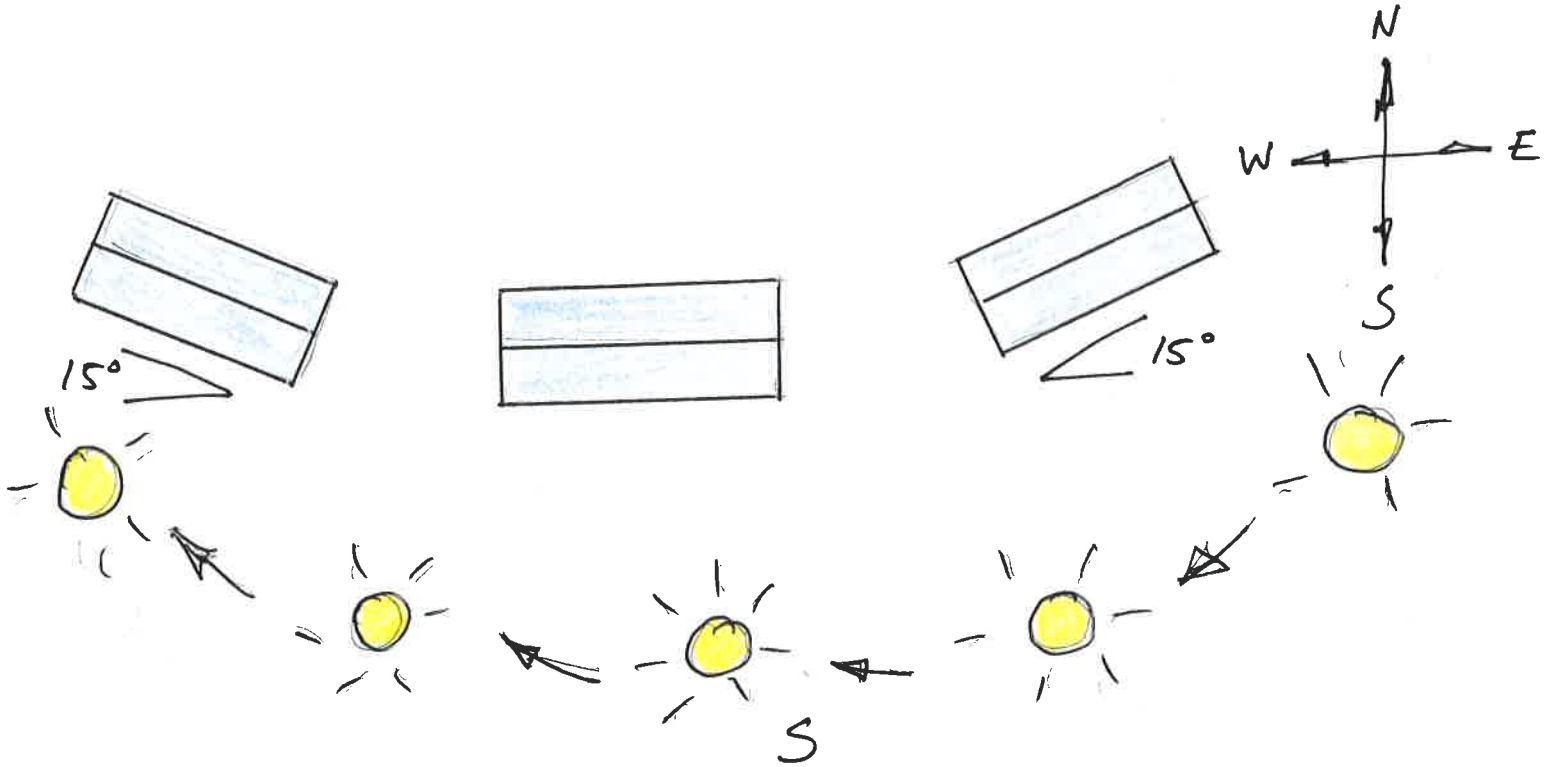
10

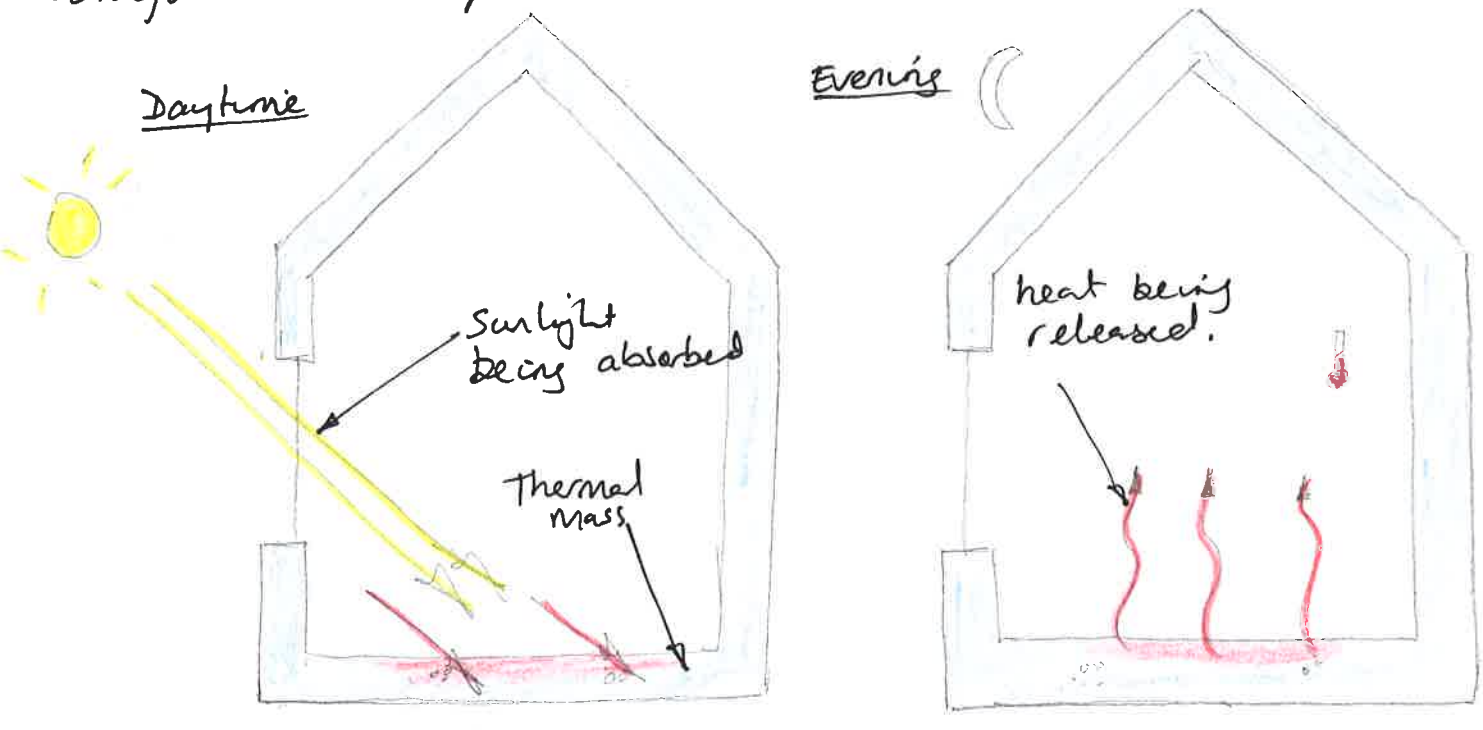
Building Orientation

The passive house relys heavily on passive solar gain to provide light and heat energy to the house. As a result it is essential that the main facade of the building is facing South or within 15° of south. Most used rooms in the house such as kitchen and living room should face South / be on south side of house. The passive house does not have an active heating system (oil / gas etc) so if it isn't orientated correctly it will not function correctly.



