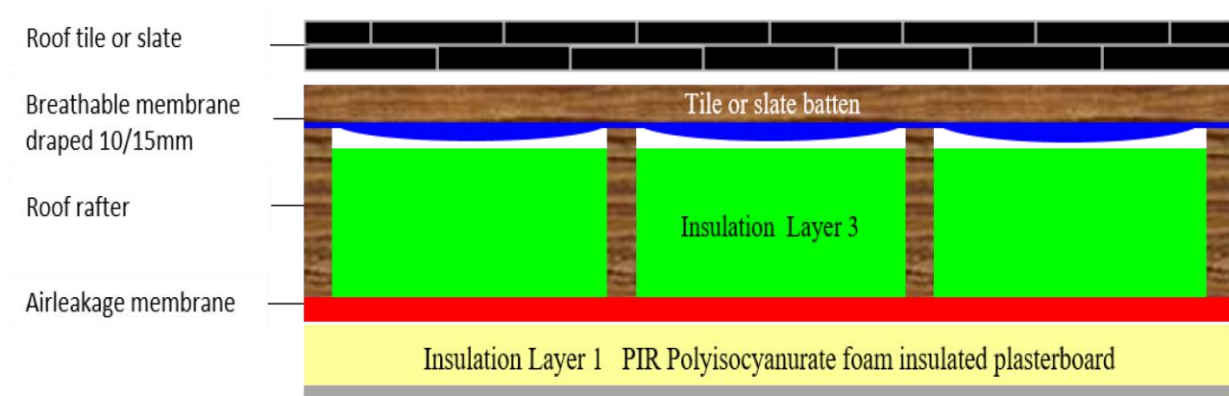


Your One Stop Shop Insulation Provider

Application: Rafter Insulation

- **100mm PIR Foil faced rigid insulation boards** applied **Between** the roof rafters
- **Warmline PIR Insulated plasterboards** applied **Below** the roof rafters
- U Value Results **0.21, 0.20, 0.19, 0.18, 0.17, 0.16, 0.15, 0.14, 0.13 & 0.12 W/m²K**
- Calculation Reference: Rafter 13, 14, 15, 16, 17 & 18



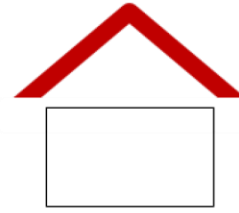
Building Regulations ROI

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

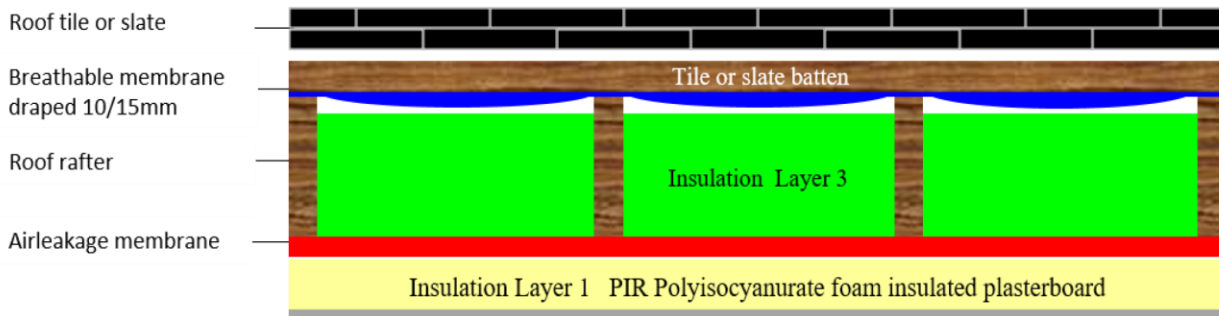
The insulation layer is simply the most important building material to consider when looking to achieve the best energy efficiency rating for your home. If the insulation layer is not fitted correctly it will fail. If the insulation fails, there will be no energy efficiency. The BER result does not take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



Application: Rafter Insulation

- **100mm 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 0.21 W/m²K**



Layer	d (mm)	λ layer	λ bridge	Fraction	R layer	R bridge	Description
1	37.5	R-value			1.205		Warmline PIR Ins-plasterboard
2							Airtight membrane
3	100	0.022	0.130	0.110	4.545	0.769	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
	<u>208 mm</u> (total roof thickness)					<u>5.950</u>	

