Southern Regional Building Control Committee

Achieving NZEB In Homes

Typical Pitfalls in NZEB Compliance

Part L and Part F

(Building Control Inspections)

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Contents

Typical Part L and Part F Non-Compliances:

- Thermal bridging – especially at bay windows / openings
- Fitment of insulation boards in the cavity
- Insulation provision to cold water storage tank and access
- Airtightness detailing
- Background ventilation
- Roof ventilation
- Location of thermostats

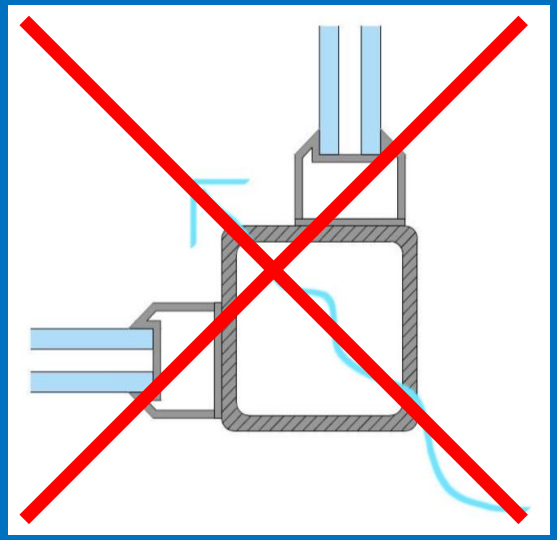
Thermal Bridging

Common thermal bridges not appropriately detailed:

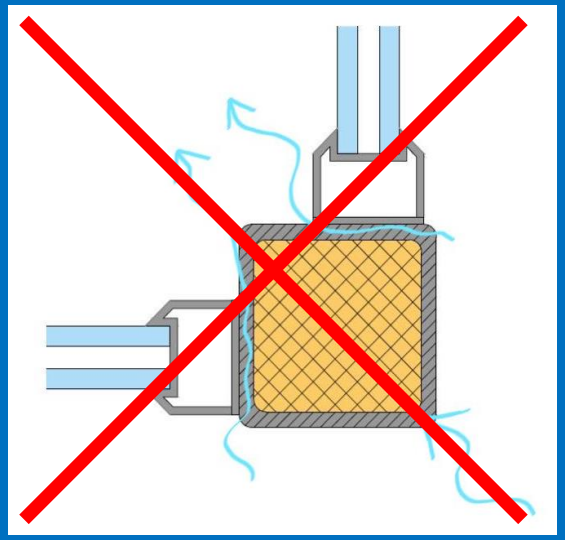
- Bay windows (steel work)
- Dormer windows
- Structural steel above openings
- Steel columns

Thermal Bridging

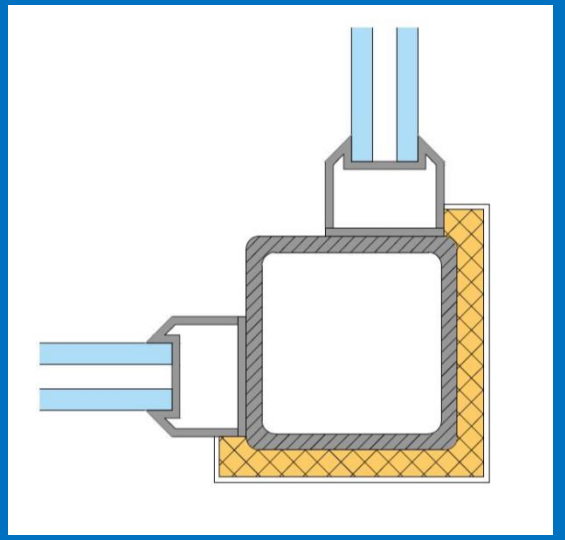
Plan Detail of Junction:



Un-insulated steel post



Steel post with insulation pumped into void



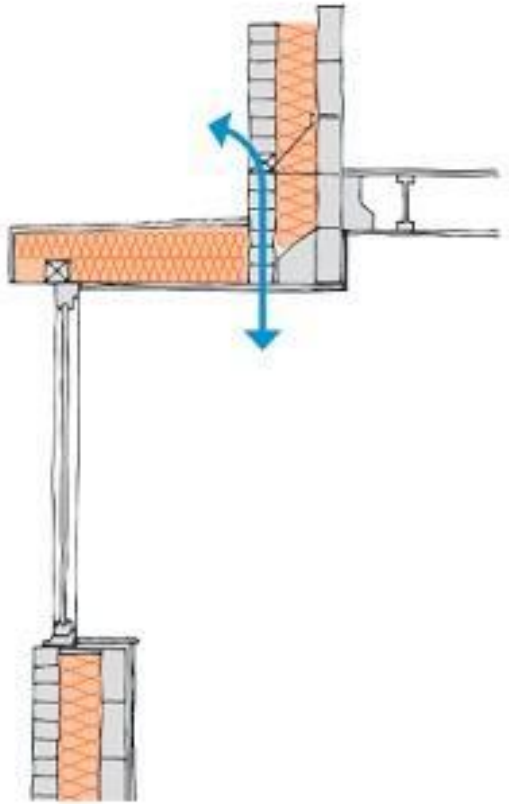
Correct detailing

Thermal Bridging

Thermal Bridging

PROBLEM TO AVOID COLD BRIDGING

THICK FRAME AND POSTS INCREASES HEAT LOSS



Thermal Bridging

Fitment of Cavity Insulation

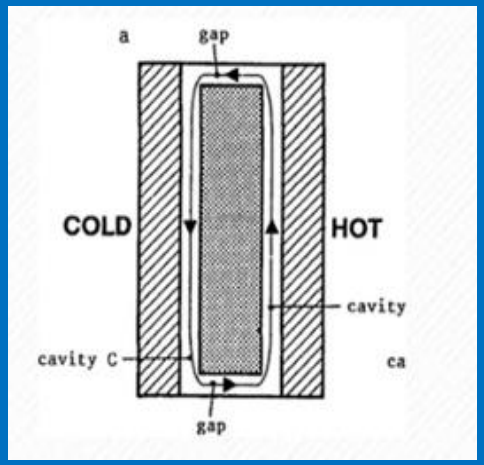
Thermal looping can occur where insulation boards are not fitted tightly to the inner leaf of blockwork.

Where this occurs, it can have a detrimental impact on the u-value achieved.

A 10mm gap can reduce the u-value by up to 92%.