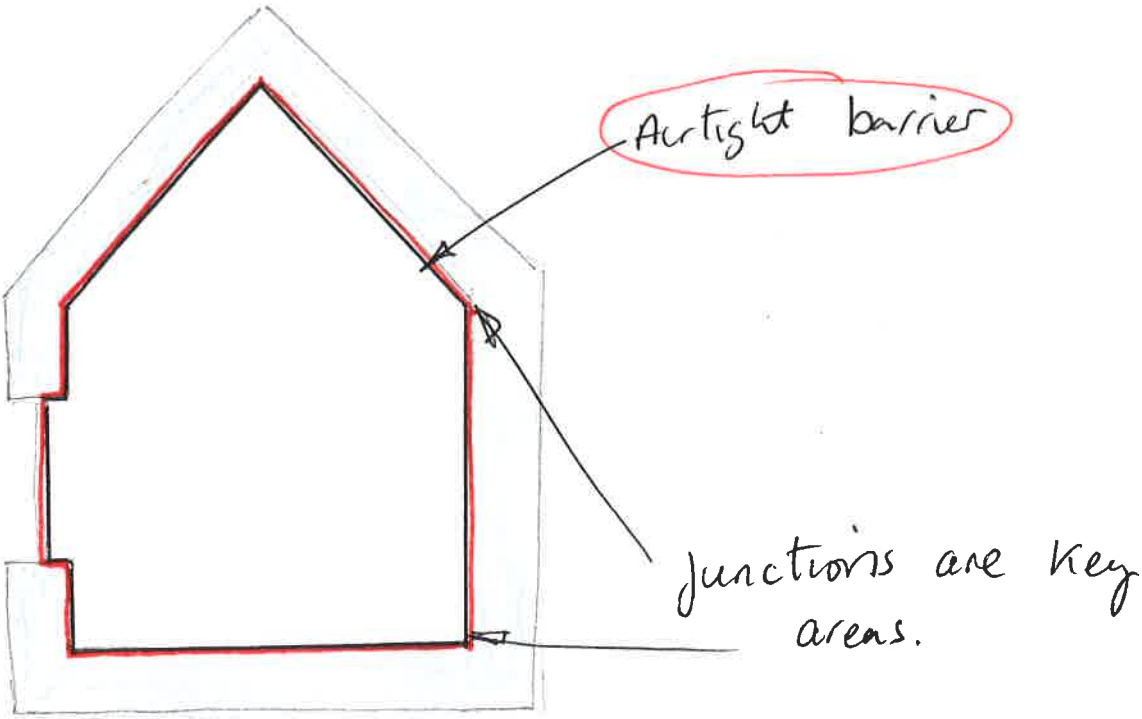
Thermal Mass

Thermal Mass is a key feature of a passive house. Thermal mass describes the ability of a material to absorb and store heat. Concrete is the perfect material to use as a thermal mass in a passive house. This could take the form of a large wall or more commonly a concrete floor. During the day when the Sun is entering the building through the large south facing windows, the thermal mass will absorb alot of the heat from the Sun. This prevents overheating/stuffiness during the day. As the day progresses and the temperature drops outside the heat will slowly ~~and~~ release from the floor. This helps keep a constant, comfortable temperature in the building



Airtight building Envelope

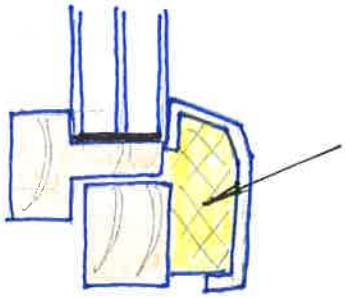
The passive house relys on passive heating from the sun. Therefore, it is essential any heat gained is retained. To do this the building should be airtight, with no gaps for air leakage. The main walls are made airtight by the plaster but junctions in the house and around service pipes are key areas which need to be properly sealed. Airtightness tape and/or flexible sealants are use in these areas to help maintain an airtight barrier around the building. A high level of workmanship is needed to achieve this. The red line rule is used to demonstrate the continuity of the airtightness barrier in the house. Airtightness is tested with the 'blower door test'. It must achieve an airtightness of not greater than 0.6 h^{-1}. Ventilation is provided via MHRV.



10(b)

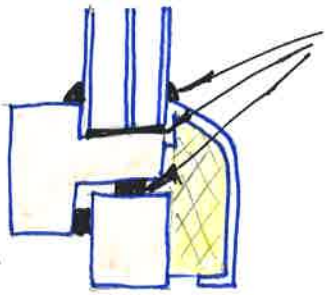
Window Frame

① The window frame should be thermally broke to ensure high resistance to heat escaping.



insulation to thermally break Frame stopping cold bridging.

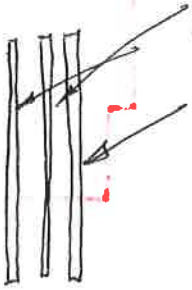
② The window frames should have proper seals to ensure there is no air leakage from inside or any draughts from outside getting in.



Good rubber seals.

Glazing System

① Triple glazing should be used as it has a high resistance to heat transfer. Argon gas is often put between the panes. this increases the resistance value of the glazing.

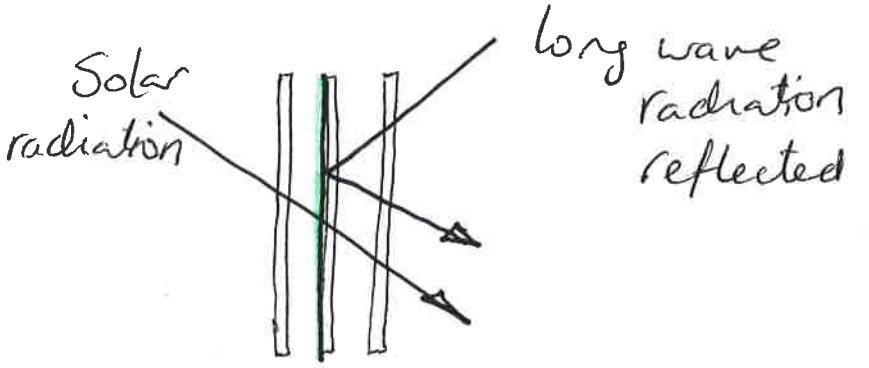


Air space / vacuum *

3 panes.

