

comfort ventilation



leading edge MVHR systems for Passivhaus and low energy buildings









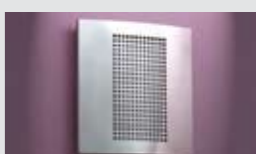

What is MVHR ?

Mechanical Ventilation with Heat Recovery (MVHR) is an essential part of **Passivhaus** and low energy building design. It allows for sufficient and comfortable ventilation to all areas of the house, whilst minimising the loss of indoor heat. This is achieved by use of a heat exchanger driven by two low energy fans. The incoming air passes the outgoing air through the heat exchanger (without being mixed together) so that heat is extracted from the outgoing air and is used to heat the incoming air.

Can MVHR work in any building?

Essential for MVHR to run efficiently is the building's airtightness. Although MVHR can be installed in any building, as a rule of thumb its use is best justified – in terms of energy conservation – when the airtightness of the thermal envelope is **less than 3 m³/m².h @ 50 Pa**.



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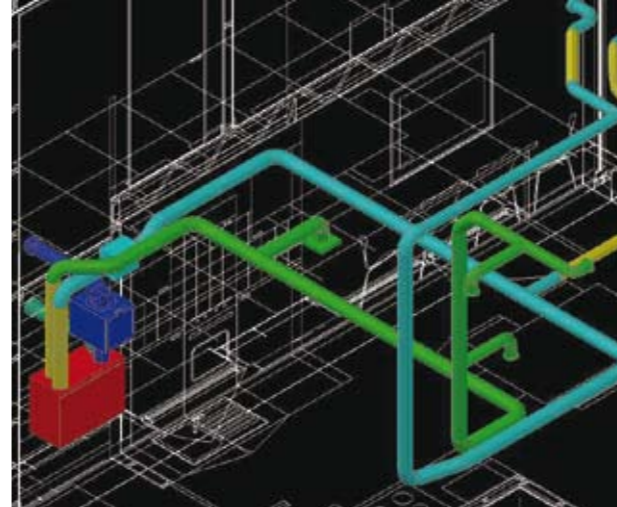
The comfort zone

Well designed and correctly installed, a **comfort ventilation system (MVHR)** should be practically **imperceptible** to the inhabitants while ensuring **good air quality** throughout the building.

*There's a pleasant warmth in the air – it's not hot, it's just comfortable. There's also a serenity about a **Passivhaus**, thanks to all the insulation and triple glazing. As for the **MVHR** system – myths about which abound – you would actually have to make a supreme effort to hear it at all. Most importantly we have found that in the extreme conditions of the winter the system has been really tested and has performed very well.*

Geoff Tunstall
owner Denby Dale Passivhaus

Denby Dale Passivhaus, West Yorkshire
Photo: Morgan O'Driscoll



We do supply **MVHR** units on their own, but we recommend that you use our specialist design service to ensure smooth-running and hassle-free MVHR systems for your Passivhaus and low energy projects.

Green Building Store's MVHR design service ensures mechanical ventilation and heat recovery systems work at their optimum for low energy buildings. Good MVHR design optimises the efficiency of the heat recovery, prevents noise, mechanical vibration and internal turbulence problems and maximises the energy efficiency of the system.

For mechanical ventilation with heat recovery (MVHR), while one can find a host of suppliers of kit nowadays, there are very few designers willing to work on one off projects. I should note a debt of gratitude to Green Building Store who are supplying the components for our project and to their MVHR Technical Manager Andrew Farr in particular who has engineered our system.

It might sound rather obvious to say it but for systems like this to work effectively it is important that they are designed and installed by competent persons. Andrew is one of few such people in the UK and we consider his input an absolute essential rather than an optional extra.
Rob Prewett
architect at Prewett Bizley Ltd
Retrofit for the Future project, Balham

MVHR design service

Summary

- Comprehensive design service – from initial plans to commissioning
- Specialists in Passivhaus and low energy buildings
- High performance PAUL MVHR units
- High quality Lindab Safe ducting system



Right: Larch House, Ebbw Vale (bere: architects)



Above: Gentoo Racecourse Project (Devereux Architects)

MVHR design service

Our design service includes:

Specialist knowledge
of Passivhaus and low energy construction

Advice on the right MVHR system
for your specific needs and budget

Careful positioning of ducting
modelling for pressure loss and sound attenuation

Air flow calculations
provided for building control

Noise minimisation
through careful design of attenuation

2D and 3D plans
with labelled products parts list for ease of installation

Technical support
including telephone support to installers



Optional on-site commissioning service

Our technical team are available to fully commission and balance the **MVHR** system for optimum performance.



