

## Episode 195

# What is cellulose insulation? with Gordon Lewis

The show notes: [www.houseplanninghelp.com/195](http://www.houseplanninghelp.com/195)

**Intro:** Insulation can make up around 80% of a building, so it deserves some careful consideration. Many of the available materials are man-made and not very environmentally friendly but there are green options. Cellulose is highly sustainable is ideal for timber framed buildings. Gordon Lewis is an expert in the use and fitting of cellulose insulation and he talked to us about the advantages of the product and why self-builders should consider using it. I started by asking him about his professional background.

**Gordon:** I've been involved with cellulose insulation now for well over 26 years. Started with Excel Industries back in 1991 and that closed in 2014 and then became self-employed. So, I took the trade of going self-employed from all the years that I'd gained with Excel, doing all the insulation and installation of Warmcel into timber-framed properties.

**Ben:** When we talk about cellulose, what is it, at a basic level? We're always told recycled newspaper. Is there more to it?

**Gordon:** No, not really. It is made from recycled newspaper. All the newspapers that we read, all the tabloids and all the rest of it.

To make the product, to give you some idea of it, it needs to be dry paper that comes into the factory. Then it gets milled down to a smaller particle size and then it goes into what we call a "hammer mill" system or a "fibrerising system" that makes the actual fibres of the paper much, much smaller. At that point then, you have fire-retardants that are added to the paper to actually make the cellulose product, what we call Warmcel.

**Ben:** Is this a plentiful supply or do we imagine it will decline over time?

**Gordon:** I think with paper, over the years, I have seen it slightly decline, only down to technology, because people are using phones and apps and computers and all the rest of it. So, papers are not made as much as they used to be made. But there is a big abundance of paper still out there.

When we had the factory down at Ebbw Vale and down in Rumney, we were getting a lot of paper coming over from Ireland and other different countries. Obviously, they have got a lot of surplus of paper. So, there is a lot of paper out there but it is slowly getting much, much smaller.

Ben: These factories, I'm imagining there aren't a massive amount of them. How many people make a product like this at the moment?

Gordon: There are a number of factories. Excel was the sole factory in the UK making insulation, but there is a very small company in Ireland, there are a number of companies in France and then obviously in Europe you've got Finland and Germany in particular, Sweden, Belgium, where there are many more manufacturers of cellulose. Primarily down to the fact that they've got the resources to do a lot more recycling and all the rest of it.

I think there's quite a few that have gone by the wayside. One, due to overhead costs and two, primarily the shortage of paper as well hasn't helped and has closed one or two factories.

But there's still one or two that are manufacturing. Particularly one in the Czech Republic called CIUR and they make the brand of Warmcel. They ship it from the Czech Republic to the UK.

Ben: Who came up with this idea in the first place? Was it just because the product was there to do something with?

Gordon: From what I can gather, there was some form of cellulose that was being introduced in either the late '20s or the late '30s in the States. But the actual product as an insulation product, I think it was back in the '70s, early '80s that it became a known product of insulation. That's how far I can remember back to.

Ben: Is it only ever used with timber frame? You would only ever put it into that void?

Gordon: Mostly, it's suited and ideal for timber frame buildings. But it can be used in other circumstances. It depends, obviously, on where the insulation is going. Because it's made from paper, you don't want it to come in contact with any damp surfaces or any surfaces where there's a risk of condensation problems.

But primarily, it's designed perfectly for timber frame buildings, whether they be one-off houses, schools – anything that's made from timber frame can accept cellulose insulation.

Ben: Are there similar linings on the inside and outside? What would it look like, that cavity?

Gordon: There are a number of different types of materials from the outside to the inside, where they're using rigid board on the outside, rigid board on the inside. You've got so many different types of makes of different boards that give thermal performances.

And then you've got materials that can mix and match. For example, you can use a rigid board on the outside and a membrane on the inside. Or you may use a membrane on the outside and board on the inside.

It's all down to the actual sandwich of what the insulation's going out to, basically to have no condensation problems.

Ben: I know you do lots of these jobs so, I'm hoping you might remember the one where I met you, where you were using the PH15 build. Can you describe the process that you go through, from maybe even costing it up. How do you know how much product you're going to be needing to begin with and turning up and ...?

Gordon: What we need to know first of all is one, where the insulation's going. Is it going into walls, into floors, into a cold loft, what we call an attic space, is it going into a warm roof, what we call a sloping ceiling, internal walls. There are a number of places that we need to know where the insulation is going.

Once we establish what the client wants, where the insulation is going, then we need to know the actual depth of the insulation that's required for walls, for example, and we need to know then the square meterage so we can work out then the actual calculation for the amount of material that's needed.

Once we've got all those figures, where it's going, the area and the size of the material that it's going into, and the thickness, what we do then is work out the average density that's required for that particular area, be it in a wall, or a sloping roof for example, and then with that formula that we use, we can establish how much material is required for that particular build.

Ben: And then you cut holes in the wall or normally is that prepared, waiting for you?

