

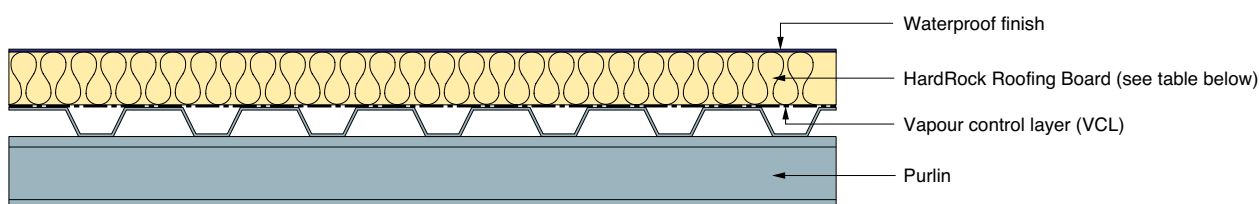
U Values

Flat and pitched roofs

Standards

ROCKWOOL® HardRock® Roofing Boards and Wil-Kool can be used towards compliance of the Malaysian Standard STREET, DRAINAGE AND BUILDING ACT 1974, UNIFORM BUILDING (AMENDMENT) TO BY-LAWS 2021, New by-law 38A “Energy efficiency in buildings” (1) where new or renovated non-residential building with air-conditioned space of exceeding 4,000 square metres — (a) shall be designed to meet the requirements of MS 1525 with regards to the Roof Thermal Transfer Value (RTTV) and Overall Thermal Transfer Value (OTTV).

Profiled metal deck flat roof on purlins



Profiled Metal Deck (using HardRock® Roofing Board)

Construction

Single ply membrane or built up roofing felt on ROCKWOOL® HardRock® Roofing Boards on approved Vapour Control Layer, on profiled galvanised metal deck.

HardRock thickness (mm) U values	Uninsulated	50	75	100	125 2 layers	150 2 layers	175 2 layers	200 2 layers	225 3 layers	250 3 layers
a) Bonded membranes	6.76	0.68	0.47	0.36	0.29	0.24	0.21	0.18	0.16	0.15
b) Mechanically fastened* Single ply membranes (with steel fasteners)	6.76	0.70	0.48	0.37	0.30	0.25	0.22	0.19	0.17	0.15

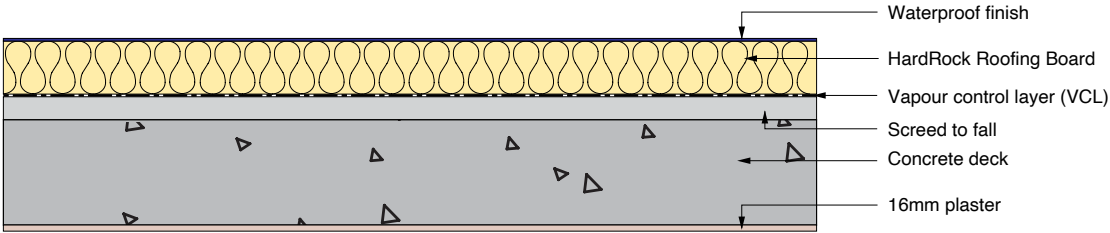
*Includes allowances for mechanical fixings which penetrate the insulation layer.

Plastic tube fasteners: Membrane and board fasteners which are of the plastic tube washer type, will have no impact upon the calculated insulation thickness. Where these fastener types are used in the U values highlighted in table, (a) should be assumed. Steel fasteners: Those U values shown in table (b) take into account the affect of the steel fixings for mechanically fastened single ply membranes (including 1 number for the insulation board). A nominal allowance of 3.56 galvanised fixing/m² has been used for the purpose of these calculation, based on a roof area 2025m² (45 × 45m). Lap fastening centres at 1.88m and fixings at 150mm centres.

It should be noted however that the actual frequency of these fixings may be governed by other factors i.e. height of building, site exposure area of roof etc.

A ceiling void and suspended ceiling should be disregarded unless it is designed to be permanently airtight with no air conditioning ductwork running through it.

Cold flat roofs/concrete deck/plaster finish



Insitu Concrete Deck (using HardRock® Roofing Board)

Construction

Single ply membrane or built up roofing felt on HardRock® Roofing Boards on approved VCL, on 50mm screed, on 150mm dense concrete deck with 16mm dense plaster finish internally.

HardRock thickness (mm) U values	Uninsulated	50	75	100	125 2 layers	150 2 layers	175 2 layers	200 2 layers	225 3 layers	250 3 layers
a) Bonded membranes	3.58	0.63	0.44	0.34	0.28	0.24	0.20	0.18	0.16	0.15
b) Mechanically fastened* Single ply membranes (with steel fasteners)	6.76	0.64	0.46	0.35	0.29	0.24	0.21	0.19	0.17	0.15

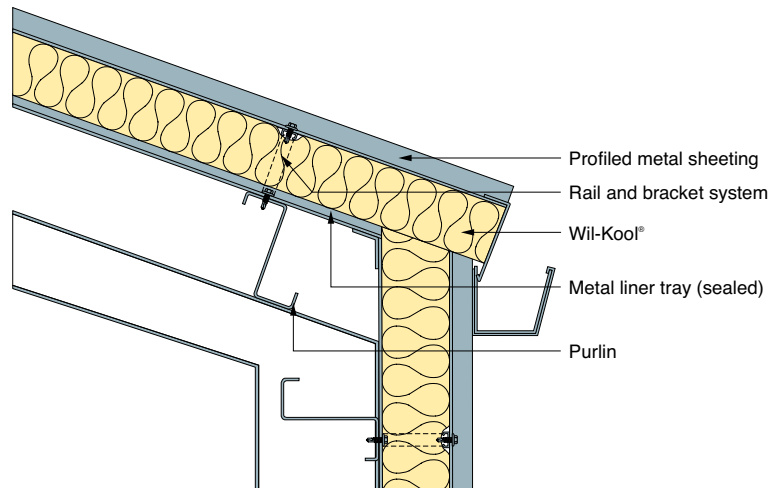
* Allowances for mechanical fixings which penetrate the insulation layer.

