Rooms with high heat losses

Rooms with large glazed areas – and therefore high heat losses – may struggle to reach target "Part L" temperatures, which would nominally be 21 deg C with an external ambient of –1 deg C. It is often not appreciated that compared to a properly insulated wall, even the best double or triple glazing has poor insulation properties.

Underfloor heating is a relatively weak heat distribution system compared to either radiators and fan coils, and this will further compound the problem. The British Standard for underfloor heating BS EN1264 limits the maximum floor surface temperature – although this can be increased in wet areas like bathrooms. It doesn't matter if a heat pump or a boiler is used – the same restriction applies. Even if the flow temperature is increased, with a heat pump this will lead to an increase in the clients energy bill of around 3% for every 1 deg C increase over the standard flow temperature to BSEN14511 of 35 deg C.

Once a particular density of underfloor heating pipe has been reached (ie. the centres between pipes, and the diameter of pipes) then adding further underfloor pipes will have almost no further beneficial effect on the surface temperature. Physical installation space will also become a problem. This restriction will limit the maximum heat emission to somewhere around 70 to 90 watts per square metre for a ceramic type surface.

Screeded Floor	Heat flow W/m2			
Floor covering	35°C	40°C	45°C	50°C
Heavy domestic Carpet	22	31	40	49
Standard Carpet	24	35	45	55
20mm engineered Board	28	41	53	64
22mm Hardwood Planks	27	39	51	62
10mm Tiles	41	58	75	92
20mm Natural Stone	42	59	76	94

The table above shows typical output heating requirements based on a 5$_{o}$C temperature difference in the heating fluid and Part L conditions. The table is a guide only and should not be used for design purposes. Different floor constructions will result in different heat flows.

Facts at a glance

Glazing - Areas of glazing have poor insulation properties and result in high heat losses.

Underfloor heating - Underfloor has relatively low heat emission rates and is highly dependant on floor coverings.

High heat losses - Double or triple aspect rooms and high ceilings also increase the heating power required by rooms.

Supplementary heating - In cases of rooms with high heat losses supplementary heating systems such as a log burner maybe required to bring the room up to the desired target temperature.

Rooms with high heat losses V1

If wood laminate or carpet is used then the output power of the underfloor heating system will be reduced. If oak planks or thick carpet underlay are used, the power of the underfloor heating system will be seriously reduced – to well below 50 watts per square metre, and the maximum floor temperature will also be around 28 deg C to avoid cracking and drying the wood.

For rooms which have double or triple aspect, with large glazed areas, then the heating requirement can easily exceed 100 watts per square metre. If the floor area is reduced – because it is a bathroom or a kitchen for example - then the heat output into the room is reduced still further.

High ceilings will increase the required heating power even further. If the room has no curtains or blinds, then the required heating power will increase further still. This heat loss figure will increase even further if a heat recovery ventilation system is used, as, contrary to popular belief, most of these devices actually increase energy use, and lower SAP ratings.

A room such as the one described is often the lounge or other heavily used room in a house – and the one room that a client would want to be warm.

It is clear that such a room would not reach target temperatures – and there is nothing that either the underfloor heating designer or the heat pump manufacturer can do to increase the room temperature. It is vitally important that clients understand that the only options available to them to reach target temperatures are to regularly use a supplementary heat source in the room – such as a log burning stove (which is ideal) or direct electric heating (which is NOT ideal).