Ventilation & Heat Recovery from Timóleon

April 2014

TN22

Reduce energy consumption and improve the air quality with whole house ventilation.

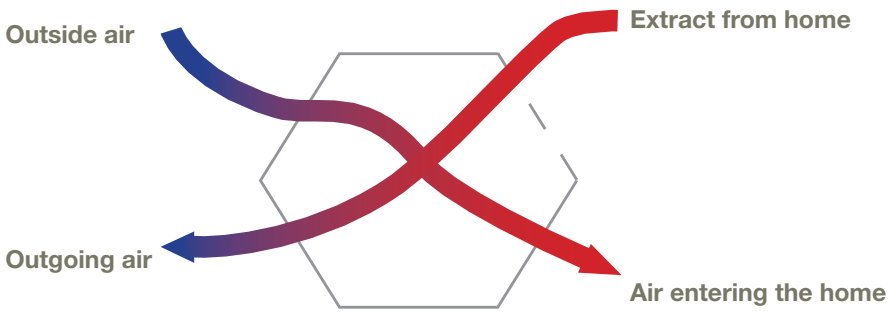
Contents

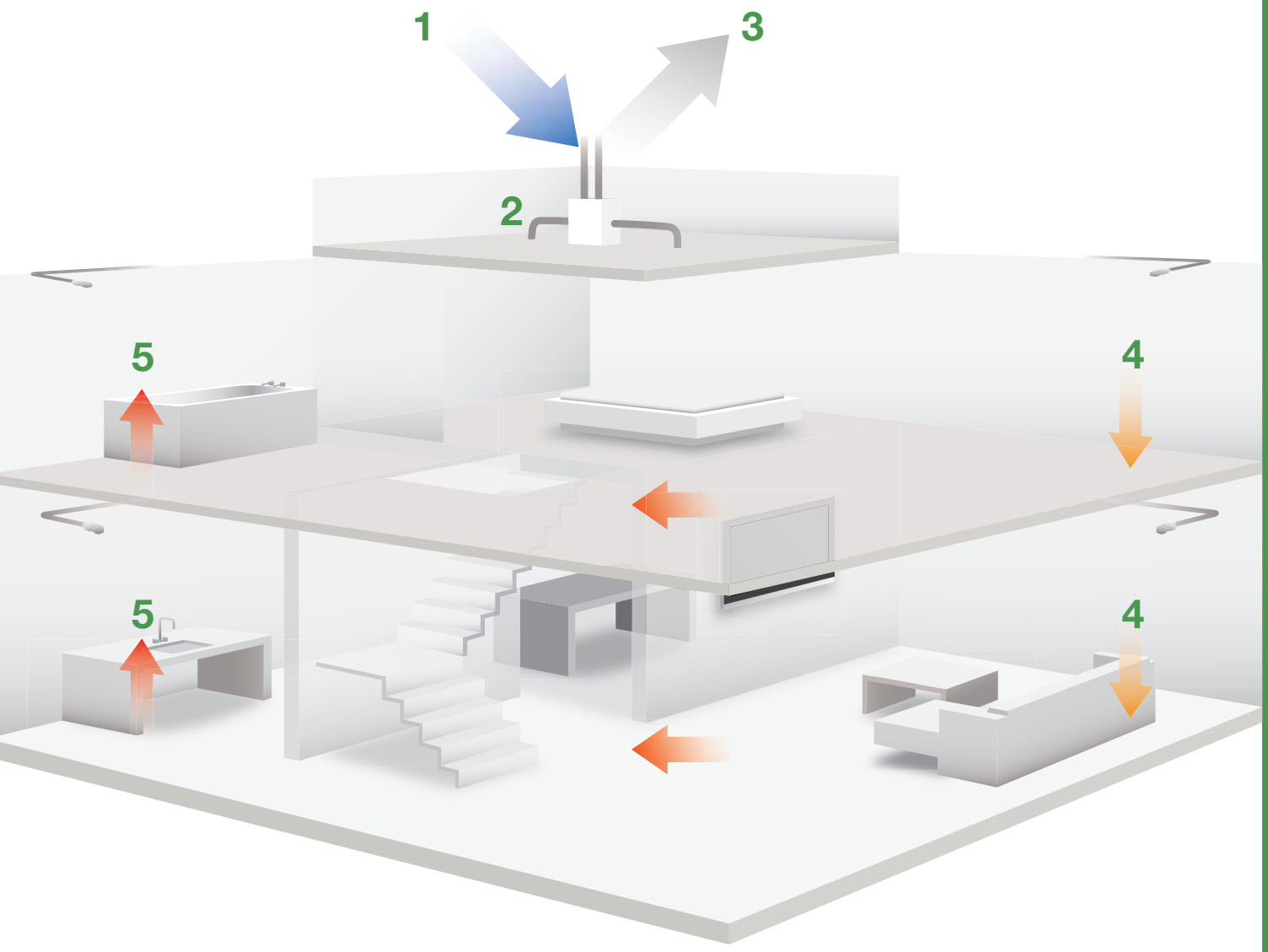
What is MVHR and how does it work?