Plastic tube fasteners: Membrane and board fasteners which are of the plastic tube washer type, will have no impact upon the calculated insulation thickness. Where these fastener types are used in the U values highlighted in table, (a) should be assumed. Steel fasteners: Those U values shown in (b) take into account the affect of the steel fixings for mechanically fastened single ply membranes (including 1 number for the insulation board). A nominal allowance of 3.56 galvanised fixing/m² has been used for the purpose of these calculation, based on a roof area 2025m² (45x 45m). Lap fastening centres at 1.88m and fixings at 150mm centres.

It should be noted however that the actual frequency of these fixings may be governed by other factors i.e. height of building, site exposure area of roof etc.

A ceiling void and suspended ceiling should be disregarded unless it is designed to be permanently airtight with no air conditioning ductwork running through it.

Pitched roof of profiled metal sheeting on purlins



Construction

A low pitched profiled metal sheeting and sealed metal liner tray over purlin separated by a rail and bracket spacer system.

Wil-Kool[®] is laid over the metal liner tray.

Wil-Kool thickness (mm)	Uninsulated	50	75	100	125 2 layers	150 2 layers	175 2 layers	200 3 layers	225 3 layers	250 3 layers
U values W/m ² K	7.14	0.64	0.45	0.35	0.29	0.24	0.21	0.19	0.17	0.15

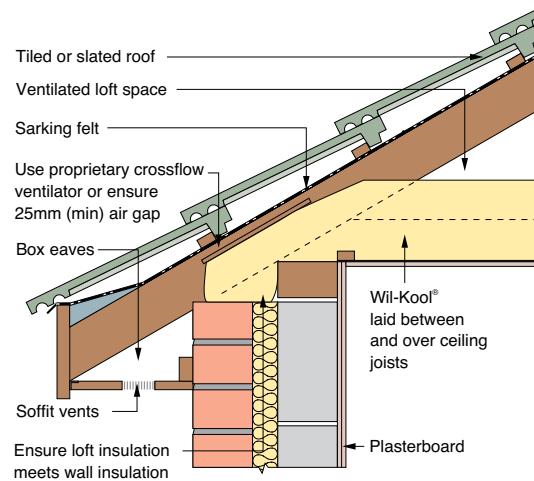
Note : Metal liner should be sealed in order to provide an air tight construction.

The U values and construction shown in the tables are based on those covered in BRE IP 5/98. The insulation thicknesses quoted can only ever be indicative, since actual thickness will depend on the actual system design.

It should be noted however, that IP 5/98 is currently under review, hence the thicknesses shown may be subject to revision once the replacement IP is made available by the BRE.

For other cladding systems, a more complex calculation method must be adopted using a 3 dimensional computer model, program. Confirmation for such U values should therefore be obtained from the industrial cladding manufacturer.

Warm Pitched Roof – tiled pitched roof with insulation between and over ceiling joists



To minimise heat loss through the roof, Wilhams recommend the use of our Wil-Kool® product cross layered between and over joists. This method minimises the effect of thermal bridging through the timbers and is therefore a more robust solution. The insulation layer between joists is taken as a bridged layer.

Note: An uninsulated single loft hatch 600 x 600mm increases the U value of the roof by 9%. The U values shown in the table below assume a minimum 50mm of Wil-Kool® has been used to insulate the loft hatch.

Recessed light fittings

Recessed light fittings (where the insulation is removed in the vicinity of the fitting to allow the dissipation of heat) maybe used up to 1% of the total ceiling area. Where this area is exceeded, increase thickness of insulation by 5mm for every further 1% of total ceiling area with removed insulation.

Timber size Spacing of timber		38 x 100 ceiling joists spaced at:		47 x 100 ceiling joists at:	
		a 400mm ctrs	b 600mm ctrs	a 400mm ctrs	b 600mm ctrs
Insulation thickness Between joists (mm)	Over joists (mm)	U values W/m²K		U values W/m²K	
		a	b	a	b
100	100	0.20	0.19	0.20	0.19
100	150	0.16	0.16	0.16	0.16
100	200 (DL)	0.13	0.13	0.13	0.13
100	250 (DL)	0.11	0.11	0.11	0.11
100	300 (DL)	0.10	0.10	0.10	0.10

****(DL)** Denotes double layer.

Note: Using a BBA approved vapour permeable membrane instead of standard roofing felt may eliminate the need for ventilating the loft space by providing an air tight construction.

In this instance, the eaves box should be filled with Wil-Kool® to eliminate thermal bridging around the soffit and fascia.

Calculations for individual constructions can be requested from the Wilhams Technical Services Department at +603-78466728.

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