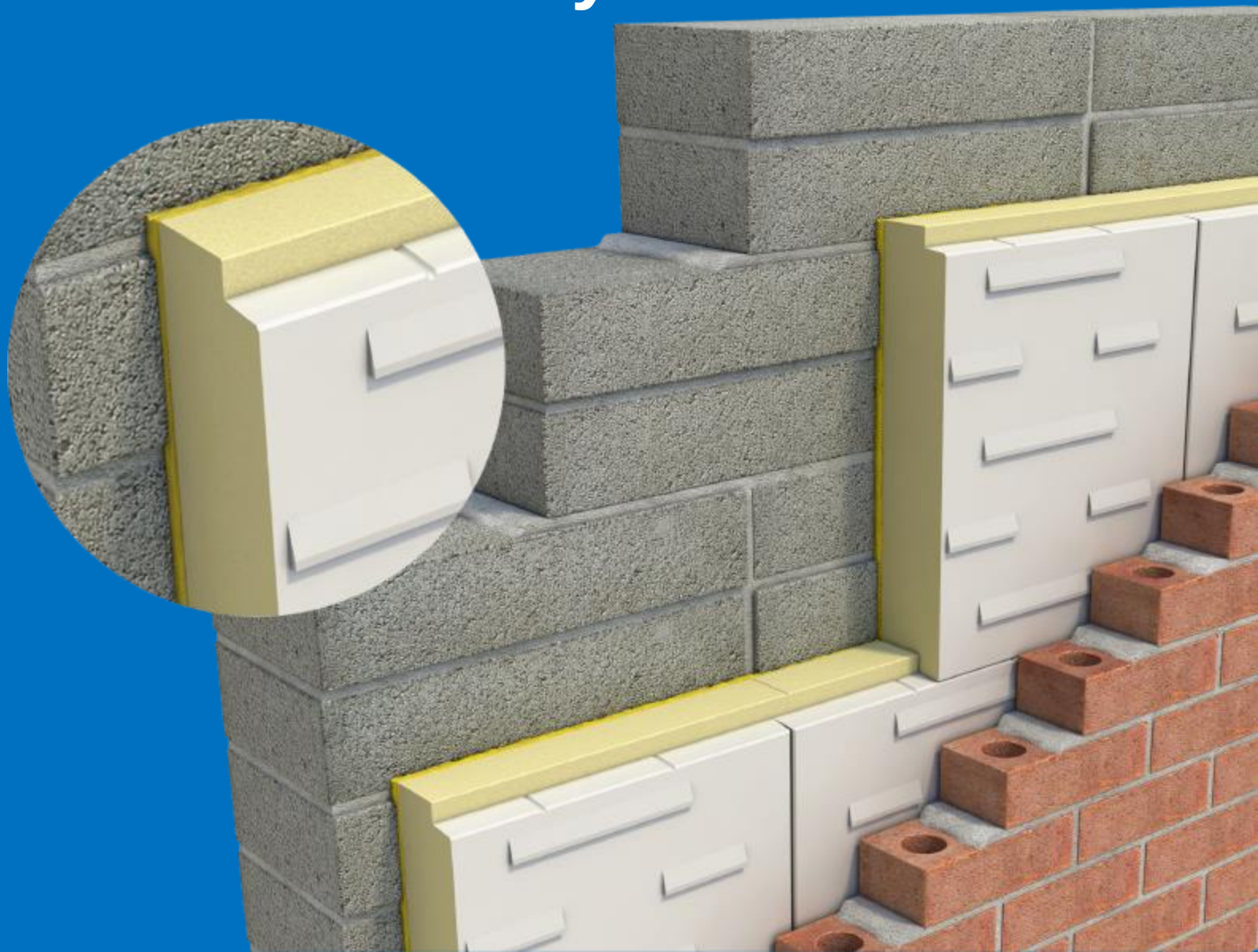
0.18W/m²K = TGD L 2019

0.18W/m²K with10mm gap = 0.34W/m²K

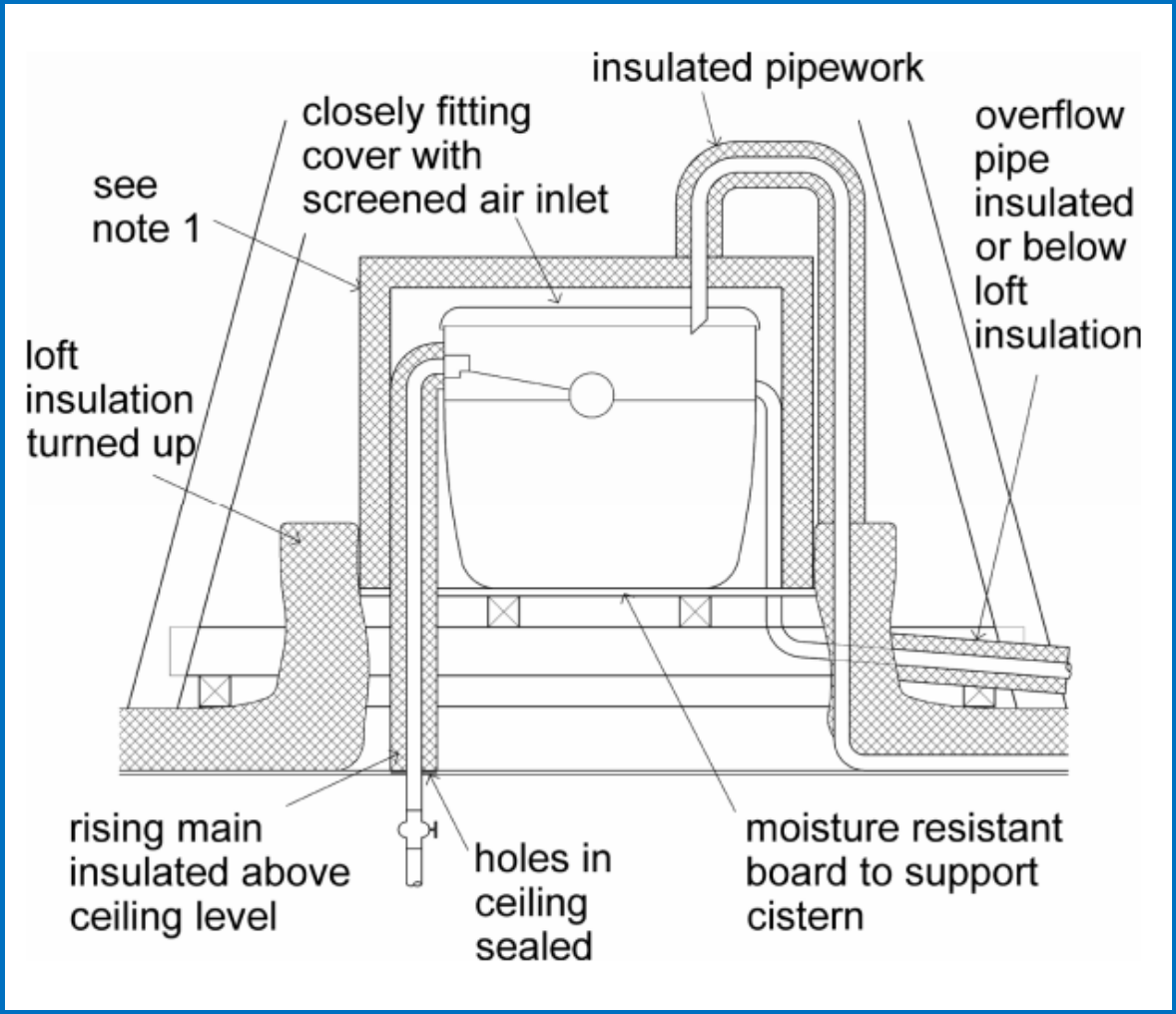


Lecompte 1990 – Influence of natural convection on the thermal quality of insulated cavity construction

Fitment of Cavity Insulation



Insulation to Water Tank / Service Access



Extract from TGD G

Insulation to Water Tank / Service Access

•U-value of 0.16 W/m²K required to roof

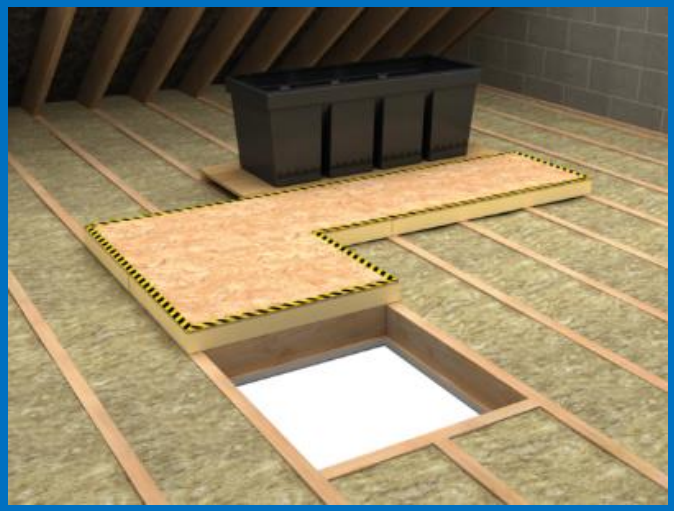
•Large depth of insulation as a result, this raises the height of the water storage tank making it difficult to ensure continuity of thermal envelope.

•Where the depth of insulation does not facilitate tenting up to the tank insulation– the ceiling should be insulated and the tank insulated separately – ie insulation to the underside of the tank.

Insulation to Water Tank / Service Access

•As the increased depth of insulation will obscure the location of joists it's important to consider safe access to the storage tank and to other services within the attic space such as a MVHR unit.

•Insulated walkways are therefore required to these services – these should be detailed at an early design stage to avoid issues on site.