A Mechanical Ventilation and Heat Recovery (MVHR) system extracts the stale humid air from wet rooms in the same way as conventional mechanical ventilation but instead of dumping the warm air outside the air is moved through internal ducting to a central Heat Recovery Unit (HRU) located in the loft or in a cupboard.

The HRU passes the outgoing air through the heat exchanger whilst simultaneously drawing fresh air from outside in the opposite direction. This process recovers up to 90% of the heat that would otherwise be lost whilst supplying fresh air in a controlled way throughout the building.

By extracting the damp air from bathrooms and kitchens condensation problems are reduced as well as mould growth and the build-up of pollutants. In addition the living environment is improved as windows do not need to be left open reducing noise, pollution and potential security issues.





1. Outside fresh air

Outside air is drawn into the house through a roof cowl or air brick.

2. Transfer through HRU

The heat recovery unit transfers the energy from the outgoing warm stale air into the incoming cold fresh air.

3. Extracted air

Air is extracted to the outside though a roof cowl or air brick.

4. Supply to bedrooms & living areas

The heat recovery unit supplies fresh air through ducting into living rooms and bedrooms through valves in the ceiling.

5. Extraction from bathrooms & kitchens

Stale humid air is extracted by the heat recovery unit from bathrooms and kitchens through valves in the ceiling.

Create the perfect environment by removing stale air and replacing it with fresh outside air.

Key benefits of MVHR Systems

- Moisture that causes mould growth is removed. Mould growth and other pollutants lead to poor indoor air quality.
- Less condensation on windows
- Provides better indoor climate
- A controlled supply of fresh air
- Windows do not need to be left open eliminating noise, pollution and security issues
- Eliminates noise from extract fans located within bathrooms
- Low maintenance
- Less dust

Introducing fresh air into a house and extracting the stale air is essential to maintain comfort levels, to alleviate the potential build-up of contaminants and to reduce humidity in bathrooms and kitchens. Part F of the building regulations makes it mandatory for new homes to be properly ventilated. Mechanical extracts are usually installed to remove stale and humid air from bathrooms and kitchens. However the energy present in the warm air is lost when extracted outside, the heating system is then needed to reheat the incoming air.

The transfer of energy from the outgoing stale humid air to the incoming fresh air reduces the need for the heating system to re-heat the air. This saves energy and reduces the running costs of the heating system.

Heat from ventilation loss is the single biggest component of energy loss in a modern building especially in Passivhaus design. This is because, no matter how air tight the building is, fresh air is always required and this needs to be heated. This supply of fresh air is conventionally provided by extracting stale air using mechanical ventilation from bathrooms and kitchens with fresh air coming from window vents in other rooms. The heat loss from mechanical ventilation can be significantly reduced by using MVHR to control and recover the energy that would otherwise be lost.

Timóleon MVHR systems have boost and automatic summer bypass control.

