MS 1525

GBI Pro-Series

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Chapter 5

Building Envelope

Roof U-values

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Roof U-value major changes

1	Roof types : Lightweight (non-concrete roof) and heavyweight (concrete roof)	Table 10
2	Multiple roofs and definition of a primary roof	Clauses 5.5.2, 5.5.3
3	Equation for the calculation of the average weight of roof	Omitted
4	Daylight credits	Omitted
5	New clause on thermal insulation with definition of mass insulation, reflective insulation and relationship between U, k and R values	Clause 4.7

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Roof U-value major changes

2014	2019	
Roof Weight Group	**Roof Type**	**Max U-value**
Light (under 50kg/m2)	Lightweight (non concrete roof construction)	0.4
Heavy (above 50kg/m2)	Heavyweight (concrete roof construction)	0.6

Table 10

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Clause 5.5.3 : Multiple Roofs

Definition of a Primary and Secondary Roof

1) Primary Roof sits directly above a habitable space;
2) Secondary Roof sits directly above the Primary Roof;
3) Area of Primary Roof that is directly covered does not need insulation, so long as the space between the two roofs are naturally or mechanically ventilated;
4) Ventilation will allow the removal of heat before it is transmitted down.

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Clause 5.5.3 : Multiple Roofs

5) GBI recommends natural cross ventilation (ie open on minimum two sides), but accepts the following forced ventilation rates:

Height	RC secondary roof	Metal secondary roof
1.0m	1.5 ACH	2.25 ACH
2.0m	0.75 ACH	1.1 ACH
3.0m	0.5 ACH	0.75 ACH

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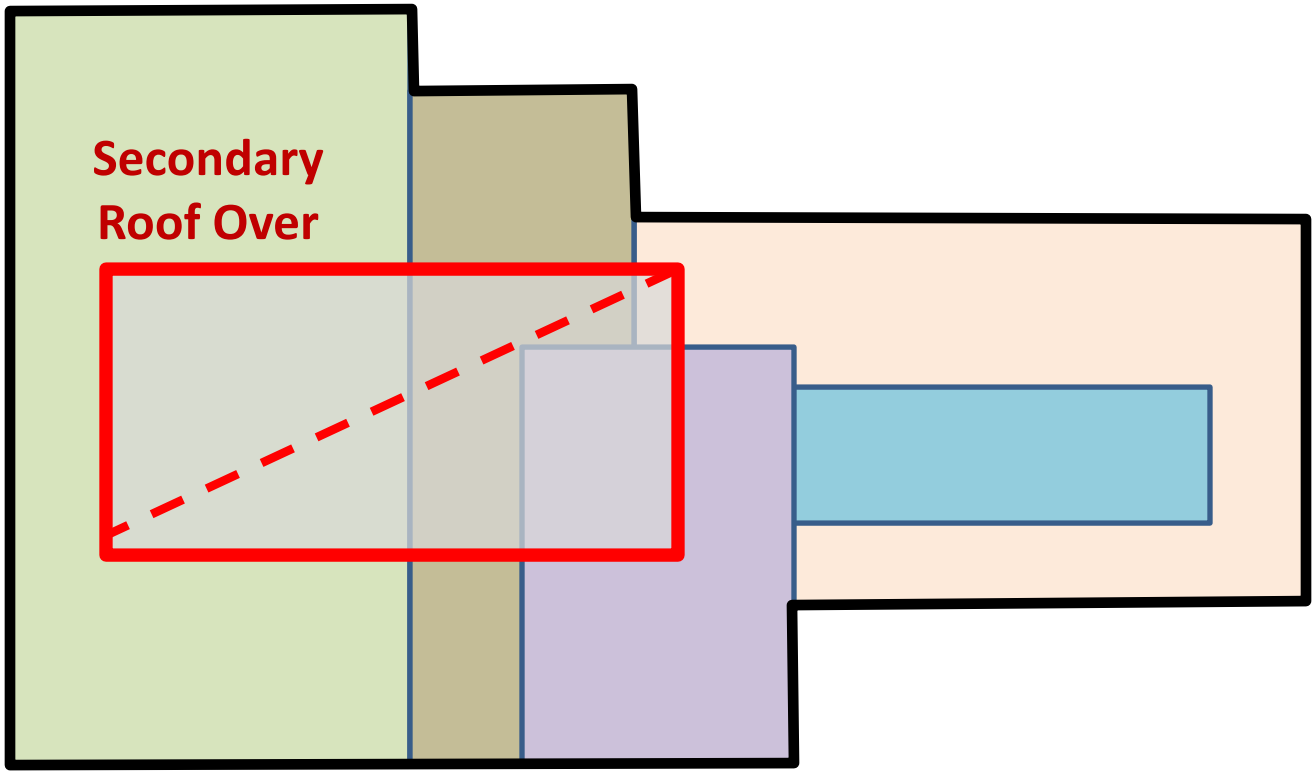
Clause 5.5.3 : Multiple Roofs