Appendix B5 – Technical Guidance Document L 2019

Airtightness – Common Issues

- Vapour Control Layer / Airtightness Membrane to Ceiling.
  - All Service Penetrations need to be sealed
  - Instruct M&E contractors with regards to minimising opening sizes for wiring etc
  - Airtightness layer to a dormer needs particular attention
- Airtightness tape to windows – ensure correct tape and installation

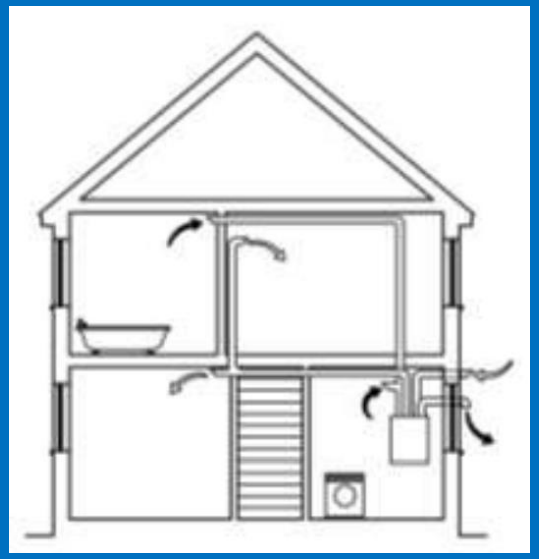
Airtightness – Good Detailing

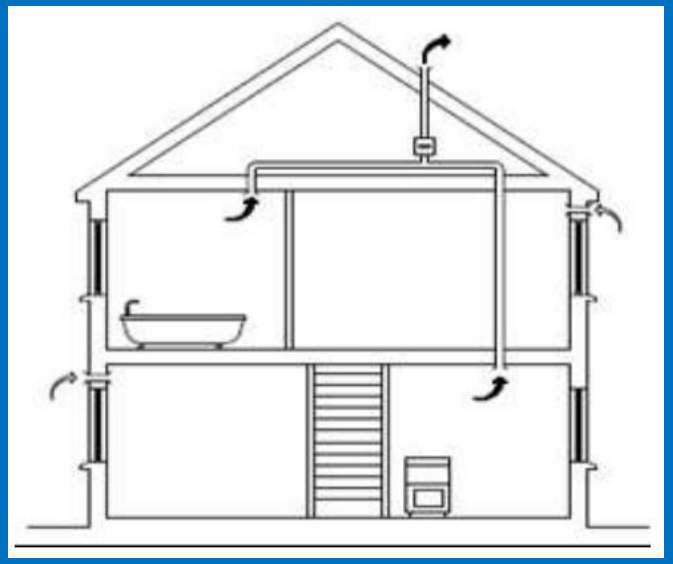
Correct tape used and sealed with airtightness paint

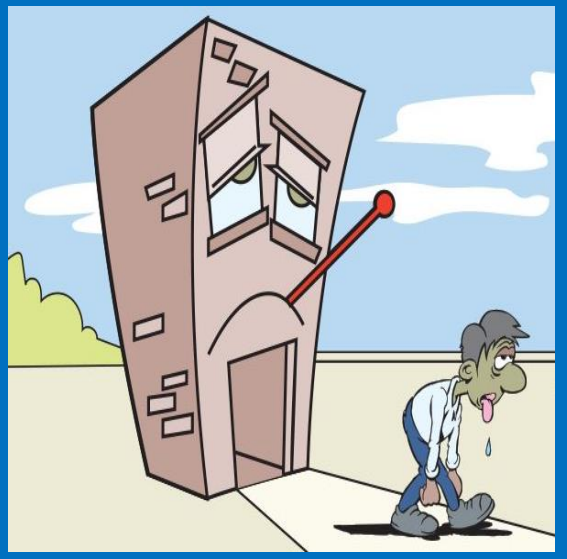
Well sealed membrane to dormer roof

Background Ventilation

- Higher airtightness levels need to be balanced with adequately designed background ventilation.
  - Natural Ventilation.....Refer to Table 3 of TGD F 2019
  - MVHR.....Mechanical Ventilation with Heat Recovery (specialist design)
  - MEV.....Mechanical Extract Ventilation (specialist design)







