REINCO

Renewables & insulation Consultancy

# Renewable Energies and Insulation Report



for

## Anne-Marie & Ken McCullagh
## Dundrum, Dublin
## (Clonlea Lodge)

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## Objectives

To provide a comfortable extension to the existing Lodge.

## Ground Floor

On top of sub floor use 125mm foil backed polyurethane (Kingspan or equivalent). In living rooms and other areas with no obstructions such as first fix plumbing pipes this is straightforward – 2 layers of Kingspan (75mm + 50mm) or equivalent – stagger all joints.
In bathroom, en-suites, utility and kitchen where there are first fix plumbing pipes use 50mm Kingspan or equivalent under the first fix pipes. Then set 50mm Kingspan around the plumbing pipes. Separate the hot and cold first fix pipes with 75mm insulation. Fill any gaps. This will be level with the top of the insulated pipes. Then use 25mm Kingspan or equivalent over the area without interruptions. Stagger joints where possible.

## Screed for UFH

60mm liquid screed
There are two main types of liquid screed Hemihydrates and Anhydrates. With Hemihydrates no scum is formed. Treat the surface with acrylic primer and the surface is ready for tiling. The Anhydrate liquid causes a scum which must be buffed off. Then treat the surface with acrylic primer and the surface is ready for tiling. When getting prices ask the possible supplier what treatments are required prior to tiling or fitting a wooden floor.

## New Wall Structure 200mm cavity

The wall structure is 100mm block outer skin, 200mm cavity, 100mm block inner skin. Use 150mm strips of 75mm thick Kingspan as cavity closure at the side of the window and door frames. The Quinnlites are required on the inner skin of the cavity wall and on all internal walls. Use 25mm Kingspan between the side of Quinnlite blocks and floor screed to further reduce cold bridging on all walls at the ground floor.

## Teplo Ties

Wall ties for 200mm cavities are more difficult to source. Traditional stainless steel wall ties cause cold bridging across the cavity. Teplo wall ties, which are thermally insulated basalt fibre wall ties from MagmaTech, are excellent. Budget price €1.80 each. As wall ties go these are expensive but I factored this cost into the comparative pricing of insulating systems. www.magmatect.co.uk

Teplo wall tie type 2, 6mm diameter, 325mm long is required for a 200mm cavity.

## Cavity Closure at top of walls

Close cavity with a 6mm cement fibre board. 100% closure is important.

## Insulation of Cavities

Fill the cavity with one of the grey beads products pumped in with glue. The earlier system with white beads and no glue caused a few problems. The white bead was poorer in k value and without glue it tended to settle, leaving gaps under the wall plates. The addition of glue prevents settling and ensures that a house modification later does not have lots of beads flowing all over the place. The beads blown in ensure that it is almost impossible to have gaps.

## Warm Roof

Install 100mm Kingspan or equivalent on top of the rafters. Install 125mm Foamlok spray-in foam between the rafters. Normally the rafters are 150mm. One possible gripe could be the length of fixings required to go through 100mm insulation and batten - 200mm fixing. Can be done and is being done! Use plasterboard with a foil backing as a vapour barrier.

Foamlok is distributed by :

Econ Insulation, Dublin (003531 4019729)

Installer Lyons Insulation, Greystones, Co. Wicklow - 086 3758 882

U value - 0.13. Passive standard 0.15.

Best fixings Timco Classic Plus 6mm X 200mm Torx drive. One stockist of these screws is Construction Fastners, Dungannon (048 8776 7981)

Using an open cell spray-in foam ensures you are achieving excellent airtightness – it is a system that is "easy to do well".

## Roof Timbers Ventilation

Best practice is to install Glidevale FV Fascia Ventilators on top of the fascia and Fulmetal Rediroll Universal Ridge Roll System under the ridge tiles This insures excellent ventilation in the cold void between

the slates / tiles and the roof insulation. Use 18” wide DPC as an eaves skirt at the guttering.

## Thickness of Warm Roof at Fascia

Trim the bottom point of the rafter to reduce the depth of the fascia.

## Airtightness around Windows and Doors

The window installer should completely fill the space between the opening and the frame with expanding foam from the DPC at the outside to the inside. There should be no voids. Later, when the foam has fully cured trim off surplus foam with a sharp knife. Then seal the foam with polymer sealer (CT1, Tex7). Multisolve (a C-Tec product) helps get a good finish.