Does the system run all the time, and all year round?

Yes, the system constantly runs moving air at a low volume in and out of the building. The system will only operate on “boost” when activated usually by switching a bathroom light on.

What is the running cost of an MVHR system?

The electricity consumed by the MVHR system is very low and this is easily offset by the heat energy saving. The running cost will vary but is in the region of 25p to 30p/day.

What will happen if there is no power?

If the MVHR system should stop operating over several hours you will begin to notice the room becoming stuffier especially in bathrooms however there is no risk to health.

Is it noisy?

In continuous mode the HRU is barely audible. In boost mode because of the extra volume extracted the noise is increased slightly. The system is designed to operate at 66% of the HRU capacity to reduce noise.

MVHR Product Characteristic Data Base (PCDB)

SAP is the Government Standard Assessment Procedure for the energy rating of dwellings. PCDB enables performance of new technologies including MVHR to be used in SAP calculations. Our MVHR appliances are >92% efficient and easily satisfy the requirements of SAP Appendix Q. To achieve the highest Code for Sustainable Homes level, a SAP heat loss parameter (HLP) of 0.8W/m^{2}K is required. This will not be achievable without MVHR.

Our integrated systems help our customers to achieve higher levels of the Code for Sustainable Homes and the best possible SAP ratings.

For passive house design

Passive house is becoming more wide spread as a concept, and is perceived as the pinnacle of energy efficiency building design and practice.

This building standard requires high levels of insulation and air-tightness to achieve this certification. It also requires a passive house certified MVHR system to be installed with a pre-heat to stop the heat exchanger freezing. On the CA350PH/CA550PH the pre-heater is installed within the MVHR unit, the HRU requires an external pre-heater to be installed on the fresh air intake. Timoleon have the technical expertise and understanding of the principles of passive house MVHR design, which will enable you to meet this standard.

CA350 and CA550 HRUs are a passive house certified product


OK

How does MVHR work?

1. A Roof Cowl is used for passing ductwork through a roof, for extract or supply.

2. The rigid insulated duct runs from the Heat Recovery Unit to the manifold. Its insulating properties prevent condensation and limit the escape of heat and noise, reducing the requirement for silencers. The installed ductwork can be supplied to meet NHBC Standards.

3. A double airbrick and adaptor is used as a terminal fitting at an external wall, for extract or supply.

4. The Heat Recovery Unit uses fans to extract air from inside the building and also introduce air from outside. The two air flows pass through a high efficiency heat exchanger. Each Heat Recovery Unit has a summer bypass fitted.

5. The manifold is used as a distribution system receiving air through rigid duct from the Heat Recovery unit and distributing the air into each room using several smaller 75mm semi-rigid ducts.

6. This duct to room outlet adaptor moves the air from the ø75mm duct through 90° to a standard air valve connector. This reduces air speed on room entry, eliminating draughts and noise.

7. Semi-Ridgid duct is used between the valve and manifold. Supplied in neatly coiled 50m lengths it is easy to handle, store and transport. Its smooth inner lining and strengthened corrugated outer layer make it flexible but hard wearing. It can be easily manipulated to changes in direction reducing the need for connectors and T-pieces and saving time on installation.