Background Ventilation

Previously 5000mm²

Previously 2500mm²

Table 3: Basic ventilation provision using background ventilators and specific provision for extract and purge ventilation for 5m³/hr/m²> air permeability > 3m³/hr/m²

Room or Space	General Ventilation Minimum equivalent area of background ventilator[a] (mm²)	Extract ventilation Extract fan[b] - Minimum intermittent extract rate (l/s)[h]	Purge ventilation Opening window or external door - Minimum provision[g]
Habitable Room	*7000[c,f]*	-	*1/20th of room floor area*
Kitchen	*3500[c,d,f]*	*60l/s generally 30l/s if immediately adjacent to cooker (e.g. cooker-hood not recirculating)*	*Window opening section (no size requirement)[d]*
Utility Room	*3500 [c,d]*	*30 l/s*	*Window opening section (no size requirement)[d]*
Bathroom	*3500 [c,d]*	*15 l/s*	*Window opening section (no size requirement)[d]*
Sanitary Accommodation (no bath or shower)	*3500 [c,d]*	*6 l/s[e]*	*Window opening section (no size requirement)[d]*

Notes:

(a) See paragraph 1.2.4.1 re: total equivalent area for all background ventilators.

(b) See paragraphs 1.2.4.9 and 1.2.4.10 re alternative of passive stack ventilation or continuous room ventilation with heat recovery.

(c) See paragraph 1.2.4.12 re the extent and location of background ventilation where there is only a single exposed façade and cross-ventilation is not possible.

(d) See paragraph 1.2.4.3 re ventilation provision where the provision of background ventilation and purge ventilation is not possible, e.g. when there is no external wall.

(e) As an alternative, the opening window section provided for purge ventilation may also be relied on for extract ventilation.

(f) See paragraphs 1.2.4.13 to 1.2.4.15 re: provision for ventilation of habitable rooms through other rooms or into courtyards.

(g) Opening window or external door minimum provisions given in this table are for ventilation purposes. Other requirements apply to the provision of openings for windows or external doors for example escape in case of a fire. Refer to Part B / TGD B for further guidance.

(h) The performance flowrates for Intermittent extract fans should be tested in accordance with I.S. EN 13141-4:2011, Cooker Hood performance flowrates should be measured in accordance with I.S. EN 13141-3:2017.

- Air permeability:

  >3m³(h.m²) <5m³(h.m²)