Green Base, St Helens (Simmonds Mills Architects)



Retrofit for the Future project, Balham (Prewett Bizley Ltd)

UK Passivhaus projects that we have designed MVHR systems for:

- Ebbw Vale Passivhaus (bere: architects)
- Retrofit for the Future project, Balham (Prewett Bizley Ltd)
- Gentoo Racecourse project (Devereux Architects)
- Centre for Disability Studies (Simmonds Mills Architects)
- Camden Passivhaus (bere: architects)
- Mayville Community Centre (bere: architects)
- Denby Dale Passivhaus (Green Building Store)
- Grove Cottage, Hereford – first certified UK EnerPHit refurbishment (Simmonds Mills Architects)
- Nottingham Passivhaus Retrofit (Gil Schalom Design)
- Green Base, St Helens (Simmonds Mills Architects)
- Sampson Close (Orbit Housing)

Design service charges

To design an **MVHR** and **ducting system**, using specialist CAD-based software, standard charges start from £350* for a standard house of up to 150m².

* Excluding VAT

COMPONENT
suitable for
**PASSIVE
HOUSES**
Dr. Wolfgang Feist



94.4/93%
heat exchange
efficiency
*PHI figures
[145 m³/h/200 m³/h]

Novus 300 MVHR unit

Novus 300 offers the highest Passivhaus-certified **MVHR** heat recovery rates currently available in the world[†], offering designers greater flexibility when designing **Passivhaus** buildings in **PHPP**. The unit's flexibility in installation and wide range of features also makes it suitable for a range of project types.

Summary

- Passivhaus Institut certified
- SAP Appendix Q listed
- Ultra efficient heat recovery
- Wide range of functions – including summer bypass
- Flexible positioning options

Ideal for:

- Passivhaus newbuild & retrofit
- CSH levels 5 & 6

Passivhaus certified
94.4/93% effective heat recovery rate*

SAP Appendix Q listed
up to 90% heat exchange efficiency

Ideal for medium & large projects
between 100-300 m² & 80-300 m³/h of ventilation

Space requirement
Dimensions: 978mm high x 792mm wide x 601mm deep

Humidity recovery option
Membrane heat exchanger helps to prevent dehumidification in winter

Patented heat exchanger
Highly efficient cross counter flow heat exchanger



Intelligent 7-day timed programmer
Allows pre-setting of: operating times, fan power levels, summer bypass valve, intake/exhaust balance; filter monitor; frost protection etc.

Flexible mounting positions
Vertical & horizontal (left & right)

Summer bypass

Optional humidity and/or CO₂ monitoring
to regulate ventilation levels

[†] as at October 2011

specification

Novus 300 MVHR unit



COMPONENT
suitable for
PASSIVE
HOUSES
Dr. Wolfgang Feist

91%
heat exchange
efficiency
*PHI figures

Focus 200 MVHR unit

Technical data

***Heat recovery rate**
94.4% [145 m³/h]/93% [200 m³/h]
Passivhaus Insitut figures
SAP Appendix Q listed: up to 90%
heat exchange efficiency

Electrical efficiency
0.24 Wh/m³ [145 m³/h] &
0.23 Wh/m³ [200 m³/h]
Passivhaus Insitut figures

Dimensions 978mm high x
792mm wide X 601mm deep

Weight 50kg

Installation
Mounting base: vertical or horizontal;
Wall mounting: vertical or horizontal

Location for installation
Frost protected, preferably >10°C

Duct connections 4 air ducts @ 160mm

Condensate Male thread 1¼

Material
Housing: Galvanised steel, powder-
coated & thermal bridge free
heat insulation
Heat exchanger: Plastic (counter
cross flow channel type) or Cellulose
(humidity recovery)