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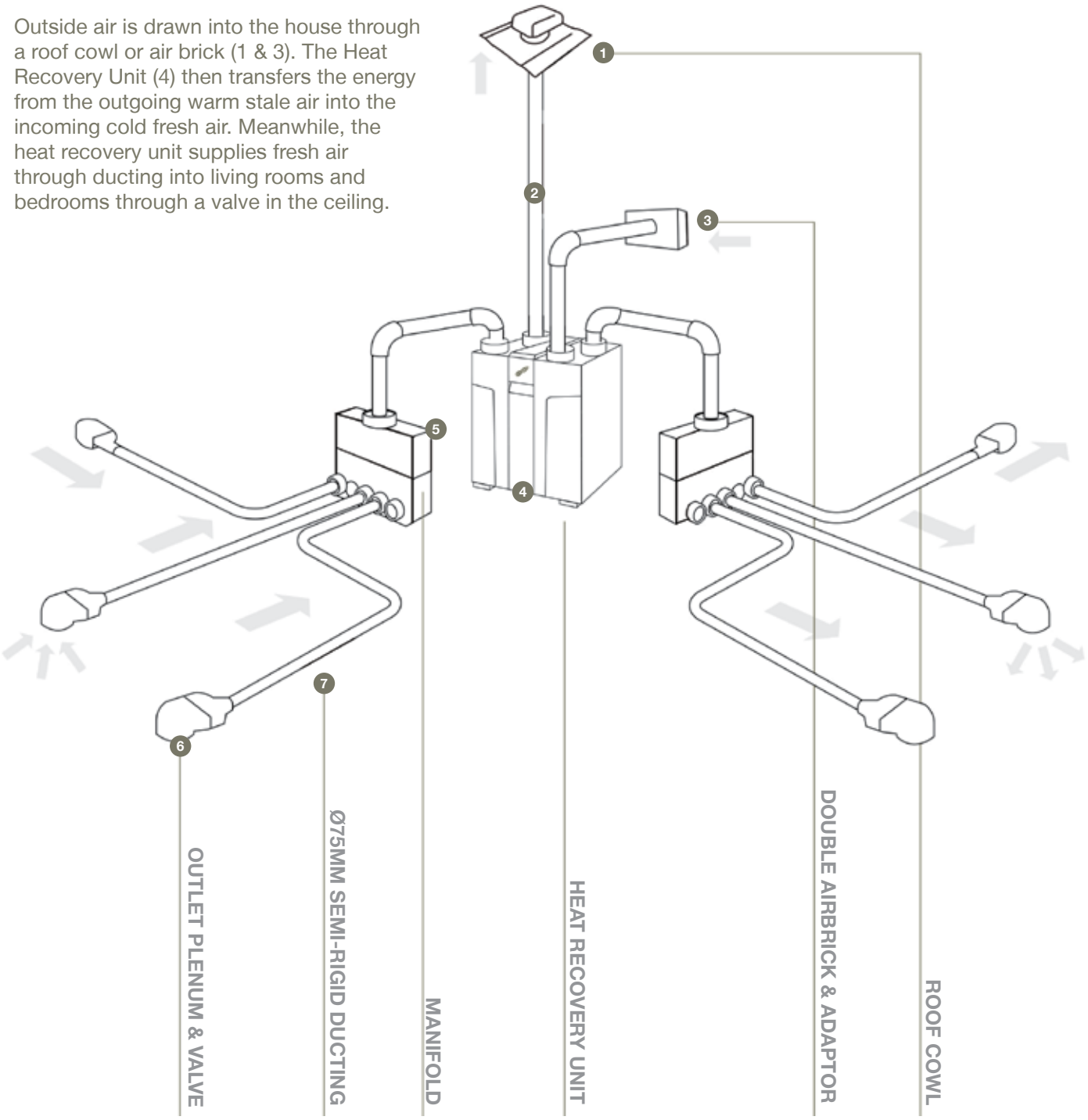
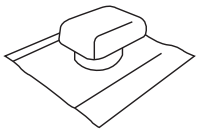
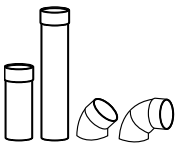
Outside air is drawn into the house through a roof cowl or air brick (1 & 3). The Heat Recovery Unit (4) then transfers the energy from the outgoing warm stale air into the incoming cold fresh air. Meanwhile, the heat recovery unit supplies fresh air through ducting into living rooms and bedrooms through a valve in the ceiling.



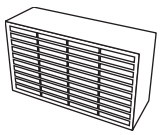
What do you need?