## Recessed Lights

All downlighters should be installed with GU10 bulb holders. Those downlighters which are well used should be fitted with 6W LED lights. These produce much less heat. However, where they are placed in sloping ceilings set an airtight box over the new light fitting. The insulation can now be safely fitted around the airtight box. Thermahood downlighter covers are available from Amazon or www.thermahood.com

## Heat Delivery Systems

Over 95% of all new self build homes now have underfloor heating (UFH). Underfloor heating when properly designed gives:

- The most comfortable home.
- The most controllable temperatures – digital thermostats in each zone.
- The most dust free house (less cleaning & more comfortable for those prone to asthma type problems).
- The same comfort level when compared with radiators at a temperature 1.5°C– 2°C higher.
- A concentration of heat near the floor – where we live, whereas with radiators the heat has to build from the ceiling down.
- Greater flexibility when furnishing and decorating the rooms.
- Maximum safety – no radiators to cause physical injury or burns.
- Capital cost of UFH now is similar to radiators.
- Running cost of UFH, properly done, is less than radiators.

UFH should be designed to run with a maximum water temperature of 35°C as this gives the most comfortable underfloor heating and the most efficient temperature at which to run the heat pump. Floors are only gently warm.

The best way to achieve this is:

- 100mm space between the pipes in areas with lots of glass, bathroom, en-suites, vaulted areas, hallway and all high demand areas.
- 150mm space between the pipes in all other normal heat demand areas.
- UFH pipes should be at 16-17mm diameter.
- pipes should be laid in "spiral" layout and not in "snake" pattern.
- The maximum length of one UFH loop should be 120m.
- UFH should always be installed to this standard, so that if a heat pump is not installed now, that option is available in the future.

## Floor coverings and UFH

Tiles or stone will give the quickest response but a range of coverings gives acceptable response times. A carpet with specialised UFH underlay is a possibility. Click flooring is widely used. Natural wood can be used provided the wood is properly dried and not more than 22mm thick. When installing natural wood or laminated flooring these should be glued directly to the screed.

## Heating Controls

Use a simplified digital time and temperature controller with one thermostat in the extension, one controlling the bedrooms down stairs and one upstairs.

## Ventilation

Trickle vents on the windows.

## Glass / Windows

The best performance available in double glazing is 1.1 u value centre pane. The new argon triple glazed system has a U value 0.6. The glazing units are 44mm thick. The glass is critical as it is 10% of the house. Window frames are what you want to pay for and wish to look at.

Key requirements u value of glass centre pane 0.6 or less.
typical u value of glass and frame 0.85
2 x 18-20mm aragon gaps between panes.

Send through quotations and specification for comparison.

Ignore the "A Class" ratings the window guys wish to quote - much too vague. Grady Joinery triple glazed uPVC windows would provide excellent performance on a budget price.

## Primary Heating System

Upgrade oil burner to a condensing boiler.

## Wood Burning Stove

A wood burning stove for a well insulated airtight house should

- Be designed with a dedicated external air supply. This could come in horizontally on the first floor and drop down behind the stove.
- Be well sealed
- Not have a back boiler
- Be purchased with a manifold
- Select 4Kw / 6Kw.

## Bathroom Management

After using the shower the bathroom door should be closed to prevent warm moist air spreading into other areas. The closed door encourages the fan to draw air in under the door and thus extract the moist air. Consider putting a self closure on the bathroom. Existing extractors should be replaced with quiet fans. A timer is required to cause the fan to run for a further 10-15minutes.

## General plumbing

The main plumbing system should be pressurised. This gives good water flow on all appliances upstairs and downstairs. It also gives you the widest range of possible appliances to choose from when buying for your renovated home. There should be no electric showers as any means of providing warm water is more cost effective than direct use of electricity.

## Cookers

Induction hobs which are now excellent.

## Passive Sills

The last big cold bridge in today's houses is caused by the window sitting on a cold concrete sill. Now an excellent solution - a Passive Sill. These are manufactured from high density expanded polystyrene and coated with a polymer resin. Excellent solution to a major problem. www.passivesills.com

## Water supply

Each house should have it's own water supply for future proofing reasons.

## PC Sums

If appointing a contractor and the following items are to be included in a contract then specify them as PC sums:

- Windows and external doors
- Underfloor heating
- Heating controls

If these items are purchased on price you will be sorely disappointed! The client purchases these items and pays for them directly. The contractor should still get his 2.5% commission on these items as he is responsible for co-ordinating the installation of all.

I do not take commissions from any company or individual. When I suggest or recommend a company I do so because I have found their service or equipment fully satisfactory in the past. This report is copyright Eric Davidson. The advice and recommendations are specifically for this project and this set of circumstances.

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