Gordon: That tends to be done, these days, when you've got a rigid board on the inside. Generally, nine times out of ten, they're OSB or OSB E1 – it's a vapour control OSB board. What we need to do then, we go in and obviously we can't see where the voids are, but we know

through the nailing pattern or the screw pattern or what have you, or look at drawings for example, we will cut a hole into each void that we need to gain access to, to pump the insulation in.

Ben: It always seems counter-intuitive, particularly on this property. It's a very air-tight property and then you're suddenly coming in and cutting circular holes everywhere.

Gordon: Yes. It's a downside, to the point where you look and think, 'oh, you've made all these holes in the walls.' But there's no other way of gaining access to get the insulation in. So, once we've cored the hole and filled up the void with insulation, then we'll make good then with the hole that with cut. We'll put the core back in and then we'll use a special sealing tape then, that will seal the core back over the board. That makes it back to 100% airtight.

Ben: I don't know whether this is something that they even told you, but it was below 0.01 air changes an hour at 50 Pascal, which is pretty impressive. There aren't too many properties like that in the UK.

Gordon: I was very impressed with the result. Apparently, it was one of the best they've recorded. So, I was more than happy with what I had done in particular, to core and hole those holes in that property and making sure that all the holes were sealed up properly.

Ben: And on that, how many holes do you think you cut? I think it's around about a 400 square metre floor area, just to give a visual idea.

Gordon: I think we may have cored close to maybe 500 holes, cut and repaired. So, that's something to cut all those holes and to repair all those holes. We had to be very, very careful when we did the repairs that the tape was well sealed and there were no creases in the tape either. So, well chuffed with the results.

Ben: Going back to how you do that, can you describe the equipment that you have both in the van – because you normally have someone working with you there – and then you're at the other end with your pipe, if that's the technical term for it?

Gordon: Yes, sure. Obviously, we turn up to sites, establish where we're going to start working and whatnot, where the power is and everything, have a look inside the property at where and what needs doing.

We attach the hose to the machine, run the hose into the property. It depends where we're going to start in the house. Generally, we start downstairs on the walls. Particularly when walls are open all

the way through from the ground going up to the first floor or even higher, then we can pump the insulation in on the first floor.

The machine side of things, it's a Krendl machine that I use. I've known Krendl and used Krendl equipment for the last 26 years but I have used many other different types of machine. They're all designed to break up cellulose product, particular Warmcel that we use. The machine breaks up the fibre, it then goes into an airlock generally based underneath the machine and then there are blowers at the back of the airlock that blows the fibre through the hose, to the delivery point where I'm injecting the fibre in.

Ben: How do you know you've got enough in each cavity and there's not a hole or a space? Or does it just happen by magic?

Gordon: Mostly, it's down to experience. But when you are filling sections and you've got the equipment set up right and you have the certain special tools that we use to inject the fibre in, you just get used to what you're doing.

Saying that, you can carry out tests to make sure that the insulation's gone in at the right density and that it is where it's blown to. You could core extra holes if you wanted, but once you get used to installing the insulation, you get a feel for it. You know that you've reached the point of no return, to stop pumping and you continue then pumping somewhere else. It's that type of thing really.

Ben: You mentioned around about 500 voids in this particular property. How do you make sure you don't miss one?

Gordon: A lot of it is a case of when you do a lot of timber framed houses, you get to know the make-up and design of a lot of these frame kits. You get to know the nooks and crannies, the small gaps, especially above windows and doors, they're particular things to watch out for.

Especially in the corners of buildings where sometimes you may be able to gain access on the inside of the building but if they've butted up together and there is no access, then you have to gain access on the outside of the corners of the property.

With saying that, there are a few things you can do. One, you can look at the drawings to find out where all these spaces are, but they tend to change now and again when the property's being built. Sometimes you can speak to the guys who put the boards on. They can tell you where these gaps are. You can ask the builders or whoever to write on the boards for you sometimes. I've been on jobs where they've actually written on the OSB board to say there's a gap or not a gap. Just put a little cross or something. That makes

life easier. And sometimes, if I'm in doubt, I'll drill a small hole to check if there's a space or not.

There's always a way around it, that we'll find something that needs to be filled.

Ben: I don't know this fact 100%, but when I was chatting to Janet, who was the architect on this project and also one of the founders of the PH15 system, she was saying something like when you look at the building, 80% of it is insulation. Does that sound about right?

Gordon: Probably, yes.

I'd say about that figure because when we tend to work out calculations, for example, of the amount of material that's going in, I make a final deduction then, particularly if you have the gross square meterage, you'd take it as anything between 12 and 15% for the timber fraction, as we call it, taking out the doors and windows and the timber that's used. Because obviously, that then is deducted from the amount of material that's needed.

So, that 80% figure is probably about right of actual insulation going in.

Ben: I can see that this is a very ecological way of building. I think one concern that maybe a lot of people have is moisture. So, let's talk a little bit about that and addressing some of these issues.

When you blow in your insulation to begin with, is it always a covered building or not always?

Gordon: Generally, the rule of thumb is that before any installation is carried out with cellulose, you need the building to be wind and watertight. Particularly watertight. Because you don't want any water ingress to get into the walls, you don't want water ingress to get into any part of the building really, where cellulose is going to go.

