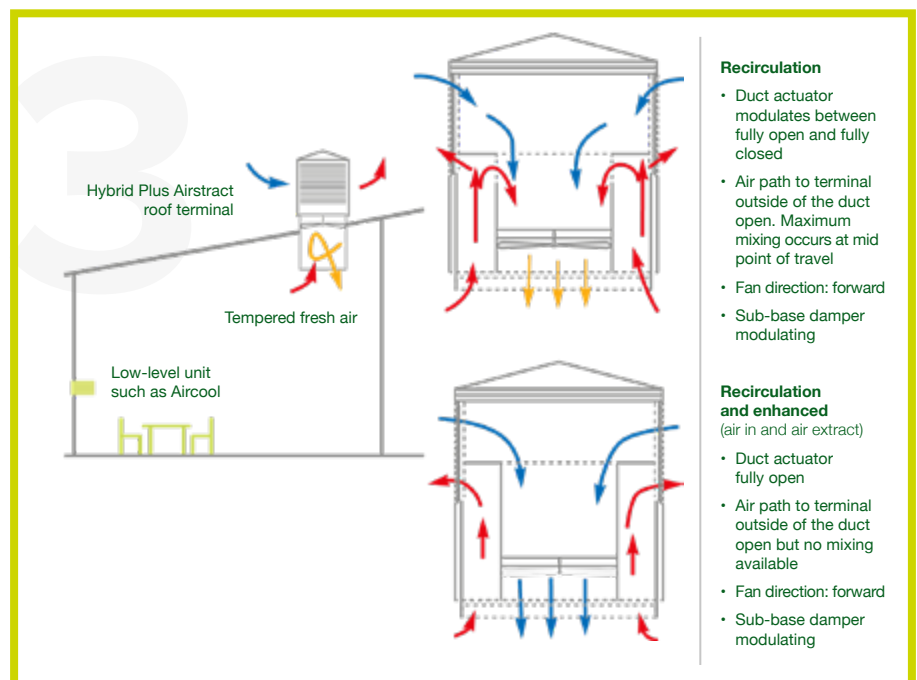


Mode 3: Recirculation *Low winter temperatures & summer night cooling*

Low-level air inlets are closed, preventing cold draughts. Fresh air is brought in at high level through the Hybrid Plus Airstract terminal. With the fan running, the incoming fresh air mixes with interior warm air in the Hybrid Plus Airstract mixing chamber, providing tempered fresh air to the room.

During unoccupied periods when the air inlets are closed and the temperature rises, the Hybrid Plus Airstract terminal both supplies and exhausts air. This ensures a fresh environment when the room is occupied again.

The same strategy can be used for secure night cooling in summer especially if there are no low-level inlets or to open them would present a security risk.



Installation

The Hybrid Plus Airstract roof terminal comprises two main elements: the sub-base unit, which houses the insulated and modulating damper, mixing chamber and fan, and the terminal which provides the weatherproof and low resistance outlet/inlet.

The sub-base unit is fixed to the structure to support the terminal. It is supplied with the necessary fixing brackets and can be used on flat roofs or builders' kerbs. The louvred terminal is fixed in position over the sub-base assembly.

Airscoop[®] Terminals

Passivent Airscoop[®] is a roof-mounted natural ventilation terminal which provides displacement or top-down ventilation using wind power.



Features and benefits

- Sustainable, low energy natural ventilation where minimal power is required to move the air. Can reduce or eliminate the capital and running costs of ventilation or air conditioning plant.
- Excellent weather resistance and 100% rain rejection as described in [more detail on page 5](#).
- Optimised segmented design delivers maximum airflow capacity with minimal pressure drop through the system.
- Designed to 'capture' prevailing wind and direct it via four separate chambers within the terminal to the space beneath. Wind from any direction is channelled down through the windward chamber(s). This cooler, denser air flows down into the building, whilst warmer (and therefore lighter) air from inside is displaced upwards and out via the leeward chambers.
- Complete separation of chambers prevents 'short-circuiting'.
- Motorised damper located at the bottom of the sub-base provides controllable ventilation.
- Acoustics: Sound reduction of up to 32dB (Dn,e,w).
- Circular terminals are mounted on a square base to make for ease of flashing and ensure weather integrity.
- Unique and purpose-designed software based on field testing has been developed with EDSL/Tas to calculate the ventilator sizes required for the application.
- The standard Airscoop system is shown here. See website for more information about the Enhanced Direct Air Dispersal (DAD) system and Enhanced Remote Air Dispersal (RAD) ducted system.