Plan View

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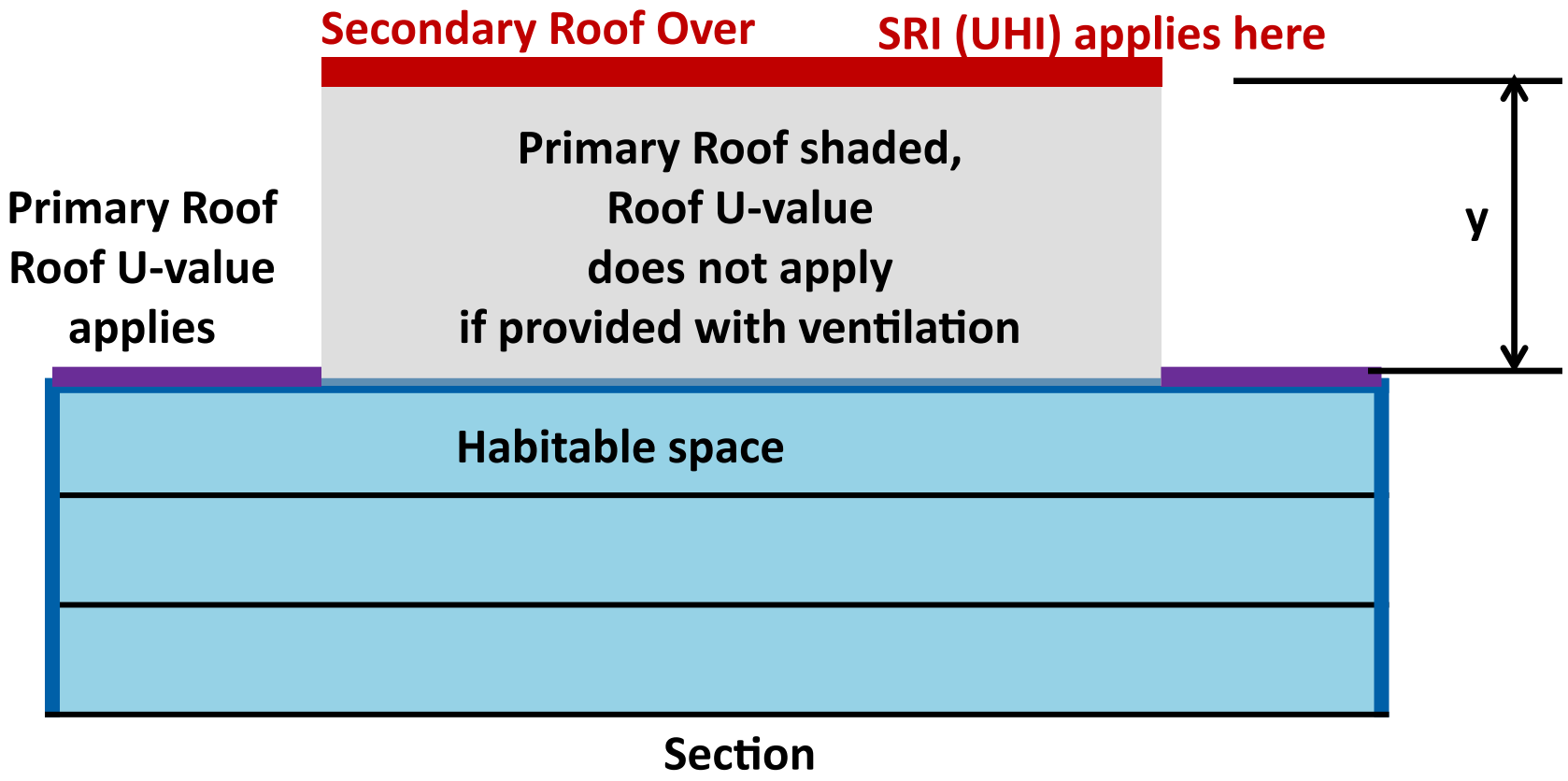
Clause 5.5.3 : Multiple Roofs