Total resistance: Upper limit: 4.996 Lower limit: 4.357 Ratio: 1.147 Average: 4.676 m²K/W

U-value (uncorrected) 0.214

U-value corrections

Air gaps in layer 1 $\Delta U = 0.000$ (Level 0)

Fixings in layer 1 $\Delta U = 0.000$ (4.00 per m², 7.5 mm² cross-section, $\lambda = 17.0$)

Total ΔU 0.000

U-value (corrected) 0.214

U-Value (rounded) 0.21 W/m²K

Contact Your Local Insulation Provider

U Value Insulation

Unit 505B, Northwest Business Park,

Ballycoolin Dublin 15.

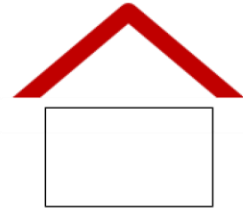
Phone (01) 861 2000

E Mail sales@uvalue.ie

<http://www.uvalue.ie>

Insulation Suggestions

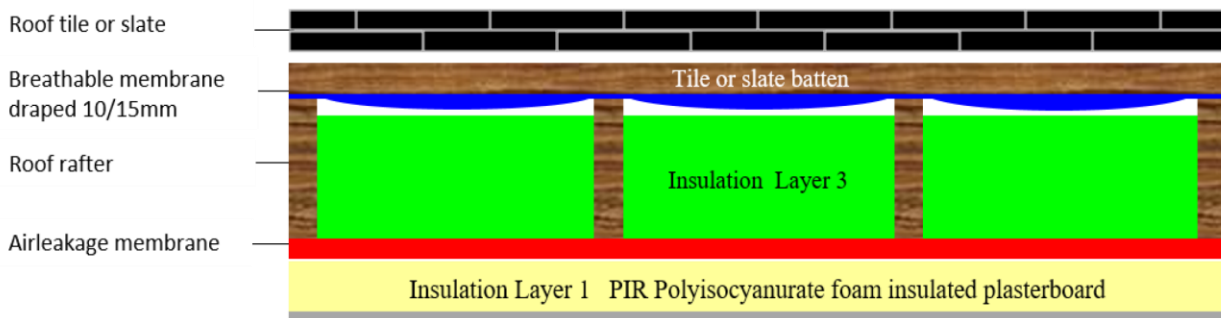
- **100mm** Quinnterm QR
- **100mm** Kingspan Therma Pitch TP 10
- **100mm** Ballytherm Pitch roof board
- **37.5mm** Warmline PIR Insulated plasterboard



Application: Rafter Insulation

- **100mm 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 0.20 W/m²K**



Layer	d (mm)	λ layer	λ bridge	Fraction	R layer	R bridge	Description
					0.100		Rsi
1	42.5	R-value			1.424		Warmline PIR Ins-plasterboard
2							Airtight membrane
3	100	0.022	0.130	0.110	4.545	0.769	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
	<u>213 mm</u> (total roof thickness)					<u>6.169</u>	

Total resistance: Upper limit: 5.257 Lower limit: 4.576 Ratio: 1.149 Average: 4.916 m²K/W

U-value (uncorrected) 0.203

U-value corrections

Air gaps in layer 1 $\Delta U = 0.000$ (Level 0)

Fixings in layer 1 $\Delta U = 0.001$ (4.00 per m², 7.5 mm² cross-section, $\lambda = 17.0$)

Total ΔU 0.001

U-value (corrected) 0.204

U-Value (rounded) 0.20 W/m²K

Contact Your Local Insulation Provider

U Value Insulation

Unit 505B, Northwest Business Park,

Ballycoolin Dublin 15.

