



Ask our experts



Dick



Caroline

Your design, product and specification questions answered by our expert columnists.

Dick Clarke is principal of Envirotecture, a sustainable building design firm in Sydney and Redland Bay, Queensland. www.envirotecture.com.au

Caroline Pidcock is director of Sydney-based architecture firm Pidcock – Architecture and Sustainability. www.pidcock.com.au

Q— *We're about to renovate an old timber house in a temperate region, where temperatures for most of the year are fairly comfortable and good ventilation is enough to get us through the summer, but where winter can be a bit bleak and sharp.*

The house has lovely 6-inch hoop pine floorboards (under the vinyl), which we would prefer to have sanded and finished throughout. I'm worried that the house will be colder once the vinyl and masonite underlay are removed. Is underfloor insulation worth considering? The house is on short stumps with sufficient working space to allow easy installation.

Anne

A— If you have space under the floor, you should definitely consider underfloor insulation. It will help make the house comfortable and allow you to remove the internal linings to appreciate the true beauty and health benefits of the timber floor.

An important issue to consider when identifying the best way to insulate is termites – they love dark, warm places where they can eat through timber in privacy and comfort! I recommend that you fit rigid insulation tightly between the floor joists, so their lower levels remain exposed. This will help deter termites and enables inspection to check they are okay.

While this can be difficult, it is incredibly important to do in most places to avoid the termite issue. The most effective insulation is a PIR (closed-cell polyisocyanurate foam core sandwiched between a choice of durable, exterior facers) as it is both rigid and offers the highest R value for the least amount of thickness.

Battens underneath the insulation are useful to hold it in place and help seal the edges. Try to use insulation with an R-value of at least 2.5.

– Caroline

Q— *We're soon to start building our family home in north-west Victoria where, in summer it can reach over 40 degrees continuously for two weeks or more, and where winter temps can get down to zero degrees. We have designed our house to maximise northern sun, take advantage of cross-ventilation, insulate walls/ceiling/roof and have decided on using uPVC double-glazed windows. All this in the hope of not spending a fortune on heating and cooling and keeping our power bills under control in the future.*

Some PVC window manufacturers we've spoken to have strongly suggested the addition of low-e glass, while another has questioned why we would need it, as uPVC double-glazed windows already have a low U-value. Should we consider using low-e glass for windows and doors on just the northern/western aspects of the house, or not at all?

Yelena Richardson, Mildura VIC

A— Low-e (low emissivity) glass has a coating that reduces the amount of heat radiated away from that particular surface of the glass. So, it is like a one-way valve, though in reality it still emits some heat, just a smaller proportion. For this reason, it is critically important that you are in total control of the glazing specification, or else this 'smart glass' can become very 'dumb'!

Mildura's climate and latitude ensures

that if solar access is available to your site, passive solar design should work brilliantly. That is, get lots of winter sun inside, keep all the summer sun outside. The design of your overhangs or shading devices (pergolas, awnings, etc) should achieve this. That means the glass is only dealing with controlling heat from ambient air temperature. Having efficient frames is a good starting point, and double-glazing provides the biggest gains, but low-e can add significantly.

The problem is, in which season and in which direction will it give most benefit? If you compare the number of hours per year when the external temperature is cold enough to suck sufficient heat out that you will need to heat the house, with the number of hours in summer when you might need to cool the house, you have the answer. A good thermal performance assessor will give you a guide to that, and can run a series of 'what ifs' to test options. My guess is that, despite the apparent harshness of those 40-degree weeks, the total heating hours will exceed the total cooling hours by a factor of at least three to one. Please write back if I am wrong!

So, the short answer is that, if your budget allows, low-e on the outward-facing inner skin (called 'surface 3'), should give you the most benefit. You then rely on the shading and the double glazing to keep the summer heat out. Whether the low-e coating is cost-effective will depend upon how much it costs compared to how much it saves you and, once again, a good thermal performance assessor can inform that decision.

– Dick