* vacuum between panes acts as an insulator

(2) Low e coating – This is a clear coating which can be put onto the inside of a pane. It allow heat through but stops it from leaving the house. (Solar radiation allowed through. Long wave radiation cannot escape).



Argon gas may also be used between panes to increase further the resistance of the glazing.

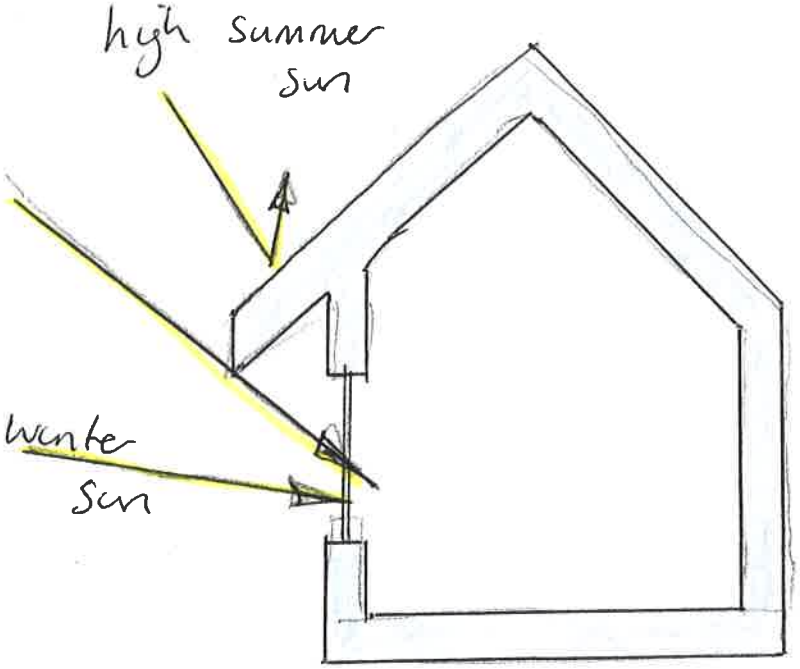
(C) Overheating

(1) – Lack of sufficient thermal mass. – If there is not enough thermal mass to absorb heat during the day the house may become stuffy and over heat.

(2) – No enough Schading to south facing glazing. Lack of shading may result in too much passive Solar heat entering in summer.

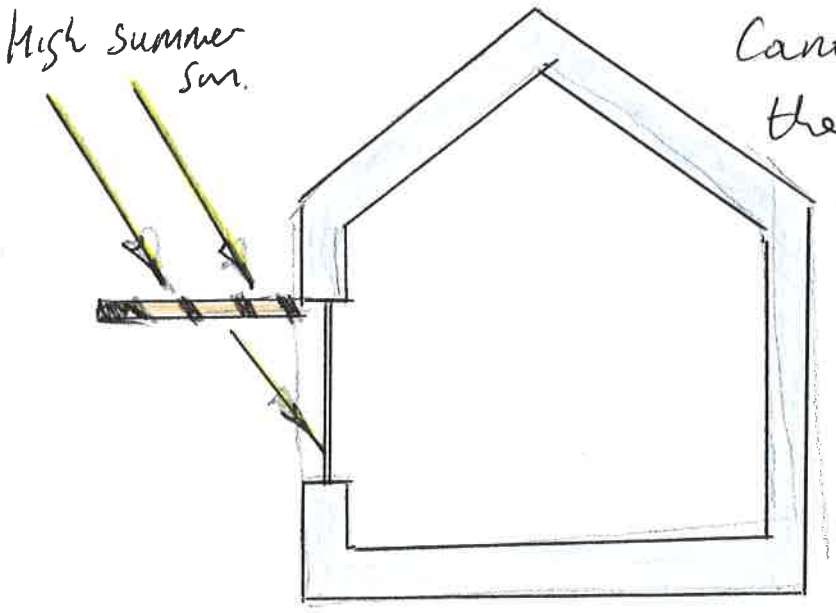
Reducing Overheating

(1) Large over hang.



A large overhang at the eaves will allow low summer/ winter sun enter but will shade the house from the high summer sun entering.

(2) Brise soleil



A brise soleil or canopy will reduce the intensity of the high sun (when it is at its hotest) some sun can get through but not all.