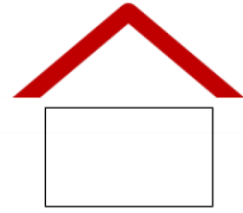
Phone (01) 861 2000

E Mail sales@uvalue.ie

<http://www.uvalue.ie>

Insulation Suggestions

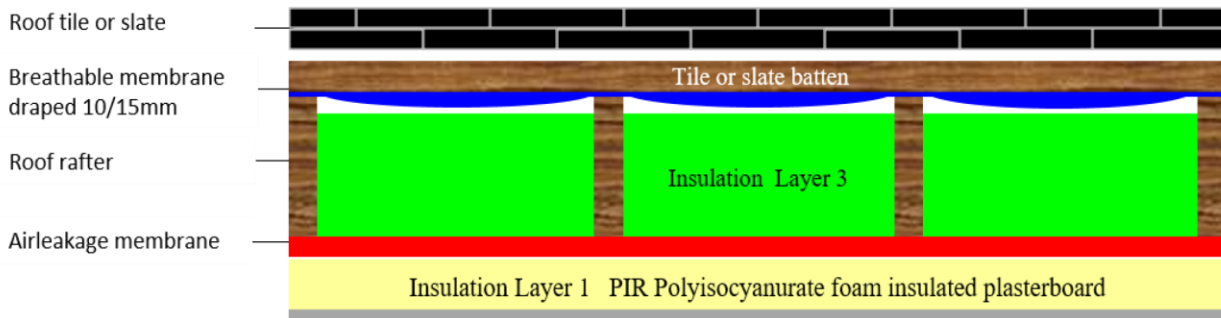
- **100mm** Quinnterm QR
- **100mm** Kingspan Therma Pitch TP 10
- **100mm** Ballytherm Pitch roof board
- **42.5mm** Warmline PIR Insulated plasterboard



Application: Rafter Insulation

- **100mm 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 0.19 W/m²K**



Layer	d (mm)	λ layer	λ bridge	Fraction	R layer	R bridge	Description
1	50.5	R-value			1.793		Warmline PIR Ins-plasterboard
2							Airtight membrane
3	100	0.022	0.130	0.110	4.545	0.769	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
	<u>221 mm</u> (total roof thickness)					6.538	

Total resistance: Upper limit: 5.684 Lower limit: 4.945 Ratio: 1.149 Average: 5.314 m²K/W

U-value (uncorrected) 0.188

U-value corrections

Air gaps in layer 1 $\Delta U = 0.000$ (Level 0)

Fixings in layer 1 $\Delta U = 0.001$ (4.00 per m², 7.5 mm² cross-section, $\lambda = 17.0$)

Total ΔU 0.001

U-value (corrected) 0.189

U-Value (rounded) 0.19 W/m²K

Contact Your Local Insulation Provider

U Value Insulation

Unit 505B, Northwest Business Park,

Ballycoolin Dublin 15.

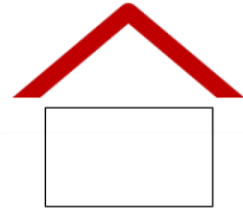
Phone (01) 861 2000

E Mail sales@uvalue.ie

<http://www.uvalue.ie>

Insulation Suggestions

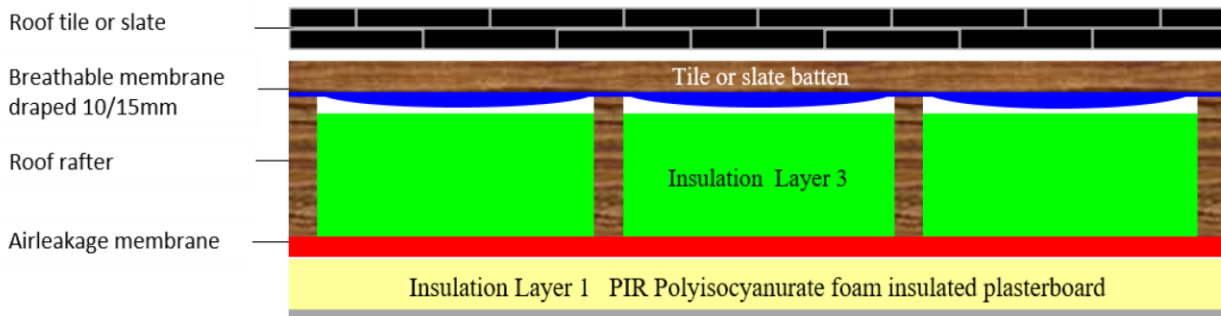
- **100mm** Quinnterm QR
- **100mm** Kingspan Therma Pitch TP 10
- **100mm** Ballytherm Pitch roof board
- **50.5mm** Warmline PIR Insulated plasterboard



Application: Rafter Insulation

- **100mm 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 0.18 W/m²K**



Layer	d (mm)	λ layer	λ bridge	Fraction	R layer	R bridge	Description
1	52.5	R-value			1.884		Warmline PIR Ins-plasterboard
2							Airtight membrane
3	100	0.022	0.130	0.110	4.545	0.769	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
	<u>223 mm</u> (total roof thickness)					<u>6.629</u>	