Applications

Particularly designed for large or deep plan buildings of up to two storeys, where direct perimeter ventilation is limited or undesirable.



Modern and traditional design terminals
 up to 45° roof pitch

Terminal size (mm)	Roof opening required (mm)	Airflow rate at 4m/s wind speed	Height** (mm)	Weight* (kg)
575 x 575*	485 x 485	80 l/s	818	69
800 x 800*	710 x 710	200 l/s	1109	110
1025 x 1025*	935 x 935	370 l/s	1350	166
1250 x 1250***	1160 x 1160	590 l/s	1391	209
Circular terminals up to 30° roof pitch (mounted on a square base)				
1400	935 x 935	320 l/s	80 l/s	197
1700	1160 x 1160	510 l/s	1583	246

* Traditional terminals are only available in these sizes.

** Height figures are based on 0° roof pitch.

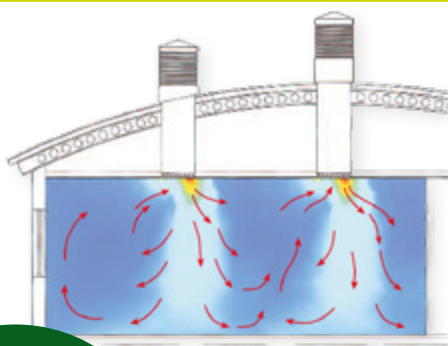
*** Basic Airscoop system only in this size.
Weight figures are based on 0° roof pitch and include the weight of the standard double-banked terminal and square base of 1000 mm in length. Weights are correct at time of going to print but contact Passivent for current figures.

Circular terminals have a square roof opening.

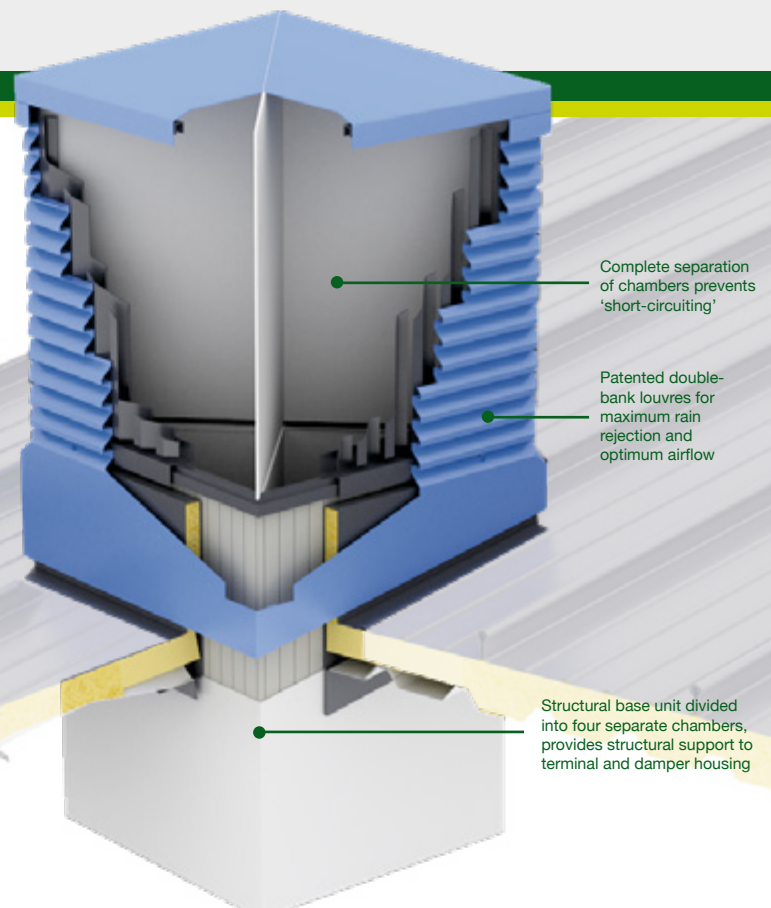
Airscoop system

See diagram below

The system is suitable for use in buildings with and without intermediate ceilings. The air is ducted down from the Airscoop to controllable double-skin aluminium louvres with ABS thermal break through a diffuser grille mounted within the ceiling or base unit for controlling airflow directly into the occupied space. The dampers ensure that draughts under the outlets are minimised, especially important in spaces occupied during the day. The angle of the louvres also assists in spreading the airflow within the ventilated space.



The standard Airscoop system is shown here. See website for more information about the Enhanced Direct Air Dispersal (DAD) system and Enhanced Remote Air Dispersal (RAD) ducted system.