Too much water and cellulose is not a good thing, particularly if you've got a constant leak or there's rainwater continually getting into the frame of the building. So, that's why the building needs to be wind and watertight.

As long as it's watertight, that's fine. If the doors and windows are not in, it's not a problem as long as those access areas, the doors or the windows, are masked off with polythene, for example, on the outside plus on the inside as well, to stop that rain being driven in through those areas. Particularly through the windows and doors.

Ben: Do you inspect those areas as you get ready to put it full of cellulose?

Gordon: What I tend to do is particularly if it's been raining, or not raining as the case, you generally find if it's been raining, you will tend to see staining particularly on boards, for example, and you'll see rainwater accumulate and dribble through to the bottom of the void on a wall, for example. And then you may see a patch of water that may have gathered or tried to dry up over a day or two.

So, what I would do then is drill the wall, because the hole that we drill, you can shine a torch inside for example and see if it's still damp. If I put my hand in and it's still damp then obviously they've got an issue that needs to be addressed to stop that water from getting in.

Ben: Over time, there's no risk of water getting in anyway? It's a timber structure so, does that not just break down or have the potential to?

Gordon: It's a case of ideally, once the frame of the building is sealed then from wear and tear, there could be an issue later on where rainwater may penetrate in. Hopefully not but if it does and if it's of a small amount then the insulation can take up a certain amount of moisture and it will release it. It will dry up and cope with a certain amount of moisture. But not too much. Like, a bad leak going into the insulation, it would need then to be removed. Because you'll have problems then with damage or staining through the inner boards, for example.

Ben: Does that happen often? You're brought back to something where you have to clean out the void and ...?

Gordon: I have done it in the past but that's only down to mismanagement of the site really, where we've told the builder or whoever that if they don't get the building watertight, you're going to have a problem. We've insulated the property, for example, and days or weeks have gone by, and nothing has been rectified or they've been delayed for whatever reason and then the weather has turned nasty. All this rain has continued to pile down on the building and it's made its way through into the insulation, to the point of totalling soaking the insulation, making it slump.

You can see the damage then to the boards because the boards tend to warp and all the timbers look damp. Then when we're asked to come back to remove all this wet material, we have to do the opposite. We have to cut a large hole in the board, if it's not too badly damaged, or the whole board is taken off, and then all that

wet insulation is totally removed before it can be replaced with dry. But only replaced with dry once the building is watertight.

Ben: But this is not something that happens that often?

Gordon: No. It's few and far between. Over the 26 years, I can count on my hand possibly – maybe three or four times. So, that's not too bad. But of those ones that failed, it was down to problems that were managed by people that didn't understand that the building needs to be wind and watertight and they had a problem.

Ben: How long will we expect this to last? Are we suddenly going to have lots of issues with this insulation or will it just go on and on?

Gordon: Generally, once the insulation's in, it's there for the lifetime of the building. As long as the fabric and the structure of the building is sound, it'll be there forever and a day. It'll be fine.

Ben: Would you say this is getting more popular as an insulation choice? How do you see this market?

Gordon: It's growing to the point of there's more and more people looking to push for a greener product and get the benefits of using Warmcel or another cellulose product.

I can see it increasing very, very slowly, where people are looking to recycle as much as they possibly can. Whether it be the insulation, the boards, all sorts of things, and sourcing the material as locally as possible.

Ben: When you look at other insulation types, do you see this as the most sustainable? How do you think it fits into the market?

Gordon: For being sustainable, it's up there with the rest of them, cellulose being right at the very top. You've got other insulation products that are near the mark. Sheep's wool and all the rest of it. And then you can whittle your way back down to the man-made materials, fibreglass, rockwool, polyurethane foam, Kingspan and Celotex. There's all those types of insulation out there, which are always going to be out there. But cellulose is slowly creeping back into the marketplace and doing a great job.

Ben: So, if someone is looking at this seriously, perhaps they know they're going timber frame but want to consider cellulose as well, is there anything that they need to do or can this work with any timber frame?

Gordon: Basically, if they want to go down the road of using cellulose, it is firstly to try and get as much feedback from other people that have had properties built. Speak to architects, speak to builders, speak to guys that do the installation. Ask as many questions as you possibly can to get on the right foot, to say, 'that's the product that I need. That's what I'm going to go down.' Choose the right materials from the outside to the inside, and then everything will be fine.

Ben: Finally, any other tips for self-builders? I suppose it could be on something completely separate if you fancy it, or in regard to cellulose insulation.

Gordon: What I'd like to say is if they want to keep it all self-building, they can get to the point where they can actually install the insulation themselves, if they want to get involved.

Ben: Is that wise?

Gordon: I've been on jobs where self-builders have helped to get involved. As long as, for example, I'm there and watching every move that they make and everything is set up right.

But it's not a problem to get hold of somebody like myself or another insulation company that pumps cellulose into walls and everywhere else, and they'd be quite happy to do the job for them.

Ben: Gordon, thank you very much for your time today. Really appreciate it.

Gordon: Thanks very much.