Programmer options
Touch-screen: 7 day programmer with
ability to control frost protection,
post-heat supply, ground-pipe and
brine loop induction
LED button: basic application
BUS: whole house management system

Filters Intake air: G4 or F7 (pollen filter)
Extract air: G4

Electrical connection 230 V. 50 Hz

Protection IP 40

Cable lengths
Mains cable (230 VAC): 2m
CAT-5 cable: 1.5m

Fans
EC radial fans with integrated
electronics. Volume constant control

Temperature suitability
Can be used between -20°C to 40°C

Summer operation
Temperature controlled summer bypass

Frost protection choices
Electrical resistance pre-heater
Ground pipe intake
Ground source heat collector
More information on page 13

Supply air heating
Hot water duct heater or Electric duct
heater (each as external unit)

**Technical data sheets, Passivhaus
Institut & SAP Appendix Q testing
results available at:**
www.passivhausproducts.co.uk

flow rate (m ³ /h)	externally available pressure (Pa)	power input (W)
100	51	17
97	105	25
199	101	45
207	148	58
297	100	86
282	201	117

Focus 200 enables **Passivhaus** designers to save space in smaller projects, while also offering the usual great PAUL MVHR quality and wide range of features.

Summary

- Passivhaus Institut certified
- SAP Appendix Q listed
- Ideal for smaller projects
- Compact size
- Wide range of functions

Ideal for:

- Passivhaus newbuild & retrofit
- CSH levels 5 & 6

Intelligent 7-day timed programmer

Allows pre-setting of:
operating times, fan
power levels, intake/
exhaust balance;
filter monitor; frost
protection etc.

Passivhaus certified
91% effective heat
recovery rate*

SAP Appendix Q listed
up to 95% heat
exchange efficiency

**Ideal for smaller
projects**
between 60-120 m²,
up to 200 m³/h
of ventilation

Compact size
Dimensions: 542mm high
x 752mm wide
x 355mm deep

Humidity recovery option
Membrane heat
exchanger helps to
prevent dehumidification
in winter

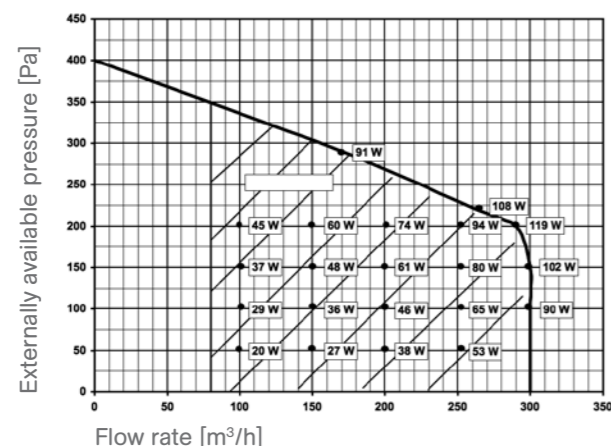
Patented heat exchanger
Highly efficient cross
counter flow heat exchanger



Flexible installation
Left & right versions for
easy installation and
optimal routing of air ducts

**Optional humidity
and/or CO₂ monitoring**
to regulate
ventilation levels

Characteristics for flow rate/externally available pressure



specification

Focus 200 MVHR unit



Technical data

***Heat recovery rate**
91%
Passivhaus Insitut figures
SAP Appendix Q listed: up to 95% heat exchange efficiency

Electrical efficiency
0.31 Wh/m³
Passivhaus Insitut figures

Dimensions 542mm high x 752mm wide X 355mm deep

Weight 25kg

Installation
Horizontal wall mounting or horizontal on mounting base

Location for installation
Frost protected, preferably >10°C

Duct connections 4 air ducts @ 125mm

Condensate Male thread 1 1/4

Material
Housing: Galvanised steel, powder-coated & thermal bridge free heat insulation
Heat exchanger: Polystyrene (standard heat exchanger); Salt ion membrane (moisture heat exchanger)

Programmer options
Touch-screen: 7 day programmer with ability to control frost protection, post-heat supply, ground-pipe and brine loop induction
LED button: basic application