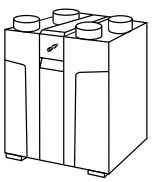
Roof Cowl



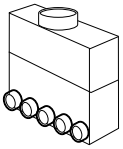
Insulated Ducting



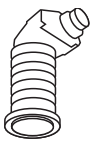
Double Airbrick & Adaptor



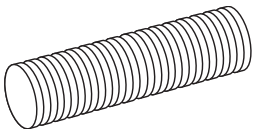
Heat Recovery Unit



Manifold



Outlet Plenum & Valve



Ø 75mm Semi-Rigid Ducting (round)

The heat recovery unit

Mechanical Ventilation and Heat Recovery (MVHR) systems consist of a central Heat Recovery Unit (HRU) located in the loft or in a cupboard with connected duct running to all the rooms in a house.

The HRU has two fans, one to extract the damp, warm air from bathrooms and kitchens and one to bring in fresh air from outside. The HRU passes the outgoing air through the heat exchanger whilst simultaneously drawing fresh air from outside in the opposite direction. The two air streams are isolated from each other as they pass through the heat exchanger with the warm stale air transferring energy to the cooler incoming fresh air which is then supplied to bedrooms and living areas.

- All units are listed on the product characteristic database (PCDB).
- Exceeds Parts F & L of the 2010 Building Regulations.
- Compact and lightweight -155 fits within a standard kitchen unit.
- Wiring centre is positioned on top of the HRV removing the possibility of moisture damaging the electronics.
- Design allows for left or right hand installation.
- Automatic summer bypass that efficiently channels air around the heat exchanger.
- Automatic humidity sensors reduce the need for remote sensors and boost control.
- Passive house certified units available.

Compact 155

CA350

MVHR and CIBSE heat load calculations

A 15% reduction for intermittent heating at the peak load can be made when using an MVHR system. This is because the MVHR system will be recycling heat energy, preheating the fresh air that is supplied into the building reducing the peak load.

Timoleon have a range of HRUs that suit different requirements and building sizes. Each HRU has a maximum flow rate. Timoleon design their systems within 66% of HRU's capacity, this means that there is sufficient boost available when required.

When designing the system Timoleon use a static pressure of 150pa at 66%, this guarantees that the resistance within the ductwork can be overcome without having to increase the air speed, and potential for increased noise. It is crucial when comparing HRU's that the unit has sufficient capacity, and is operating at a low static pressure so that the minimal sound from the fan or valves can be heard. This is very important when it comes to bedrooms and living spaces where HRU's operating with a higher static pressure or fan speed will potentially cause excessive noise or 'whistling'.

Timoleon offer four passive house certified units can be supplied with a preheat to prevent the heat exchanger from freezing. The summer bypass comes as standard, and takes 100% of the extract air past the heat exchanger without heating the fresh incoming air.

Timóleon HRU data

Description	Compact 155	Compact 185	CA350	CA350PH
Dimensions H x W x D (mm)	594 x 550 x 300	839 x 546 x 554	851 x 625 x 572	851 x 625 x 572
Weight (kg)	20	30	39	39
Extract volume m^3/ h @ 150pa at 66% operating speed	108	144	223	223
Extract rate l/s at 66% operating speed @ 150pa	30	40	62	62
Mounting position	Wall	Wall	Wall	Wall
Efficiency of the unit under design conditions (%)	92	92	95	95
Max floor area (m^2)	100	134	206	206
Max sound dB(A) @ 3m medium	22.9	22.5	29.2	29.2
Power consumption, medium/trickle (W)	16	14.2	44	44

Key Features	Compact 155	Compact 185	CA350	CA350PH
Passive house certified	✗	✗	✓	✓
Passive house certified with an integral preheater	✗	✗	✗	✓
Auto summer bypass as standard	✓	✓	✓	✓
Warranty	2 year's	2 year's	2 year's	2 year's
Can be used with rigid/ semi rigid system	✓	✓	✓	✓
Frost protection inbuilt	✓	✓	✓	✓
Control display integrated within the HRU	✓	✓	✓	✓
Wireless remote control available to switch boost and filter replacement indicator	✗	✗	✓	✓
Automatic humidity sensor inbuilt	✓	✓	✓	✓
Automatic RH/ LH selected on set up	✓	✓	✗	✗
Condensate trap within the unit	✓	✓	Supplied externally	Supplied externally
PCDB listing	Zehnder Compact 155	Zehnder Compact 185	Zehnder CA350	Zehnder CA350 LUXEPH

