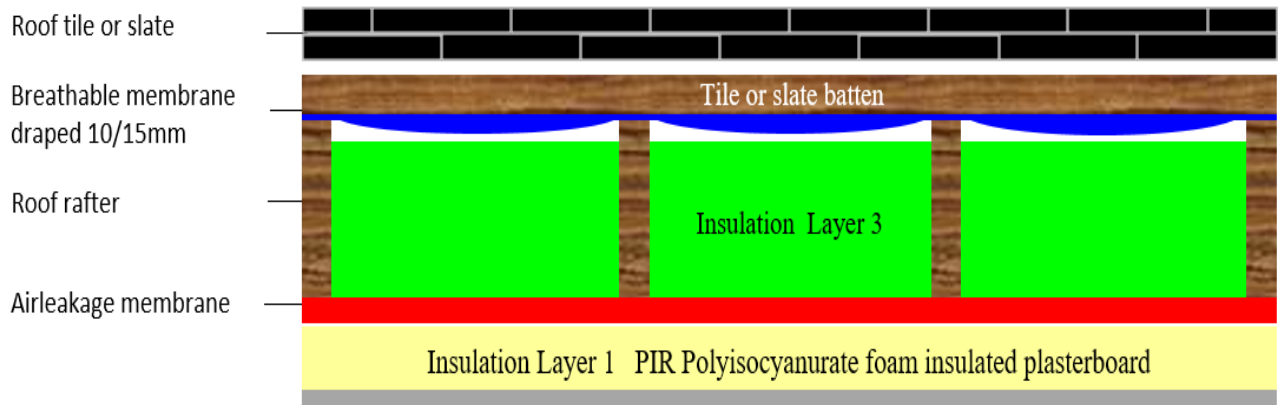
U Value Insulation

Your One Stop Shop
Insulation Provider

Application: Rafter Insulation

- **125mm PIR Foil faced rigid insulation boards** applied **Between** the roof rafters
  Warmline PIR Insulated plasterboards applied **Below** the roof rafters
- U Value Results **0.18, 17, 16, 15, 14, 13, 12 & 0.11 W/m²K**
- Calculation Reference: Rafter 13, 14, 15, 16, 17 & 18



Building Regulations ROI

The current back stop U Value for the roof rafters is **0.16 W/m²K**

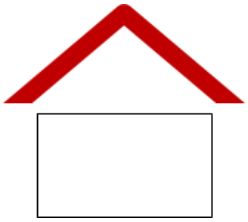
The preliminary building energy rating BER certificate will determine the U Value required for all new homes and extensive renovations. In most cases the U Values required are typically lower than the backstops.

- The lower the U Value the slower the heat loss
- The slower the heat loss the greater the savings

The insulation layer is simply the most important building material to consider when looking to achieve the best energy efficiency rating for your home. If the insulation layer is not fitted correctly it will fail. If the insulation fails, there will be no energy efficiency. The BER result does not take into account badly fitted insulation materials.

Dermot Kearns Insulation Sales and Technical Advisor. Mobile: 087-0526909

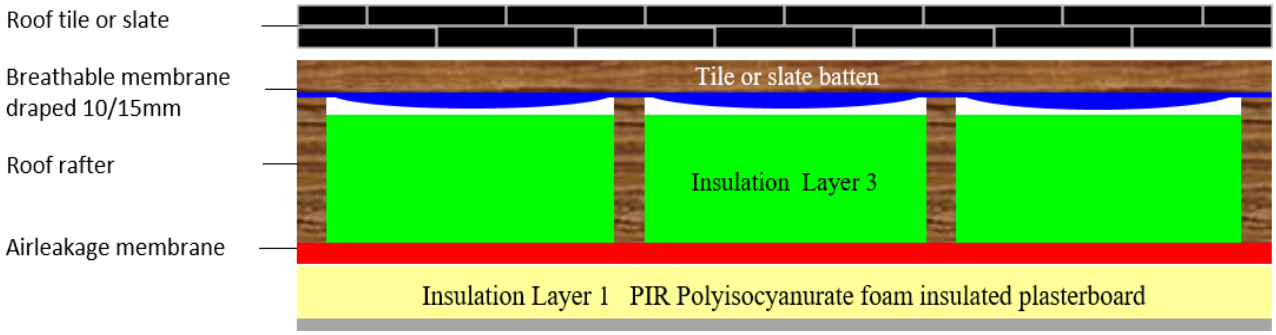
U Value Insulation



Application: Rafter Insulation

- **125mm PIR Foil faced rigid insulation boards** applied **Between** the roof rafters
- **37.5mm Warmline PIR Insulated plasterboard** applied **Below** the roof rafters