Total resistance: Upper limit: 5.787 Lower limit: 5.036 Ratio: 1.149 Average: 5.411 m²K/W

U-value (uncorrected) 0.1848

U-value corrections

Air gaps in layer 1 $\Delta U = 0.0000$ (Level 0)

Fixings in layer 1 $\Delta U = 0.0006$ (4.00 per m², 7.5 mm² cross-section, $\lambda = 17.0$)

Total ΔU 0.0006

U-value (corrected) 0.185

U-Value (rounded) 0.18 W/m²K

Contact Your Local Insulation Provider

U Value Insulation

Unit 505B, Northwest Business Park,

Ballycoolin Dublin 15.

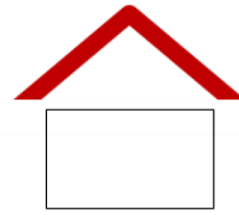
Phone (01) 861 2000

E Mail sales@uvalue.ie

<http://www.uvalue.ie>

Insulation Suggestions

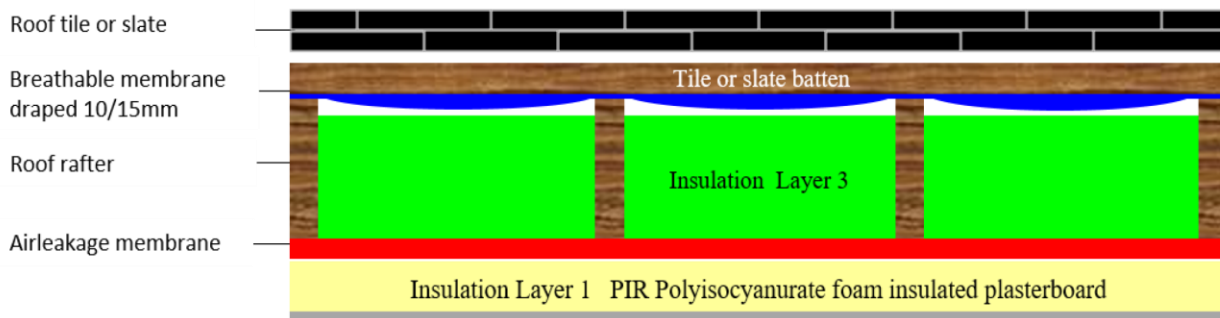
- **100mm** Quinnterm QR
- **100mm** Kingspan Therma Pitch TP 10
- **100mm** Ballytherm Pitch roof board
- **52.5mm** Warmline PIR Insulated plasterboard



Application: Rafter Insulation

- **100mm 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 0.17 W/m²K**



Layer	d (mm)	λ layer	λ bridge	Fraction	R layer	R bridge	Description
1	62.5	R-value			0.100	2.339	Rsi Warmline PIR Ins-plasterboard
2							Airtight membrane
3	100	0.022	0.130	0.110	4.545	0.769	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
	<u>233 mm</u> (total roof thickness)					<u>7.084</u>	

Total resistance: Upper limit: 6.294 Lower limit: 5.491 Ratio: 1.146 Average: 5.892 m²K/W

U-value (uncorrected) 0.1697

U-value corrections

Air gaps in layer 1 $\Delta U = 0.0000$ (Level 0)

Fixings in layer 1 $\Delta U = 0.0007$ (4.00 per m², 7.5 mm² cross-section, $\lambda = 17.0$)

Total ΔU 0.0007

U-value (corrected) 0.170

U-Value (rounded) 0.17 W/m²K

Contact Your Local Insulation Provider

U Value Insulation

Unit 505B, Northwest Business Park,

Ballycoolin Dublin 15.