Ductwork

Timoleon provide three ductwork options;

1.Rigid ductwork (conventional plastic)

2.Semi rigid (flexible round)

3.Semi rigid (flexible flat)

Timoleon Rigid	
Size of ductwork round	100 / 125 / 150mm
Size of ductwork rectangular	204 x 60mm / 220 x 90mm
Advantages at a glance	Cheaper / not limited to a specific ductwork length / varying diameter ductwork available to overcome air flow requirements.
Disadvantages	Potential for leaks and installation faults / longer installation time / requirement to fit silencers to prevent cross talk.
Can be used with a range of cowls / vents and grilles	✓

Timoleon Semi Rigid (round)	
Size of ductwork round	75 / 90mm
Advantages at a glance	Guaranteed flow rates and less likely hood of air leakage/ quicker to install as no joints required in ducting. Very adaptable. Ducting is more durable. Interchangeable with rigid/ flat semi rigid. No silencers required.
Disadvantages	Limited to 25m run from the manifold/ more expensive when compared against rigid systems, however cheaper overall when including quicker installation time.
Can be used with a range of cowls / vents and grilles	✓

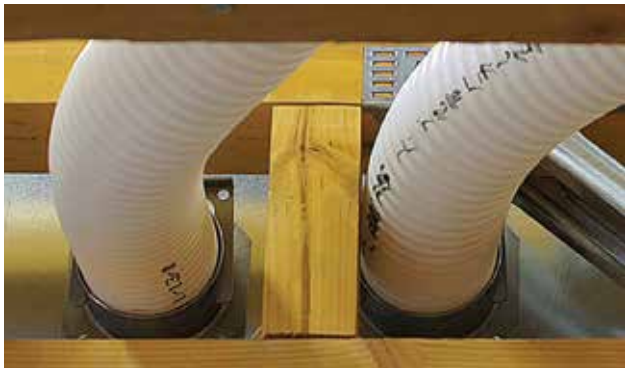
Timoleon Semi Rigid (flat)	
Size of ductwork round	138 x 51mm
Advantages at a glance	Guaranteed flow rates and less likely hood of air leakage/ quicker to install as no joints required in ducting and flexible. Very adaptable. Ducting is more durable. Interchangeable with rigid/ flat semi rigid. No silencers required. Low profile enables the ductwork to fit within limited space and access. In-floor manifolds available
Disadvantages	Limited to 25m run from the manifold/ more expensive when compared against rigid systems, however cheaper overall when including quicker installation time.
Can be used with a range of cowls / vents and grilles	✓

Why use Semi-Rigid Duct?

Our ventilation systems use the latest semi-rigid duct technology removing the need for many of the fittings required in a rigid duct system. As this is smaller and more flexible it is an easier and faster installation that suits both new-build and refurbishment.

By having less fittings and easy push fit joints air leakage is reduced and the single duct run to each room results in significantly less cross talk noise. Installation is up to 50% faster than conventional rigid duct systems especially in suspended floors.

- No leaks
- Easy to clean
- Simple and quick install
- Less fittings required
- Connection from the manifold to the room in one length
- No cross talk between rooms
- No need for silencers
- Straightforward balancing
- Easy to cut and join
- Flexibility means less accuracy required in measuring



Extract and supply valves

Timoleon offer a range of valves which are specifically used for extract and supply. We can also provide 'coanda effect' valves that direct the supply air along the ceiling providing added comfort, reducing duct length and the improving the efficiency of the HRU. Valves are also available with fire proof dampers if building control require this specification. Alternatively Timoleon can provide fire collars that sit within the ceiling void above the valve. Fire rated collars are also available where it is necessary to provide this level of protection between floors or between adjoining properties.