U-Value Calculation Method: I.S. EN ISO 6946 **U-Value Result 0.18 W/m²K**



Layer	d (mm)	λ layer	λ bridge	Fraction	R layer	R bridge	Description
					0.100		Rsi
1	**37.5**	**R-value**			**1.205**		**PIR Insulated plasterboard**
2							Airtight membrane
3	**125**	**0.022**	**0.130**	**0.110**	**5.682**	**0.962**	**PIR Rigid insulation (foil faced)**
4	25	R-value					Air layer ventilated
5							Breathable roofing membrane
6	35	R-value					Air layer ventilated (Tile battens)
7							Roof tile or slate
					0.100		Rse
	233 mm (total roof thickness)				7.087		

Total resistance: Upper limit: 5.812 Lower limit: 5.094 Ratio: 1.141 Average: 5.453 m²K/W
U-value (uncorrected) 0.1834
U-value corrections
Air gaps in layer 1 ΔU = 0.0000 (Level 0)
Fixings in layer 1 ΔU = 0.0003 (4.00 per m², 7.5 mm² cross-section, λ = 17.0)
Total ΔU 0.0003
U-value (corrected) 0.184

U-Value (rounded) 0.18 W/m²K

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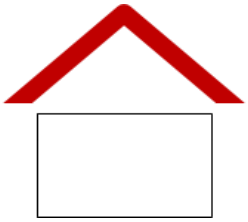
Insulation Suggestions

- **125mm** Quinntherm QR
- **125mm** Kingspan Therma Pitch TP 10
- **125mm** Ballytherm Pitch roof board
- **37.5mm** Warmline PIR Insulated plasterboard

U Value calculated by: Dermot Kearns Insulation Sales and Technical Advisor Mobile: 087-0526909

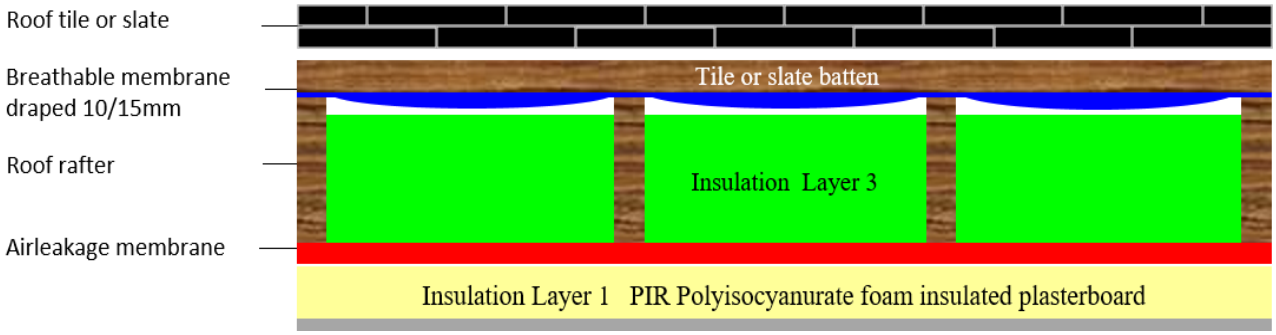
U Value Insulation



Application: Rafter Insulation

- **125mm PIR Foil faced rigid insulation boards** applied **Between** the roof rafters
- **42.5mm Warmline PIR Insulated plasterboard** applied **Below** the roof rafters

U-Value Calculation Method: I.S. EN ISO 6946 **U-Value Result 0.17 W/m²K**



Layer	d (mm)	λ layer	λ bridge	Fraction	R layer	R bridge	Description
					0.100		Rsi
1	**42.5**	**R-value**			**1.402**		**PIR Insulated plasterboard**
2							Airtight membrane
3	**125**	**0.022**	**0.130**	**0.110**	**5.682**	**0.962**	**PIR Rigid insulation (foil faced)**
4	25	R-value					Air layer ventilated
5							Breathable roofing membrane
6	35	R-value					Air layer ventilated (Tile battens)
7							Roof tile or slate
					0.100		Rse
	238 mm (total roof thickness)				7.284		

Total resistance: Upper limit: 6.057 Lower limit: 5.291 Ratio: 1.145 Average: 5.674 m²K/W
U-value (uncorrected) 0.176
U-value corrections
Air gaps in layer 1 ΔU = 0.0000 (Level 0)
Fixings in layer 1 ΔU = 0.0004 (4.00 per m², 7.5 mm² cross-section, λ = 17.0)
Total ΔU 0.0004
U-value (corrected) 0.177

U-Value (rounded) 0.17 W/m²K

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Insulation Suggestions

- **125mm** Quinntherm QR
- **125mm** Kingspan Therma Pitch TP 10
- **125mm** Ballytherm Pitch roof board
- **42.5mm** Warmline PIR Insulated plasterboard

