Website: www.proair.ie
Email: proair@proair.ie
Telephone: 091 73 9442

HEAT RECOVERY VENTILATION SYSTEMS
Hi-Tech House Unit 18,
Claregalway Corporate Park,
Claregalway,
Co. Galway.

HRV System Design Guidelines

House owners are looking for higher quality standards when employing builders, subcontractors etc. Among their objectives are having a healthier home and lower energy costs. Targets for air tightness have been improved in an effort to reduce energy demands. As a result, providing adequate ventilation and recovering heat from stale exhausted air is becoming more important. This is achieved by using Heat Recovery Ventilation (HRV) systems. They are becoming more common in houses in Ireland and the UK. The HRV system can be said to be the lungs of the house in that it continuously takes in fresh air and exhausts stale used air.

Most HRV systems deliver efficiencies of c90% or more, reduce energy demands and provide a good indoor healthy environment. Poor ventilation has a detrimental effect on the health of the occupants of a house. Condensation, mould spores, odours, etc can build up. Provision of a properly designed, correctly installed and commissioned HRV system will ensure that occupants will have a healthy environment inside.

Planning for the provision of a system should be addressed as early as possible in the build process. House owners should aim to go down the Passive House road as far as possible. This implies investing in the fabric of the house by investing in insulation and air tightness (draught proofing) and complementing this with energy efficient ventilation such as HRV.

A HRV system consists of an air handling unit (AHU), a ducting system linked to all the rooms in the house and connections to the outside for the ingress/egress of air. The AHU has a pair of fans which run continuously and are set to run at speeds that are appropriate to the size of the house and its occupants.

The following points need to be addressed early on:

1. Location of the AHU: It is best located within the thermal envelope of the house. Some years ago when houses were not as well insulated and as air tight as they are now, most units were located in attics/lofts away from view. With improved insulation and air tightness attics/lofts are colder and this impinges on the efficiency of the system. ProAir Systems recommend placing the unit in the utility room, hotpress or similar area. Positioning the AHU on or adjacent to an external wall will reduce the power required to run the system. Generally access is easier in these rooms. This is important when it comes to servicing the unit. Sometimes in the past, when the unit was out of sight it was a case of out of mind also. No attention was given to it until some problem occurred.

2. Condensate Drain: Moisture condenses inside the heat exchanger. It is very important that this condensate is removed from the AHU. Connecting to a waste water pipe within the house is best practice. An adequate fall is required.

3. Power: An ordinary socket is required beside the AHU.

4. Ingress/Egress of air: ProAir Systems have a few options on getting air in/out to the AHU. One of our preferred options is to use our FEX terminal. It is a low cost efficient solution that facilitates the ingress and egress of air to and from a MVHR unit. It ensures that no cross contamination of Fresh and EXhaust airflows occur as they enter/leave a building.
http://www.proair.ie/wp-content/uploads/2013/03/ProAir_FEX_Terminal_Flyer.pdf
Other options are holes in the wall 2 -3 m apart, slate vents or via soffit vents.

5. Type of Duct: Consideration has to be given to its size of the duct, its shape and its ability to allow easy passage of air through it. ProAir Systems uses rigid oval PVC high quality duct because it is similar to circular duct, it is smooth on the inside, it has a low resistance and it has a low profile (60mm). http://www.proair.ie/wp-content/uploads/2014/05/ProAir-Duct-Joint-Brochure-Ver4-15.pdf
Smaller ducting while often cheaper, will require fans to run at a higher speeds if the required air volumes are to be delivered to each room. Flexible or semi flexible duct should not be used.

6. Layout of Duct System: The ducts are best placed inside the thermal envelope of the house. The layout should take cognisance of room sizes and their use. ProAir Systems use a radial plenum box distribution system with each room served by an individual duct. This means that noise transfer between rooms is eliminated. Good duct design aims to minimise pressure losses in order to minimise electrical power consumption. Bends are minimised and paths of least resistance are taken. Valves are installed at the end of each duct run to control the air flow in/out of each room.

7. Unit Sizing: It is necessary that the required amount of air is moved at the lowest fan speed, achieving high efficiency with the resulting low sound levels. Correctly sized units will ensure electrical efficiency, low noise levels, longer life-span of the fans and less frequent filter changes.

8. Installation: This should be done by competent knowledgeable installers. Poor installation can exacerbate poor design.

Addressing these issues as early as possible in the build will help to ensure that a healthy low energy house can be delivered. Future maintenance will also be easier and cheaper when the system has been properly designed and installed at the outset.