Grilles, air bricks and roof cowls

A range of grilles for low level walls are available when ceiling valves can't be used. External Air bricks are also supplied for air intake and exhaust air from the HRU. If the fresh air intake and exhaust air cannot be supplied through an air brick, then a roof cowl can be installed for tile and slate roofs. All grilles, air bricks and roof cowls come in a range of colours.

Manifolds

Timoleon supply plastic manifolds in 5, 10 and 15 port configurations. These manifolds are specifically designed to be used with the 75mm semi rigid ducting, unused ports can be plugged. These manifolds are low profile and can be housed within the plant room or loft.

Insulated ductwork

A wide range of insulated products for 'cold areas' can be supplied where it is necessary to insulate the ductwork. This is to stop condensation forming. All the insulation products we supply meet NHBC standards, which states a minimum of 25mm insulation with a thermal conductivity of 0.04 W/mK.

tonos from timóleon

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streamline from timóleon

Timóleon Streamline provides a specialist service that commissions, services and troubleshoots underfloor heating, MVHR, solar thermal and heat pumps.

Our experienced field personnel, together with our technical team at our base in Exeter, can troubleshoot and fix problems when they occur. They can also carry out regular servicing, maintenance contracts and offer advice on the most effective way to control a system so that it continues to give the very best energy performance over its lifetime.

For more information on our services then please visit our website.
www.timoleon.co.uk/streamline

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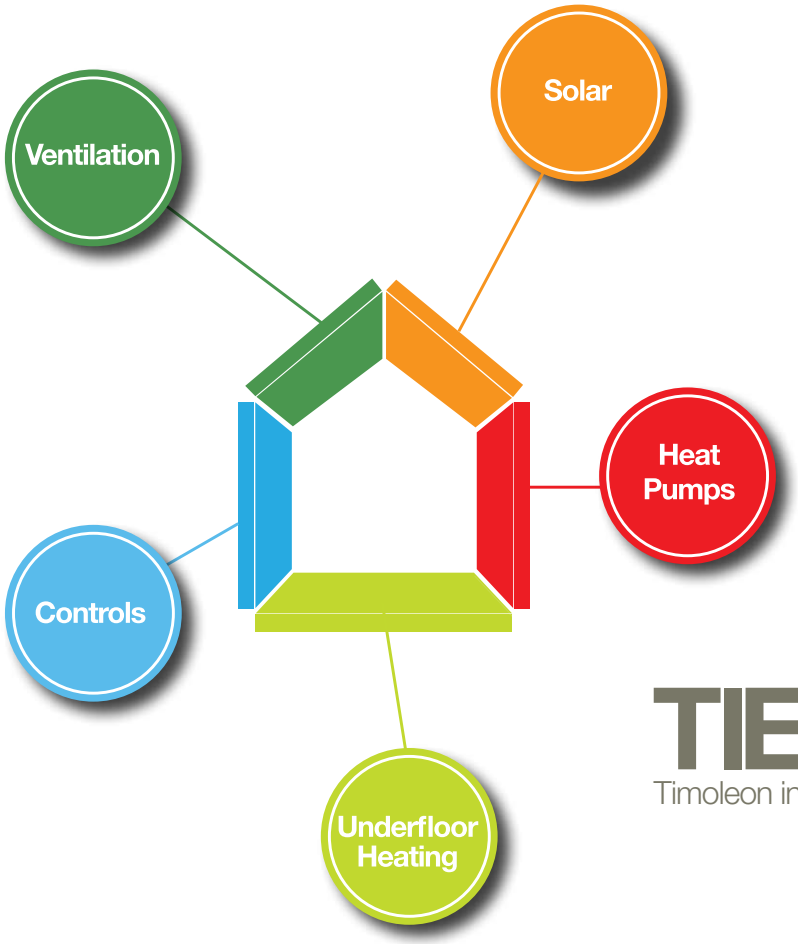
timoleon

Timoleon supplies a wide range of underfloor heating, heat pump, ventilation and solar thermal products and systems for UK constructions.



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