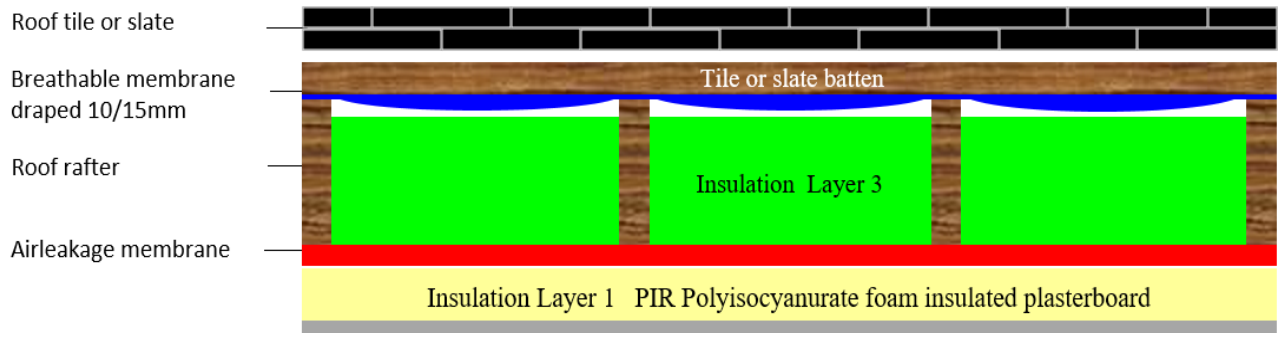
U Value calculated by: Dermot Kearns Insulation Sales and Technical Advisor Mobile: 087-0526909

U Value Insulation

Application: Rafter Insulation

- **125mm PIR Foil faced rigid insulation boards** applied **Between** the roof rafters
- **50.5mm Warmline PIR Insulated plasterboard** applied **Below** the roof rafters

U-Value Calculation Method: I.S. EN ISO 6946 **U-Value Result 0.16 W/m²K**



Layer	d (mm)	λ layer	λ bridge	Fraction	R layer	R bridge	Description
					0.100		Rsi
1	**50.5**	**R-value**			**1.791**		**PIR Insulated plasterboard**
2							Airtight membrane
3	**125**	**0.022**	**0.130**	**0.110**	**5.682**	**0.962**	**PIR Rigid insulation (foil faced)**
4	25	R-value					Air layer ventilated
5							Breathable roofing membrane
6	35	R-value					Air layer ventilated (Tile battens)
7							Roof tile or slate
					0.100		Rse
	246 mm (total roof thickness)				7.673		

Total resistance: Upper limit: 6.525 Lower limit: 5.680 Ratio: 1.149 Average: 6.103 m²K/W
U-value (uncorrected) 0.164
U-value corrections
Air gaps in layer 1 ΔU = 0.000 (Level 0)
Fixings in layer 1 ΔU = 0.000 (4.00 per m², 7.5 mm² cross-section, λ = 17.0)
Total ΔU 0.000
U-value (corrected) 0.164

U-Value (rounded) 0.16 W/m²K

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Insulation Suggestions

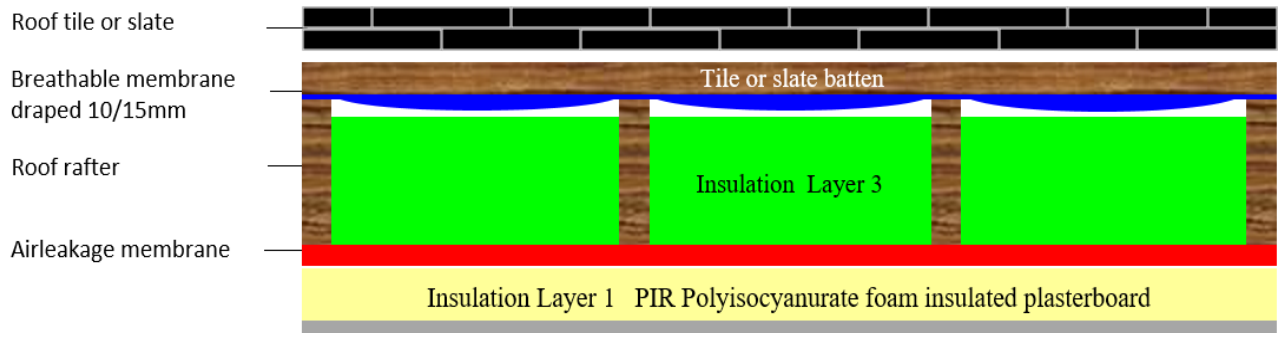
- **125mm** Quinntherm QR
- **125mm** Kingspan Therma Pitch TP 10
- **125mm** Ballytherm Pitch roof board
- **50.5mm** Warmline PIR Insulated plasterboard

U Value calculated by: Dermot Kearns Insulation Sales and Technical Advisor Mobile: 087-0526909

Application: Rafter Insulation

- **125mm PIR Foil faced rigid insulation boards** applied **Between** the roof rafters
- **52.5mm Warmline PIR Insulated plasterboard** applied **Below** the roof rafters