42,000mm² + 7,000mm² for each 10m² above the first 70m²

Background Ventilation

Window Trickle Vent

Pro: Slim / Neat, work with MEV systems

Con: May not achieve natural ventilation requirements

VS

Wall Vent

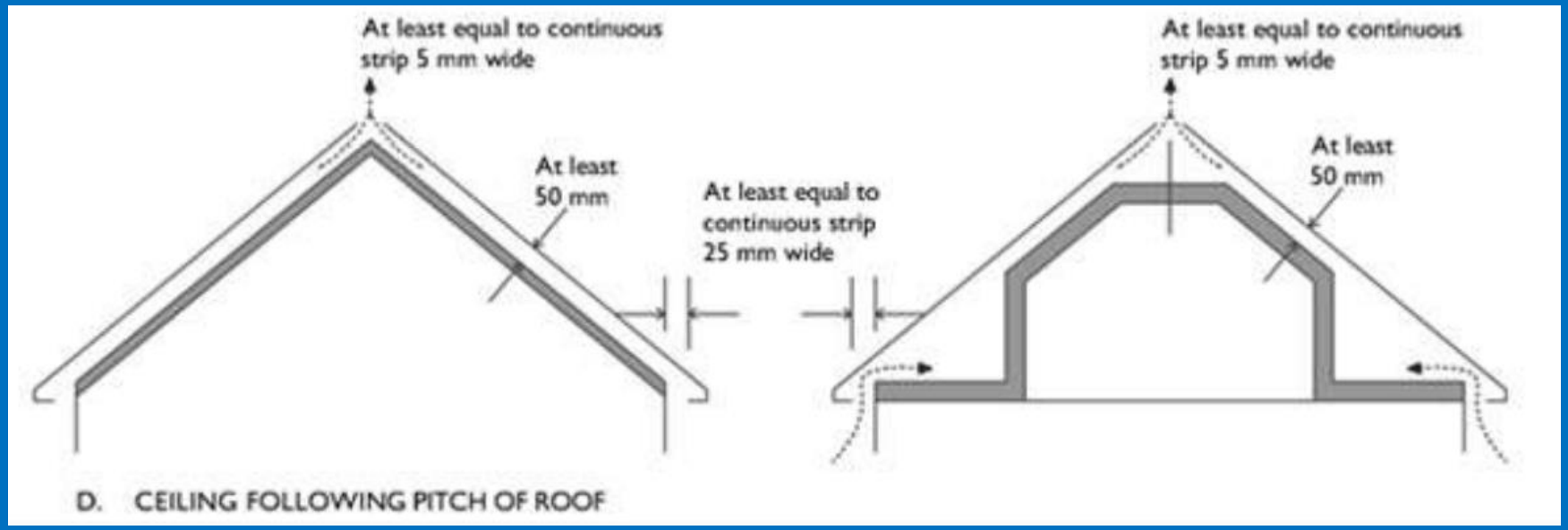
Pro: High equivalent area values

Con: May cause draughts (consider the layout of the room / product selected)

Roof Ventilation

- Eaves ventilation to roof void needs attention
  - Increased depth of insulation – ensure 50mm gap is maintained at eaves
  - Eaves ventilators need to be installed correctly
  - Particular attention to be paid when spray foam insulation is specified

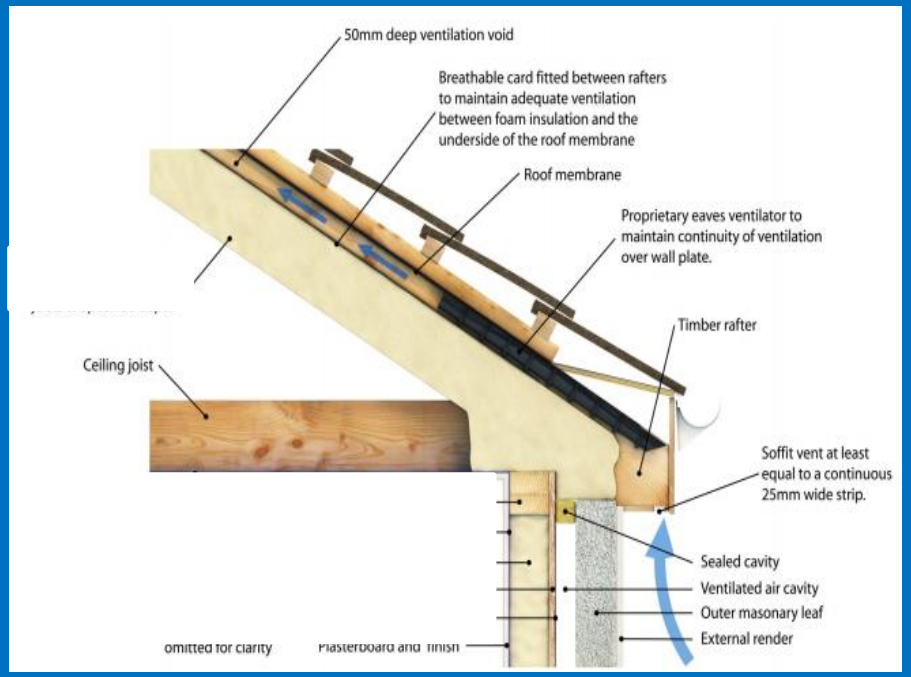
Extract from Diagram 11 TGD F 2019



Roof Ventilation

•Eaves Ventilator – Ensure it is not pulled tight when installing.

