Episode 79

How Ventilation in the Home Has Evolved

The show notes: www.houseplanninghelp.com/79

Intro: Mark Chesney is the Installation and Services Manager at Beam Vacuum & Ventilation and we're going to chat to him about ventilation. What exactly do you need to know and how are things different when we're creating low energy buildings?

I started by asking him about his work and what goes on at Beam.

Mark: My background is in the building trade. We are involved in ventilation installations throughout the UK and Ireland and we have a 15-year history with installing new products, ventilation products, into new and existing homes.

Ben: And do you live in a house that's right on the cutting edge, or have you managed to bring this into your personal life?

Mark: No, I don't live in a cutting edge house at all. My home's 15 years old and it has one or two of the ventilation products installed. Ventilation products are for all homes, whether they be 50 year old bungalows or very new, modern, airtight buildings.

Ben: The reason I've got you on today is because I thought that it would be a good opportunity to revisit ventilation. And also I'm going to throw in some new questions that I have about it as we go through.

So I wanted to start on a side of ventilation that I hadn't really discussed before, and that is ventilation of the structure. Because as I understand it there are three different parts of a house that you can ventilate: the living space, the structure and when you come to deal with stoves and open fireplaces, etc. Would that be correct?

Mark: Yeah, that's correct, and it would fall under three different forms. The mechanical systems would be ventilating the inside of the home for the people that live in the home, so you're getting air change inside the dwelling. Completely different is the air combustion for the combustible appliances; your fires, stoves etc. And the building itself needs to breathe, and that's done at the new build where you allow air transfer routes for the roof space to breathe, and the building itself to breathe, especially with timber frame products.

Ben: So how would you do that, with an air brick?

Mark: Well for instance, for the roof space you would have an air transfer route beneath the roof itself. You would have air gaps in the cavity walls and generally just allows the building itself to breathe in and breathe out.

Ben: And is it doing this just by blowing the air around effectively?

Mark: Yes, well in the construction phase the air transfer routes would allow the building itself to breathe naturally so that there is no mechanical form of ventilating the actual structure.

Ben: And presumably that has been historically the case as well, that whole buildings would work that same way?

Mark: Yes, that was the traditional way buildings were designed and built. In the past there was no need for mechanical systems to provide fresh air into the internal dwelling or extraction away from it because there was so much natural leakage within the actual timber frame of the house or the block construction. It's only as houses have become more airtight, better insulated, that the need for mechanical extraction and mechanical supply of air to the home for the people within the house to breathe more easy and allow for better air change.

Ben: And why have we gone down that route, increasing insulation and airtightness, for someone that this might be a new idea to?

Mark: Well if you consider houses from the 1970s and 80s and before that, the airtightness levels were very poor. Natural leakage was great and the opening of windows was normal to ventilate the house for the people living in it. As houses have become more airtight in the late 90s and since the turn of the century, it's all down to the cost of heating the homes. Considering that heating the home has become 5 times, 6 times dearer than it was 15/20 years ago.

Ben: And it's having that level of control, so looking at the different ways that we could approach this, I'm assuming that mechanical ventilation with heat recovery is the ultimate, but perhaps we could work through some of the others that I've seen. Particularly recently I saw a house that was being retrofitted that had trickle vents put in and was using extract fans. So what are the advantages and disadvantages of going down that route?

Mark: The cheapest way to ventilate a home is via natural leakage and openable windows. That doesn't cost anything to put in place, but you've no control over the cold ingress from outside or the heat loss to the outside. Thus the heat in the home is lost a lot quicker and you've no control over the amount of air transfer that you get.

Ben: And I'm assuming that there was a stage when we didn't even think about ventilation, and then perhaps we did think about ventilation, but it was this natural ventilation even though we weren't still controlling it very well?

Mark: Yes, that's correct. On the stepping stone to ventilation and I suppose that the top step would be MVHR (Mechanical Ventilation with Heat Recovery). The stepping stone from natural ventilation with openable windows through to trickle vents and independent extract fans which has become the norm from the late 80s and early 90s. More modern types of ventilation have been mechanical extract systems, positive input systems and ultimately MVHR systems (Mechanical Ventilation with Heat Recovery) which are used and recognised to be an essential part of an airtight, well insulated home.

Ben: Because it's quite a blurry line isn't it, as to when you might use mechanical ventilation in terms of, obviously if you're very airtight it makes total sense, but if we start to go up to where it might be 3 air changes per hour or perhaps 4, do you still use extract fans at that level for comfort purposes even though it might be using more energy to run these fans?

Mark: Well that's an important question. When you're talking about 3 to 4 air changes an hour, that's for intermittent extract fans which are only run for 15 to 20 minutes giving you a higher change rate in a small space for a small amount of time. For instance, if you were to ventilate a home, a domestic home, with 4 air changes an hour you would struggle greatly to keep heat within that home. With a new build, whether it be timber frame or block built home or equivalent, the recognised air change rate would be something just slightly less than half an air change per hour. A Passivhaus for instance is even less. It's down to 0.3 air changes per hour. This is confused sometimes with the air permeability rate which is the designed air permeability rate for the fabric of the building which is 0.6m^2 per m^3 per hour.