U-Value Calculation Method: I.S. EN ISO 6946 **U-Value Result 0.16 W/m²K**



Layer	d (mm)	λ layer	λ bridge	Fraction	R layer	R bridge	Description
					0.100		Rsi
1	**52.5**	**R-value**			**1.884**		**PIR Insulated plasterboard**
2							Airtight membrane
3	**125**	**0.022**	**0.130**	**0.110**	**5.682**	**0.962**	**PIR Rigid insulation (foil faced)**
4	25	R-value					Air layer ventilated
5							Breathable roofing membrane
6	35	R-value					Air layer ventilated (Tile battens)
7							Roof tile or slate
					0.100		Rse
	248 mm (total roof thickness)				7.766		

Total resistance: Upper limit: 6.635 Lower limit: 5.773 Ratio: 1.149 Average: 6.204 m²K/W
U-value (uncorrected) 0.1612
U-value corrections
Air gaps in layer 1 ΔU = 0.0000 (Level 0)
Fixings in layer 1 ΔU = 0.0005 (4.00 per m², 7.5 mm² cross-section, λ = 17.0)
Total ΔU 0.0005
U-value (corrected) 0.162

U-Value (rounded) 0.16 W/m²K

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Insulation Suggestions

- **125mm** Quinntherm QR
- **125mm** Kingspan Therma Pitch TP 10
- **125mm** Ballytherm Pitch roof board
- **52.5mm** Warmline PIR Insulated plasterboard

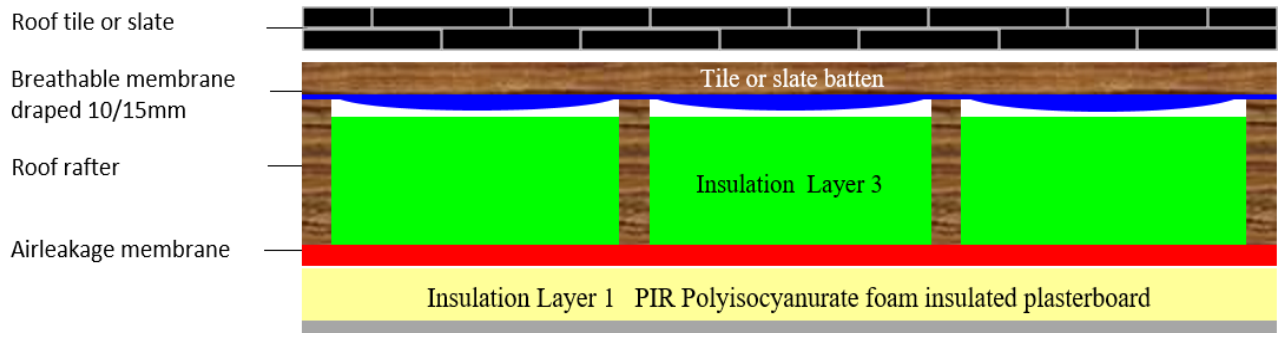
U Value calculated by: Dermot Kearns Insulation Sales and Technical Advisor Mobile: 087-0526909

U Value Insulation

Application: Rafter Insulation

- **125mm PIR Foil faced rigid insulation boards** applied **Between** the roof rafters
- **62.5mm Warmline PIR Insulated plasterboard** applied **Below** the roof rafters

U-Value Calculation Method: I.S. EN ISO 6946 **U-Value Result 0.15 W/m²K**



Layer	d (mm)	λ layer	λ bridge	Fraction	R layer	R bridge	Description
					0.100		Rsi
1	**62.5**	**R-value**			**2.339**		**PIR Insulated plasterboard**
2							Airtight membrane
3	**125**	**0.022**	**0.130**	**0.110**	**5.682**	**0.962**	**PIR Rigid insulation (foil faced)**
4	25	R-value					Air layer ventilated
5							Breathable roofing membrane
6	35	R-value					Air layer ventilated (Tile battens)
7							Roof tile or slate
					0.100		Rse
	258 mm (total roof thickness)				8.221		

Total resistance: Upper limit: 7.159 Lower limit: 6.228 Ratio: 1.149 Average: 6.694 m²K/W
U-value (uncorrected) 0.149
U-value corrections
Air gaps in layer 1 ΔU = 0.000 (Level 0)
Fixings in layer 1 ΔU = 0.001 (4.00 per m², 7.5 mm² cross-section, λ = 17.0)
Total ΔU 0.001
U-value (corrected) 0.150

U-Value (rounded) 0.15 W/m²K

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Insulation Suggestions

- **125mm** Quinntherm QR
- **125mm** Kingspan Therma Pitch TP 10
- **125mm** Ballytherm Pitch roof board
- **62.5mm** Warmline PIR Insulated plasterboard