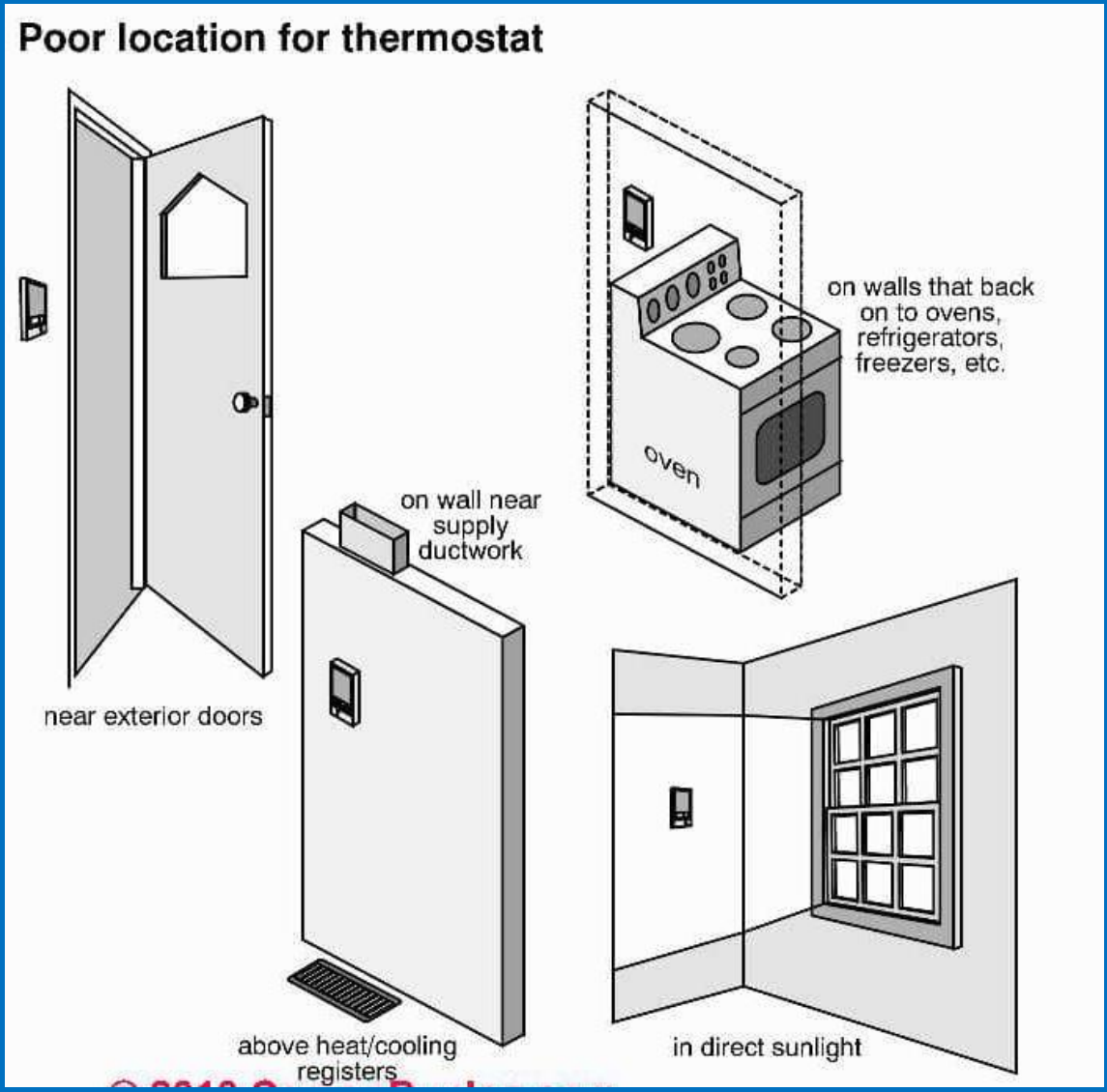
Roof Ventilation



Location of Thermostat

- With the mass usage of heat pumps, thermostat location is becoming more crucial
- Thermostat should be:
  - Located on an internal wall approx 1.5m high
  - Kept away from direct sunlight and windows.....be mindful of low angle winter sun
  - Kept away from heat sources.....stoves, radiators kitchens etc.
  - Avoid locating in hallway near external door.....door opening will cause temperature fluctuation

Location of Thermostat



Questions?