Litevent Airstract[®] Rooflight/Ventilator

Passivent Litevent Airstract[®] combines a controllable ventilator and a rooflight in one unit for installation on flat or low-pitched roofs.



Features and benefits

- Combines natural ventilation and natural daylighting functions in one unit.
- Provides controllable ventilation with minimal energy consumption.
- Reduces the need for artificial lighting, thereby further reducing energy expenditure.
- Thermally insulated upstand and triple-skin polycarbonate glazing minimise heat loss and the risk of condensation. Our Technical department can provide U-value calculations for given sizes in different roof constructions to comply with building regulations.
- Impact strength – The unit has been subjected to large, soft-body impact testing by BRE and may be considered non-fragile to HSG 33. It will resist a soft body impact of at least 1200 joules.
- Weather resistance - driving and deluge rain resistance demonstrated by test.
- Biological resistance - 4 mm insect screen in cowl excludes large nesting insects.
- Height of upstand will accommodate both warm and cold deck constructions without the need for an additional timber kerb.
- Ventilation performance and light transmission performance. [See page 15.](#)

Appearance

Aluminium upstand and glazing frame are mill finish as standard. Frame can be supplied polyester powder coated to order. Cowl is aluminium, mill finished as standard. Glazing is clear, diffused or bronze (see light transmission section for further information). Dome shaped. Internal surfaces finished in white for maximum light reflectance.

Composition

Aluminium upstand with insulated core, incorporating insulated ventilation doors on all four sides, controlled by linked actuators (24V modulating). Weather cowl is mill finish aluminium (or RAL/BS colour upon request) and has an aluminium insect screen.

Rooflight has triple-skin 3mm to 4mm polycarbonate glazing with vented air gap, in an extruded aluminium frame with mitred and secret-welded corners. Glazing has a 10-year postformed warranty from the material sheet supplier against yellowing and loss of light transmission, and for impact resistance.



Ventilation performance

Maximum ventilation area: see Size table

Passivent can advise on the size of Litevent Airstract terminal in relation to volume of air movement required, likely external conditions and internal temperatures. Cd value = 0.77.

Data from independent testing is available on request

Light transmission

For daylight areas see Size table

Average light transmission (3 mm glazing)		G-values
Clear glazing	92%	0.59
Diffused glazing	85%	0.56
Bronze glazing	50%	0.43

Clear glazing allows the greatest amount of daylighting, making it ideal when seeking passive solar gain. Diffused glazing diffuses the light and cuts down shadows and bright spots. Bronze glazing provides a good combination of light transmission with greater control of passive solar gain.