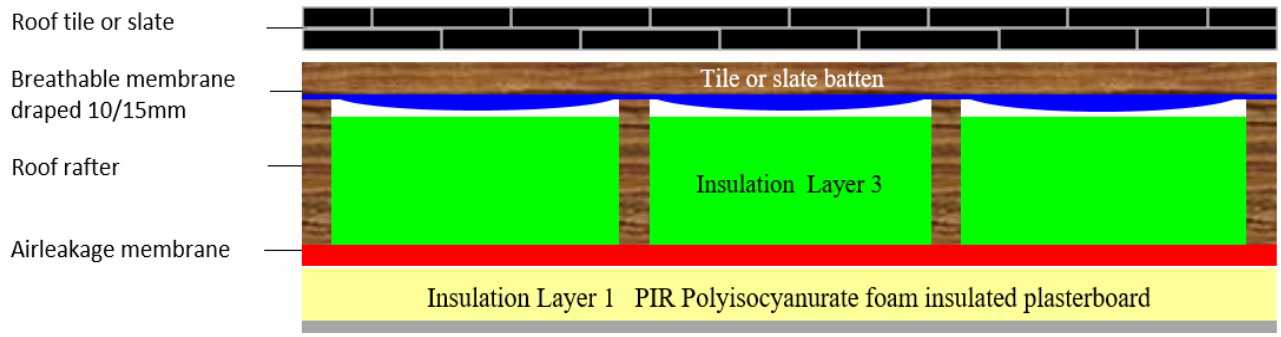
U Value calculated by: Dermot Kearns Insulation Sales and Technical Advisor Mobile: 087-0526909

U Value Insulation

Application: Rafter Insulation

- **125mm PIR Foil faced rigid insulation boards** applied **Between** the roof rafters
- **72.5mm Warmline PIR Insulated plasterboard** applied **Below** the roof rafters

U-Value Calculation Method: I.S. EN ISO 6946 **U-Value Result 0.14 W/m²K**



Layer	d (mm)	λ layer	λ bridge	Fraction	R layer	R bridge	Description
					0.100		Rsi
1	**72.5**	**R-value**			**2.793**		**PIR Insulated plasterboard**
2							Airtight membrane
3	**125**	**0.022**	**0.130**	**0.110**	**5.682**	**0.962**	**PIR Rigid insulation (foil faced)**
4	25	R-value					Air layer ventilated
5							Breathable roofing membrane
6	35	R-value					Air layer ventilated (Tile battens)
7							Roof tile or slate
					0.100		Rse
	268 mm (total roof thickness)				8.675		

Total resistance: Upper limit: 7.668 Lower limit: 6.682 Ratio: 1.147 Average: 7.175 m²K/W
U-value (uncorrected) 0.139
U-value corrections
Air gaps in layer 1 ΔU = 0.000 (Level 0)
Fixings in layer 1 ΔU = 0.001 (4.00 per m², 7.5 mm² cross-section, λ = 17.0)
Total ΔU 0.001
U-value (corrected) 0.140

U-Value (rounded) 0.14 W/m²K

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Insulation Suggestions

- **125mm** Quinntherm QR
- **125mm** Kingspan Therma Pitch TP 10
- **125mm** Ballytherm Pitch roof board
- **72.5mm** Warmline PIR Insulated plasterboard

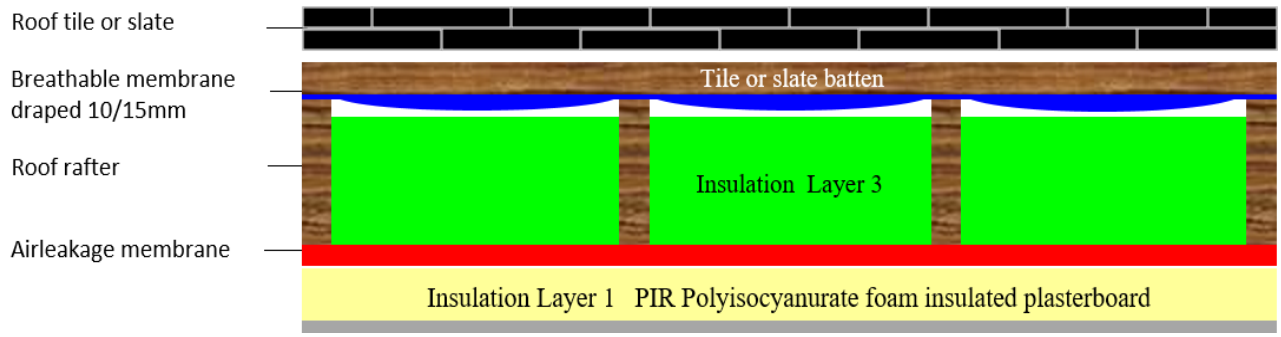
U Value calculated by: Dermot Kearns Insulation Sales and Technical Advisor Mobile: 087-0526909

U Value Insulation

Application: Rafter Insulation

- **125mm PIR Foil faced rigid insulation boards** applied **Between** the roof rafters
- **82.5mm Warmline PIR Insulated plasterboard** applied **Below** the roof rafters