Filters Intake air: G4 or F7 (pollen filter)
Extract air: G4

Electrical connection 230 V. 50 Hz

Protection IP 40

Cable lengths
Mains cable (230 VAC): 2m
CAT-5 cable: 1.5m

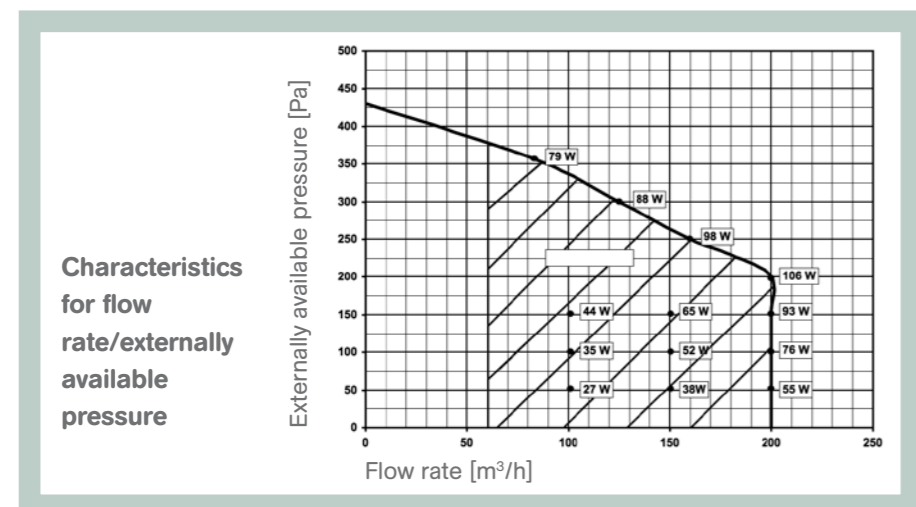
Fans
EC radial fans with integrated electronics. Volume constant control

Temperature suitability
Can be used between -20°C to 40°C

Frost protection choices
Electrical resistance pre-heater
Ground pipe intake
Ground source heat collector
More information on page 13

Supply air heating
Hot water duct heater or Electric duct heater (each as external unit)

Technical data sheets, Passivhaus Institut & SAP Appendix Q testing results available at:
www.passivhausproducts.co.uk



flow rate (m ³ /h)	externally available pressure (Pa)	power input (W)
85	44	20
83	69	24
207	104	90
103	101	34






larger projects

We can also design and supply **MVHR systems** for larger buildings including schools, offices and community centres.



Above: Centre for Disability Studies, Essex (Simmonds Mills architects)

Top left: Mayville Community Centre (bere: architects)

	details
	Maxi For medium/large sized buildings. Available in a range of sizes to deliver air flow rates between 800 and 6000 m ³ /hr @ 200 Pa.
	Campus 500 For large domestic/small commercial projects. Can deliver air flow rates up to 600m ³ /h @ 100 Pa. PHI certified.
	Novus 450 For large domestic projects/ small commercial projects. Can deliver air flow rates up to 450m ³ /h @ 100 Pa.

For more information, contact the MVHR department on 01484 461705 or email mvhr@greenbuildingstore.co.uk



ducting

A well-designed **high quality** ducting system is critical to the efficiency of an MVHR system and comfort for the occupants.

- Increases the energy efficiency of the MVHR unit and reduce energy losses from the system itself
- Ensures MVHR systems are practically imperceptible to the inhabitants, while ensuring good air quality throughout the building
- Allows the MVHR system to continue to perform well for the lifetime of the building

Left: Centre for Disability Studies (Simmonds Mills Architects)



Lindab safe ducting system

Rigid galvanised steel spiral wound system for exceptional durability and longevity. Robust push-fit system with twin rubber seals for the highest level of airtightness (Type D approval). Lifetime system airtightness, requiring no tapes or mastics.