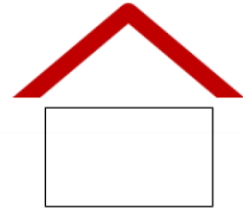
Phone (01) 861 2000

E Mail sales@uvalue.ie

<http://www.uvalue.ie>

Insulation Suggestions

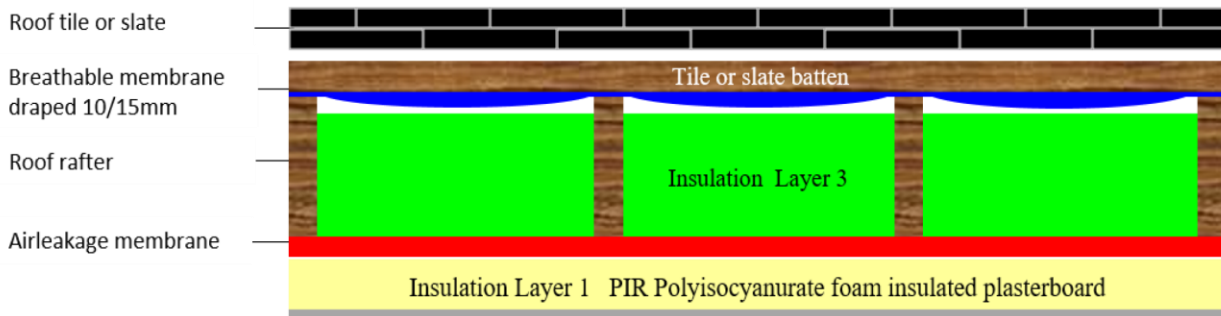
- **100mm** Quinnterm QR
- **100mm** Kingspan Therma Pitch TP 10
- **100mm** Ballytherm Pitch roof board
- **62.5mm** Warmline PIR Insulated plasterboard



Application: Rafter Insulation

- **100mm 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 0.17 W/m²K**



Layer	d (mm)	λ layer	λ bridge	Fraction	R layer	R bridge	Description
					0.100		Rsi
1	72.5	R-value			2.791		Warmline PIR Ins-plasterboard
2							Airtight membrane
3	100	0.022	0.130	0.110	4.545	0.769	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
					<u>0.100</u>		Rse
	<u>243 mm</u> (total roof thickness)				<u>7.536</u>		

Total resistance: Upper limit: 6.787 Lower limit: 5.943 Ratio: 1.142 Average: 6.365 m²K/W

U-value (uncorrected) 0.157

U-value corrections

Air gaps in layer 1 $\Delta U = 0.000$ (Level 0)

Fixings in layer 1 $\Delta U = 0.001$ (4.00 per m², 7.5 mm² cross-section, $\lambda = 17.0$)

Total ΔU 0.001

U-value (corrected) 0.158

U-Value (rounded) 0.16 W/m²K

Contact Your Local Insulation Provider

U Value Insulation

Unit 505B, Northwest Business Park,

Ballycoolin Dublin 15.

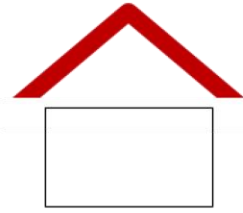
Phone (01) 861 2000

E Mail sales@uvalue.ie

<http://www.uvalue.ie>

Insulation Suggestions

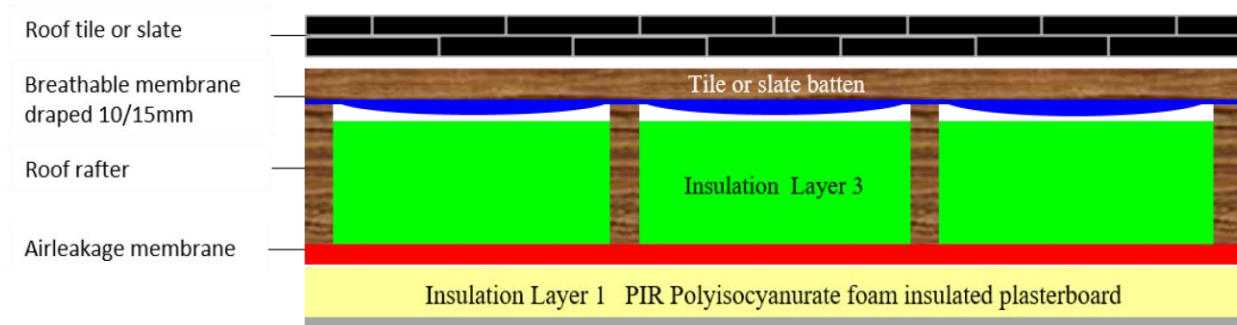
- **100mm** Quinnterm QR
- **100mm** Kingspan Therma Pitch TP 10
- **100mm** Ballytherm Pitch roof board
- **72.5mm** Warmline PIR Insulated plasterboard