U-Value Calculation Method: I.S. EN ISO 6946 **U-Value Result 0.13 W/m²K**



Layer	d (mm)	λ layer	λ bridge	Fraction	R layer	R bridge	Description
					0.100		Rsi
1	**82.5**	**R-value**			**3.248**		**PIR Insulated plasterboard**
2							Airtight membrane
3	**125**	**0.022**	**0.130**	**0.110**	**5.682**	**0.962**	**PIR Rigid insulation (foil faced)**
4	25	R-value					Air layer ventilated
5							Breathable roofing membrane
6	35	R-value					Air layer ventilated (Tile battens)
7	10	1.000					Roof tile or slate
					0.100 #		Rse
	278 mm (total roof thickness)				9.130		

Total resistance: Upper limit: 8.168 Lower limit: 7.137 Ratio: 1.144 Average: 7.653 m²K/W
U-value (uncorrected) 0.1307
U-value corrections
Air gaps in layer 1 ΔU = 0.0000 (Level 0)
Fixings in layer 1 ΔU = 0.0006 (4.00 per m², 7.5 mm² cross-section, λ = 17.0)
Total ΔU 0.0006
U-value (corrected) 0.131

U-Value (rounded) 0.13 W/m²K

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Insulation Suggestions

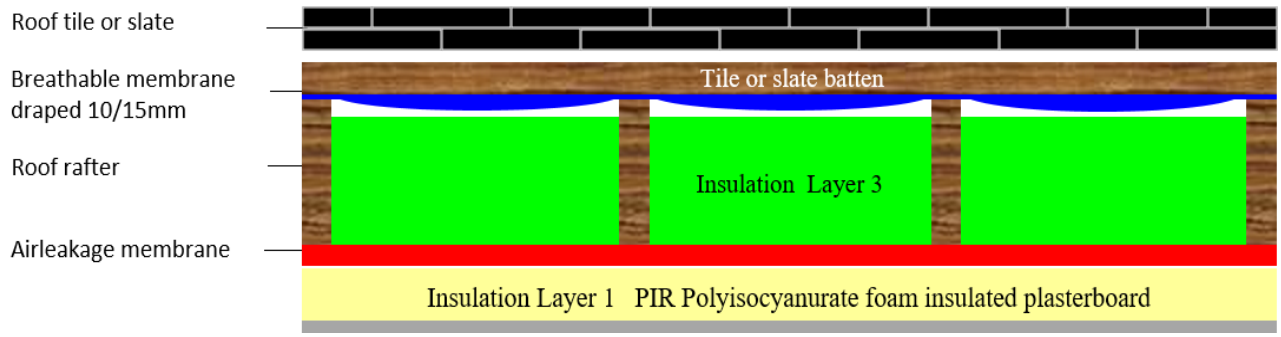
- **125mm** Quinntherm QR
- **125mm** Kingspan Therma Pitch TP 10
- **125mm** Ballytherm Pitch roof board
- **82.5mm** Warmline PIR Insulated plasterboard

U Value calculated by: Dermot Kearns Insulation Sales and Technical Advisor Mobile: 087-0526909

Application: Rafter Insulation

- **125mm PIR Foil faced rigid insulation boards** applied **Between** the roof rafters
- **92.5mm Warmline PIR Insulated plasterboard** applied **Below** the roof rafters

U-Value Calculation Method: I.S. EN ISO 6946 **U-Value Result 0.12 W/m²K**



Layer	d (mm)	λ layer	λ bridge	Fraction	R layer	R bridge	Description
					0.100		Rsi
1	**92.5**	**R-value**			**3.702**		**PIR Insulated plasterboard**
2							Airtight membrane
3	**125**	**0.022**	**0.130**	**0.110**	**5.682**	**0.962**	**PIR Rigid insulation (foil faced)**
4	25	R-value					Air layer ventilated
5							Breathable roofing membrane
6	35	R-value					Air layer ventilated (Tile battens)
7						Roof tile or slate	
					0.100		Rse
	288 mm (total roof thickness)				9.584		

Total resistance: Upper limit: 8.659 Lower limit: 7.591 Ratio: 1.141 Average: 8.125 m²K/W
U-value (uncorrected) 0.123
U-value corrections
Air gaps in layer 1 ΔU = 0.000 (Level 0)
Fixings in layer 1 ΔU = 0.001 (4.00 per m², 7.5 mm² cross-section, λ = 17.0)
Total ΔU 0.001
U-value (corrected) 0.124

U-Value (rounded) 0.12 W/m²K

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Insulation Suggestions

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- **125mm** Kingspan Therma Pitch TP 10
- **125mm** Ballytherm Pitch roof board
- **92.5mm** Warmline PIR Insulated plasterboard