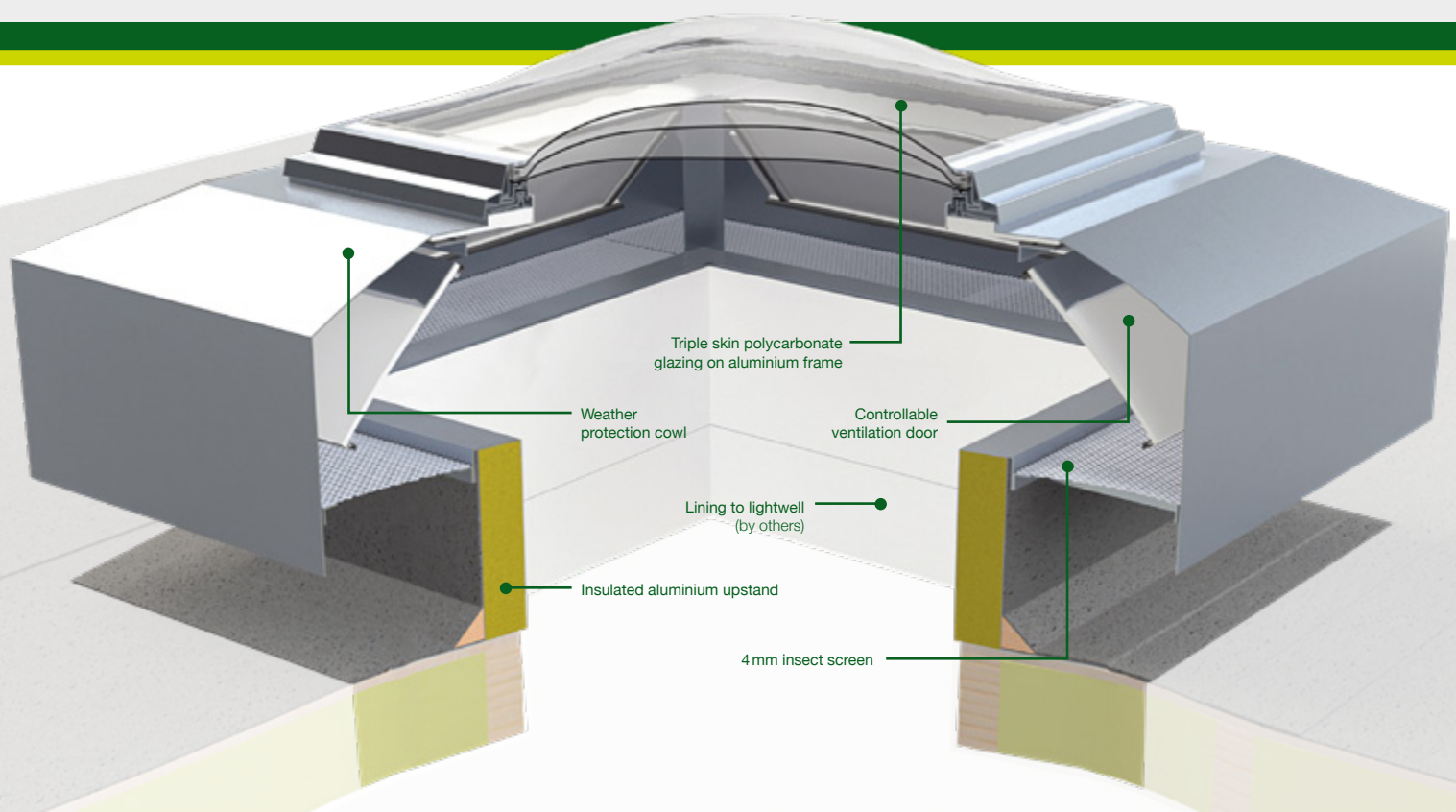
Fire spread: internal and external

Ratings to BS 476: Part 7: 1987 are Class 1 for internal surfaces of the upstand and frame, and Class 1Y for the polycarbonate glazing. Under Building Regulations Approved Document B4 paragraph 15.7, a polycarbonate rooflight with a Class 1 rating may be regarded as having an AA designation for external fire spread.

By virtue of the above performance, under Approved Document B2 Table 11 and B4 Section 14, Litevent ventilators can be used without restriction on size or spacing in all types of occupiable and circulation space except protected stairways.

Sizes	Litevent size* (mm)	Daylight area (m ²)	Ventilation geometric free area (m ²)
	600 x 600	0.270	0.550
	750 x 750	0.448	0.630
	900 x 900	0.672	0.690
	1050 x 1050	0.941	0.770
	1200 x 1200	1.254	0.860
	1200 x 900	0.918	0.770

* Roof opening size.



About us

Passivent's range of natural and hybrid ventilation products provide sustainable and energy-efficient solutions for improved air quality, natural daylight and the removal of moisture. They also help provide healthier, more comfortable environments for a buildings' occupants.

Our solutions have been tried, trusted and tested in many sectors including education, commercial, residential, leisure, care, health and many others. A pioneer in their field with over 40 years' experience Passivent products are designed and developed under ISO 9001 quality standards in their UK manufacturing facility in Nottinghamshire.

Our dedicated sales, technical and commissioning teams provide valuable support throughout the lifecycle of a project and are on hand to work with you every step of the way.

Design and technical support

We offer a comprehensive design and technical support service tailored to your specific project. At the early concept and design stage the Passivent Sales team will discuss the scope and requirements of the project with the customer and ascertain the core ventilation strategy to be achieved. There are many factors that will influence this strategy, some of which are shown below:

- Building design
- Building orientation
- Building location
- Proximity of building to other buildings
- Building fabric
- Building use
- Dimensions of rooms
- Aesthetic requirements
- Heating system specified

The above information, in addition to drawings provided by the customer, will form a comprehensive brief for the Passivent Technical team who will then be able to provide bulk airflow calculations where required and a detailed quotation. Sometimes more detailed thermal modelling may also be required.

Other products

Passivent sells a range of other ventilation products for commercial, educational and residential buildings.

Aircool®

Ventilators for windows, curtain walling and walls, including standard, thermal, acoustic and hybrid versions.

/MEV

intelligent Mechanical Extract Ventilation.

SoundScoop®

Acoustic 'room to room' air transfer unit.



Ventilation
& Air Quality



Natural
Daylight



Moisture
Removal

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passivent

**building
product design**