Ben: It does get technical doesn't it when we start having all these numbers flying around!

Mark: It does but if you can set up a new home to have one air change every two hours in the domestic situation and you heat the home, you will limit and reduce, or eliminate, the amount of condensation, eliminate mould and provide a fresh filtered indoor air climate.

Ben: So that's always what we're aiming to do. It's really down to health issues?

Mark: Primarily. Ventilation systems, no matter what form, are there to provide fresh, filtered, changed air into the dwelling and for the people living within the home.

Ben: So are there choices in terms of filtering that air as well or do all products filter the air?

Mark: Most products will filter the air to some degree. There is obviously different levels and different levels of filtration available. Mechanical heat recovery ventilation systems should and mostly would have a filtration level of at least F4 and potentially F7, which is a pollen rated filter. But F4 would be the industry norm.

Ben: And what else might you have in that system? Is it just filtering the air, drawing in the fresh air from the outside? Are there any other considerations?

Mark: Well the considerations are the amount of people living within the home, the airtightness of the dwelling and also is the dwelling well enough insulated that it deems an MVHR system? Is it a suitable product for that home? Sometimes less airtight homes, older homes with a retrofit which can't achieve a great level of airtightness, some of the simpler products, the MEV systems or the PAV systems would be an approved alternative to a complete MVHR system.

Ben: Another aspect that I wanted to talk about which may just be on the border of this discussion, but we've mentioned ventilation, if we're talking about a very airtight home and you're looking at heating or cooling that air, it's often in a Passivhaus for example something that you wouldn't necessarily do, you'd hope that the structure of the house would mean that you wouldn't have to heat or cool the air, but if you do, what would your options be there?

Mark: It's a common mistake that ventilation systems with heat recovery, because of the last two words in its title, will provide a heating system for the home, and that's not the case. If you're building an approved, accredited Passivhaus using the ventilation system with heat recovery and a primary heat source you can then sustain the heat within that dwelling a lot easier than you could if it was just a traditional build. A traditional build even with a low air permeability rating and high levels of insulation will most definitely need a primary heating source for that house.

Ben: So what is your main business then at Beam?

Mark: At Beam we have been installing central vacuum systems into the Irish and British markets since 1977. We are a domestic company with a commercial and industrial side to our business. In the last 15 years we have moved into ventilation systems and we now combine the installation of both and while the two products are completely individual we feel that a central vacuum system and depending on the form of ventilation system, provide both clean air and clean home to the people and the occupants of the new dwelling or existing dwelling.

Ben: So that's obviously a separate element to it, but what is a central vacuum system and does it link up at all with the ventilation? In some respect are you making use of what's already there or is it not that case at all?

Mark: No, it's a completely standalone product. The central vacuum system is a ducted system with a vacuum unit, a power unit and the motor itself being located in the non-living area of the home, either the utility room or a garage or store. It removes all the dust pollutants from the home and provides no recycled dust into the dwelling. It's a proven fact that asthma and allergy sufferers see dramatic decreases in their symptoms if they have a central vacuum system installed. The two products are completely separate but the motto of clean air and clean home combine together to provide a better indoor climate for everybody, but especially those who suffer from any allergies or asthma sufferers.

Ben: And how does it actually work? What are the components for the user?

Mark: The vacuum system, as I said, the motor itself is located in the non-living area of the home so all the noise and the dust is removed to that area. All that is provided through the house, the dwelling, is a hose - a lightweight hose which is inserted into a socket, not unlike an electrical socket. And the vacuum commences from there and the dust is then drawn and removed back to the one point, for instance in the garage.

Ben: And there are multiple sockets like this throughout the house that you'd incorporate during the construction?

Mark: Yeah, depending on the size of the home. You're talking somewhere between 5 and 7 wall sockets throughout the dwelling.

Ben: And then you just empty it in the same way you would a normal vacuum?

Mark: Yes, there's the plastic bin which can be emptied like any other vacuum cleaner.

Ben: As we get towards the end I just want to ask a few questions about your situation where you are in Northern Ireland. And what are the houses like out there? How would you describe them, are they getting better?

Mark: Yes most definitely. The construction business has changed dramatically in the last 10 years and as each year passes by you notice and you see more airtightness products being made available and better built homes and all within the industry are recognising this and taking on board those improvements.

Houses that were built 15 years ago for instance, they wouldn't have been built airtight at all. There would have been very few of the construction people on site would have given it any thought. Each different phase of the construction on a new build in today's marketplace, every part of that house is being built airtight and everybody contributes to that.

Ben: Well, thank you very much for your time today Mark. It's been fantastic to get some answers to our questions here so I appreciate that, cheers!

Mark: Thank you very much, Ben. Thank you for having us.