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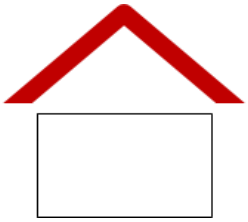
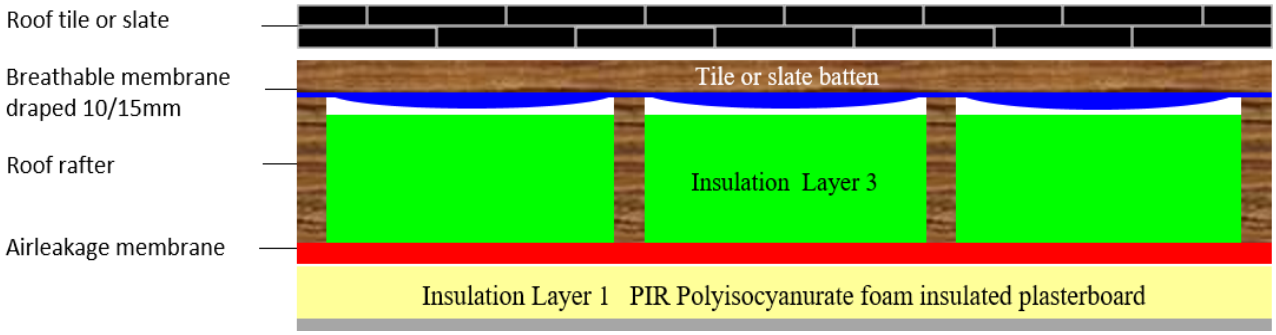
U Value Insulation



Application: Rafter Insulation

- **125mm PIR Foil faced rigid insulation boards** applied **Between** the roof rafters
- **102.5mm Warmline PIR Insulated plasterboard** applied **Below** the roof rafters

U-Value Calculation Method: I.S. EN ISO 6946 **U-Value Result 0.12 W/m²K**



Layer	d (mm)	λ layer	λ bridge	Fraction	R layer	R bridge	Description
					0.100		Rsi
1	**102.5**	**R-value**			**4.150**		**PIR Insulated plasterboard**
2							Airtight membrane
3	**125**	**0.022**	**0.130**	**0.110**	**5.682**	**0.962**	**PIR Rigid insulation (foil faced)**
4	25	R-value					Air layer ventilated
5							Breathable roofing membrane
6	35	R-value					Air layer ventilated (Tile battens)
7							Roof tile or slate
					0.100		Rse
	298 mm (total roof thickness)				10.032		

Total resistance: Upper limit: 9.138 Lower limit: 8.039 Ratio: 1.137 Average: 8.589 m²K/W
U-value (uncorrected) 0.116
U-value corrections
Air gaps in layer 1 ΔU = 0.000 (Level 0)
Fixings in layer 1 ΔU = 0.001 (4.00 per m², 7.5 mm² cross-section, λ = 17.0)
Total ΔU 0.001
U-value (corrected) 0.117

U-Value (rounded) 0.12 W/m²K

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Insulation Suggestions

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- **125mm** Kingspan Therma Pitch TP 10
- **125mm** Ballytherm Pitch roof board
- **102.5mm** Warmline PIR Insulated plasterboard

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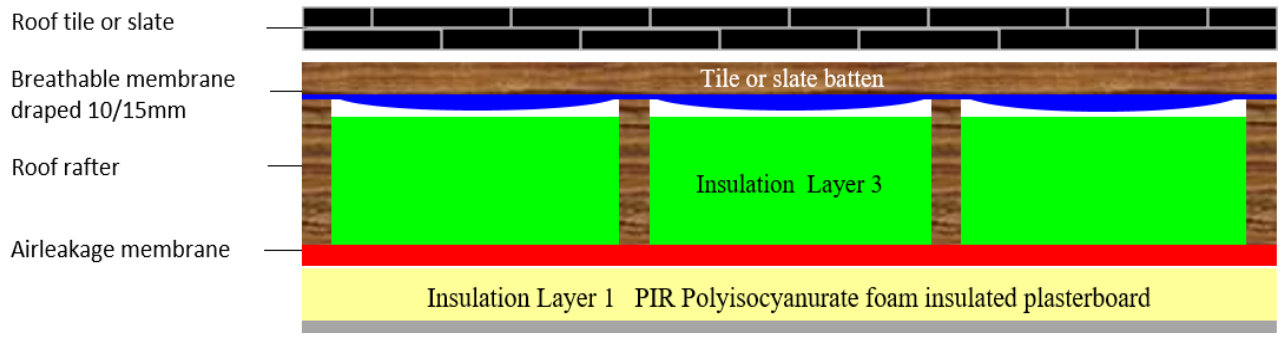
Application: Rafter Insulation

- **125mm PIR Foil faced rigid insulation boards** applied **Between** the roof rafters
- **112.5mm Warmline PIR Insulated plasterboard** applied **Below** the roof rafters

