Thermal Comfort/Simulation Method Checklist/Considerations for Sales & Design

Orientation & position on lot (lock in easy performance

- ☐ Position close to south boundary which will maximise space to the north to allow solar access & less overshadowing
- ☐ Main living areas to face north, this allows natural light and passive heating
- ☐ Position garage and service rooms like laundry/bath to protect from south and west
- ☐ Typical rectangular lots running east/west will result in the long side of the house facing north, this is a good idea as lets heat in in winter compared to rear/front facing north which means hard to get heat in the house

Construction Methods (options to help just by building)

- ☐ Depends on customers likes/budget
- ☐ Brick veneer & cladding will have good R value
- ☐ Lightweight construction on south side of house/use closer to coast (clad walls/Hebel) climate zone 56
- ☐ Heavyweight construction on north side of house/use more inland (insulated cavity brick, internal brick walls, reverse brick veneer) climate zone 28
- ☐ Waffle pod slabs
    - Help in a temperate/colder climate
    - H class will generally rate better than M class (if you know the classification tell the energy rater)
- ☐ Raft slabs will help in a hot climate
- ☐ Suspended concrete with sections that are exposed to air movement underneath will be cold, insulate this with 50mm foil faced foam
- ☐ Roof & wall colours
    - Medium = balanced loads
    - Light colours help cooling
    - Dark colours help heating

Insulation (low cost performance)

- ☐ Bulk (glass wool/foam) job is to keep heat in – helps reduce heat load
- ☐ Reflective (sarking foil faced foam) to keep heat out – helps reduce cool load
- ☐ Generally, the thicker the better, check with natHERS assessor will be a level cost is not worth the performance gain
- ☐ Insulate areas normally overlooked
    - Under floor with bearers & joists
    - Between garage & rooms above
    - Under suspended floors exposed under (timber or concrete) like over alfresco or cantilevered concrete etc.
- ☐ Walls - generally R2.0 or R2.5 HD in 90mm frames
- ☐ Ceilings – generally R3.0 or R3.5 & anticon blanket for metal roof
- ☐ Ceilings – generally R3.5 or R4.0 & sarking for tile roof
- ☐ Wall wraps
    - Sarking will cause an increased condensation risk
    - Check permeability rating to allow moisture out
    - James Hardie wall wrap is reflective and permeable – temperate/warm climate
    - Proctor is not reflective but very permeable – cool/cold climate
- ☐ Limit penetrations in ceiling they result in air leakage and gaps or loss of insulation
    - Downlights need to be a sealed LED type, ground floor ceiling not too bad, first floor ceiling will start to reduce performance
    - Exhaust fans, need to be self-closing to reduce air leakage (worth 5MJ/m2)
    - Think warm air rises, the ceiling is an air barrier, if warm air leaks through it then it will be replaced with cold air from lower levels

Shading (depending on design)

- ☐ Eaves – 450 to 900mm including the gutters will help the most
- ☐ No eaves = no passive cooling or unwanted heat gain, no weather protection
- ☐ Too large eave/alfresco = no solar access or passive heating, large window/sliding door will result in heat loss
- ☐ Horizontal shading works well to the north (not east or west), easy to manage sun angles for winter & summer
- ☐ Vertical shading works well to east/west, hard to manage low sun angles
- ☐ Pergolas to the north

Ventilation (air movement = cooling at low cost)

- ☐ Window type = opening percentage, (fixed glass means increased heat load, openable window allows cooling air movement)
- ☐ Cooling breezes generally come from east, north east or south east in Sydney
- ☐ Roof ventilation will help reduce cooling load (slight increase in heating load)

Roof (streetscape)

- ☐ Generally, tiles will help passive heating
- ☐ Generally, metal will help passive cooling
- ☐ Light/medium colour in temperate climate
- ☐ Dark colour in cold climate

Windows (the key to natural light & comfort)

- ☐ Most windows facing north, up to 50% of north façade glazed
- ☐ Medium number of windows facing east/west, up to 15% of east/west elevations glazed
- ☐ Least number of windows facing south, up to 10% of south elevation glazed
- ☐ North shaded by eave will work both summer & winter
- ☐ North unshaded will get hot in the afternoon
- ☐ East & west will = unwanted heat gain
- ☐ South = heat loss
- ☐ High level windows especially around voids will result in heat loss as all the heat will go up and leak out
- ☐ Windows are approximately 90% of a home's heat gain and 50% of a home's heat loss
- ☐ Glazing ratio, compare the window area to the floor area of a room or a whole house, around 20-40% will work well, higher than this will require performance glass to keep the home comfortable
- ☐ If you are going to have high glass/floor ratios then expect higher window costs as some or all windows will need to be performance glass
- ☐ Adding thermal mass to an over glazed room will help smooth out temperature changes
- ☐ Walls perform around 6-12 times better than windows in reducing heat flow, making windows a little smaller with affecting the amenity of the room will help reduce heat/cost
- ☐ Blade walls that project perpendicular to the window/wall will help shade glass and provide interesting facade

Skylights

- ☐ Great natural light, even the best performing ones will generally = heat loss, warm air rises
- ☐ Should face north
- ☐ Consider using a diffuser

Thermal Mass (Store heat or cool like a battery)

- ☐ Slab = good thermal mass, tiles generally work well, carpet and timber not as well
- ☐ Consider adding an amount of thermal mass by changing one or two internal walls to brick
- ☐ Considering cavity brick (uninsulated) near the coast, climate zone 56
- ☐ Consider insulated cavity brick inland, climate zone 28

Thermal Comfort/Simulation Method Checklist Construction

1. Slab on ground (waffle or raft, site classification) or suspended floor
    a. If suspended Basix allowances and insulation
2. Wall types and colours, insulation levels
3. Ceiling insulation
4. Roof type, colours and insulation, check if ventilation will help
5. Insulation to garage/rooms above, suspended floors
6. Downlights & exhaust fans (sealed)
7. Windows (use window description/upgrades sheet to improve if required)
8. Consider;
    a. better ventilation options
    b. more/less shading
    c. adding thermal mass