Sound attenuators (silencers)

Specialist range of off-the-shelf and custom-made sound attenuators, including rigid and semi-rigid attenuators. Designed to work within the parameters of domestic installation.

peripherals

We are also able to supply the following products and can advise you on their **suitability** for your project.

supply air heaters

Device used to heat supply air, offering a neat and compact heating solution for up to approximately 10 W/m² of building floor area, reducing the need for other heating sources. NB If used as only means of heating, it is important that Passivhaus levels of performance are achieved.



Supply air heater – electric-heated



Supply air heater – water-heated

Frost protection

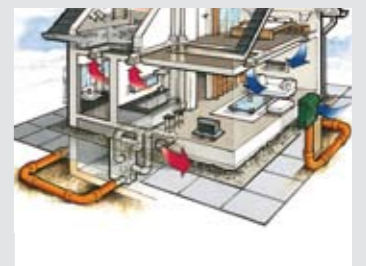
MVHR systems require **frost protection** to ensure that the condensation in the heat exchanger does not freeze. MVHR systems for Passivhaus require **active** frost protection and we can advise on the best system for your project.

frost protection/pre-heating & pre-cooling units

Electrical resistance frost protection unit
With ultra safe self-modulating ceramic element.



Ground pipe systems
Offering frost protection and pre-heating/pre-cooling supply air by means of underground pipes.



Ground source heat collector
Form of frost protection offering moderate pre-heating/pre-cooling of intake air using a glycol solution as a passive heat transfer medium. This is not an active heat pump but a passive temperature exchange. The maximum cooling effect of these types of system is approximately 650 W/ 100m³ of ventilation.



duct insulation

Closed-cell sheet insulation
For primary ducts within the thermal envelope.

Foil-backed mineral wool insulation
For ducting where supply air heating is used.



air valves supply

We also offers a comprehensive range of **air valves** to complement our MVHR systems



options

Wall throw directional air valve. Designed to exploit 'coanda effect'*. Powder coated pressed steel. VVTK



Ceiling mounted directional air valve. Designed to exploit the 'coanda effect'*. Powder coated pressed steel. VTTB



Supply air valve – internal baffle plate allows some directional control of air movement (but not as much as the VVTK or VTTB models). KIR



Supply air valve – supplies air around the valve using ambient (non-directional) air flow. KE



Linear bar grilles are a standard part of commercial building design. They can also be used in domestic buildings as part of the design aesthetic.



options

High performance extract air valve, with minimal noise impact. Powder coated pressed steel. KSU



Filter extract valves

Recommended for kitchens. White powder coated valve ceiling or wall mounted and flush or surface. Supplied either with a replaceable fleece filter or an aluminium wire filter that can be put through a dishwasher to clean.



Stainless steel valve available as surface mount only.



filters



Green Building Store stocks a wide range of MVHR filters to ensure the smooth running of its MVHR systems.

Filters are required for the MVHR units, frost protection units and kitchen extract valves and should be replaced 2-4 times a year (depending on local air quality factors etc). It is important to change filters regularly to optimise energy efficiency and comfort levels.

air valves extract



Other ducting air terminals are available – please contact the MVHR department for more information

* The coanda effect enables an air valve to be located at ceiling height on one side of a room, but extract air from the other, utilising air flow characteristics. This helps to minimize ducting requirements and simplifies silent delivery.

innovations for sustainable building

call our
MVHR
department
on
01484 461705

email us at:
mvhr@greenbuildingstore.co.uk

Free Passivhaus technical resources

Free online resources on the Denby Dale Passivhaus project – including 60 minute film and 40 page technical briefing – are available at:
www.denbydalepassivhaus.co.uk



other environmental construction products from Green Building Store

high performance windows & doors

- Ecoplus³ – UK made, natural finishes, high specification
- Ecocontract – cost-effective option for large-scale projects
- Ecopassiv – cost-effective and Passivhaus compatible
- Optiwin – leading edge Passivhaus certified ranges

Passivhaus products & services

- Windows & doors
- MVHR systems & design
- Airtightness membranes & tapes
- Wall ties
- Building services
- Design guidance
- Training

water-saving products

- Low flush siphon WCs (including Doc M pack)
- Airflush waterless urinals
- Low volume baths
- Aerating showerheads
- Kitchen & bathroom taps.
- Washroom range



Passivhaus range



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