U-Value Calculation Method: I.S. EN ISO 6946 **U-Value Result 0.11 W/m²K**



Layer	d (mm)	λ layer	λ bridge	Fraction	R layer	R bridge	Description
					0.100		Rsi
1	**112.5**	**R-value**			**4.605**		**PIR Insulated plasterboard**
2							Airtight membrane
3	**125**	**0.022**	**0.130**	**0.110**	**5.682**	**0.962**	**PIR Rigid insulation (foil faced)**
4	25	R-value					Air layer ventilated
5							Breathable roofing membrane
6	35	R-value					Air layer ventilated (Tile battens)
7							Roof tile or slate
					0.100		Rse
	308 mm (total roof thickness)				10.487		

Total resistance: Upper limit: 9.621 Lower limit: 8.494 Ratio: 1.133 Average: 9.058 m²K/W
U-value (uncorrected) 0.110
U-value corrections
Air gaps in layer 1 ΔU = 0.000 (Level 0)
Fixings in layer 1 ΔU = 0.001 (4.00 per m², 7.5 mm² cross-section, λ = 17.0)
Total ΔU 0.001
U-value (corrected) 0.111

U-Value (rounded) 0.11 W/m²K

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Insulation Suggestions

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- **125mm** Kingspan Therma Pitch TP 10
- **125mm** Ballytherm Pitch roof board
- **112.5mm** Warmline PIR Insulated plasterboard

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Simple Insulation Solutions - Rafter Insulation

- **PIR Foil faced rigid insulation** boards applied **Between** the roof rafters
- **PIR Insulated plasterboards** applied **Below** the roof Rafters

Before we can provide a solution we need to know the following

Note:
A 25mm Space between the top side of the insulation layer and the breathable membrane is recommended by most PIR manufacturers.

Question 1
Are you applying a breathable or non-breathable roofing membrane? Breathable is the best option.
If the answer is non-breathable there will be less insulation space available.

Question 2
What is the depth of the roof rafters? Are they 125mm, 150mm, 180mm or 225mm?
The answer to this question will determine the insulation space available.

Question 3
What is the spacing/centers between the roof rafters? Are they 300mm, 400mm or 600mm centres?
The answer to this question will determine the bridging factor.

Question 4
Are you applying an airtight/vapour control membrane below the roof rafters?
Yes, is the best option, airtightness reduces heat loss.

Question 5
What U value would you like to achieve? Example: 0.16 Good 0.14 Better 0.12 Best

Note: For the purpose of the U Value calculations the air layer (air space) between the breathable roofing membrane and the insulation layer is calculated as a ventilated space. The airspace can only be described as an unventilated air layer where the breathable roofing membrane is fully taped and sealed **(not common practice)**.

Where a non-breathable (slaters felt) is applied above the roof rafters you must maintain a minimum **50mm fully ventilated airspace (cross flow)** between the slaters felt and the top side of the insulation layer. The purpose of the ventilated airspace is to reduce the risk of condensation and damage to the roof rafters. A 50mm still airspace in not sufficient.

Best Practice:
Applying additional insulation directly below the roof rafters will reduce the risk of thermal bridging.

Note:

- The slate or roof tile will not affect the U Value result.
- The roof tile battens will not affect the U Value result.

Timber roof rafters are natural building materials and will continue to expand and contract over the entire lifetime of the building. Small gaps between the insulation layers and the sides of the roof rafters can considerably reduce the overall thermal performance of the roof. Cold air must not be permitted to circulate on the warm side (inside) of the insulation materials applied between the roof rafters.

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Insulation & Associated Building Materials Available from U Value Insulation

PIR Foil faced rigid insulation boards

- 125mm Quinntherm QR
- 125mm Kingspan Therma TP 10
- 125mm Ballytherm Pitch roof board

PIR Insulated plasterboards

- 37.5mm Warmline PIR Insulated plasterboard
- 42.5mm Warmline PIR Insulated plasterboard
- 50.5mm Warmline PIR Insulated plasterboard
- 52.5mm Warmline PIR Insulated plasterboard
- 62.5mm Warmline PIR Insulated plasterboard
- 72.5mm Warmline PIR Insulated plasterboard
- 82.5mm Warmline PIR Insulated plasterboard
- 92.5mm Warmline PIR Insulated plasterboard
- 102.5mm Warmline PIR Insulated plasterboard
- 112.5mm Warmline PIR Insulated plasterboard

- ✓ High performance breathable roof membrane
- ✓ Eaves carrier
- ✓ Roof vents

- ✓ Airtight membrane
- ✓ Airtight tapes
- ✓ Airtight sealant

- ✓ Roof tiles
- ✓ Roof slates
- ✓ Counter battens
- ✓ Roof tile battens

- ✓ Fire stopping insulation for party walls

- ✓ Loft Walk boards
- ✓ Pipe lagging
- ✓ Cold water tank jackets

- ✓ Loft ladders
- ✓ Downlight covers

- ✓ Plasterboards
- ✓ Timber drywall screws
- ✓ Joint filler
- ✓ Paper joint tape
- ✓ Scrim tape
- ✓ Plaster skim coat

Get it right before you enter the site

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