Section

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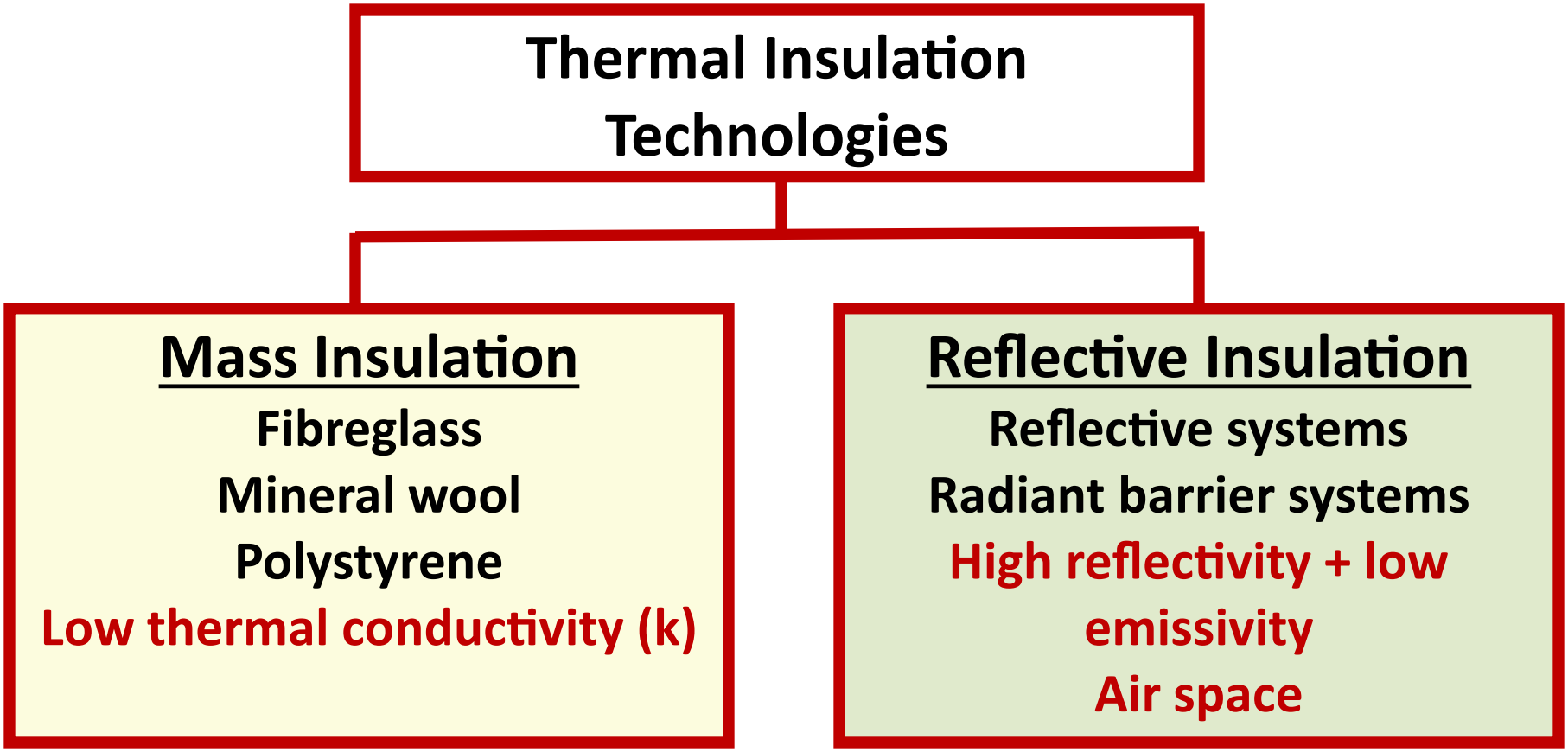
Clause 4.7 : Thermal Insulation



Clause 4.7 Figure 14

A combination of both technologies is recommended

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Clause 4.7 : Thermal Insulation

Relationship between thermal conductivity (k), thermal resistance (R) and thermal transmittance (U-value)

k = Thermal conductivity

$$R = \frac{\text{Material thickness, } d}{k}$$

$$U = \frac{1}{R} = \frac{k}{d}$$

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Clause 4.7 : Reflective Insulation

1) Based on a composite system or assembly to derive R;
2) Comprises of a low emissivity and high reflectance values;
3) Reflective insulation relies on the low conductivity of air space bounded and adjacent to the low-e surfaces;
4) Radiant barriers rely on large ventilated airspaces eg attics;
5) A combination of mass insulation and reflective insulation/radiant barrier is recommended.