Application: Rafter Insulation

- **100mm 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 0.15 W/m²K**



Layer	d (mm)	λ layer	λ bridge	Fraction	R layer	R bridge	Description
1	82.5	R-value			0.100	3.248	Rsi Warmline PIR Ins-plasterboard
2							Airtight membrane
3	100	0.022	0.130	0.110	4.545	0.769	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
	<u>253 mm</u> (total roof thickness)					<u>7.993</u>	

Total resistance: Upper limit: 7.277 Lower limit: 6.400 Ratio: 1.137 Average: 6.838 m²K/W

U-value (uncorrected) 0.146

U-value corrections

Air gaps in layer 1 $\Delta U = 0.000$ (Level 0)

Fixings in layer 1 $\Delta U = 0.001$ (4.00 per m², 7.5 mm² cross-section, $\lambda = 17.0$)

Total ΔU 0.001

U-value (corrected) 0.147

U-Value (rounded) 0.15 W/m²K

Contact Your Local Insulation Provider

U Value Insulation

Unit 505B, Northwest Business Park,
Ballycoolin Dublin 15.

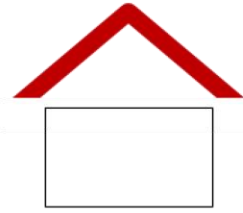
Phone (01) 861 2000

E Mail sales@uvalue.ie

<http://www.uvalue.ie>

Insulation Suggestions

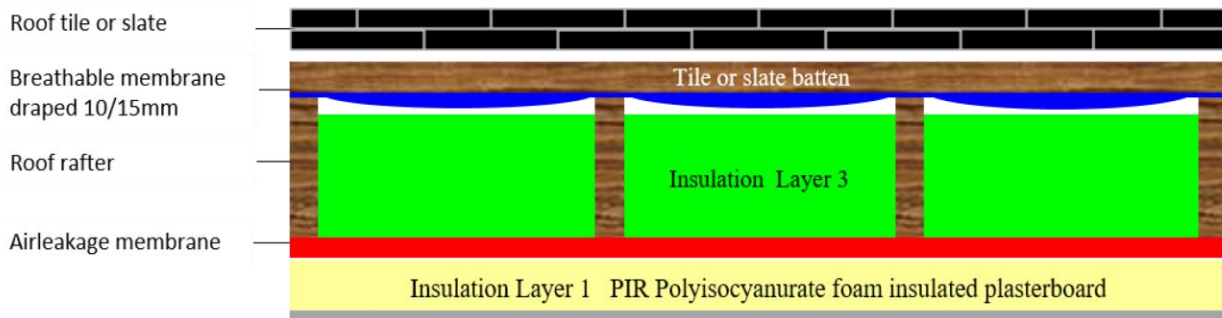
- **100mm** Quinnterm QR
- **100mm** Kingspan Therma Pitch TP 10
- **100mm** Ballytherm Pitch roof board
- **82.5mm** Warmline PIR Insulated plasterboard



Application: Rafter Insulation

- **100mm 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 0.14 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		Warmline PIR Ins-plasterboard
2							Airtight membrane
3	100	0.022	0.130	0.110	4.545	0.769	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
					<u>0.100</u>		Rse
	<u>263 mm</u> (total roof thickness)				<u>8.447</u>		

Total resistance: Upper limit: 7.758 Lower limit: 6.854 Ratio: 1.132 Average: 7.306 m²K/W

U-value (uncorrected) 0.137

U-value corrections

Air gaps in layer 1 $\Delta U = 0.000$ (Level 0)

Fixings in layer 1 $\Delta U = 0.001$ (4.00 per m², 7.5 mm² cross-section, $\lambda = 17.0$)

Total ΔU 0.001

U-value (corrected) 0.138

U-Value (rounded) 0.14 W/m²K

Contact Your Local Insulation Provider

U Value Insulation

Unit 505B, Northwest Business Park,
Ballycoolin Dublin 15.

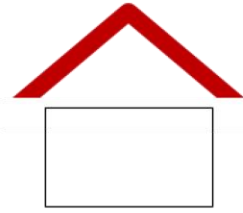
Phone (01) 861 2000

E Mail sales@uvalue.ie

<http://www.uvalue.ie>

Insulation Suggestions

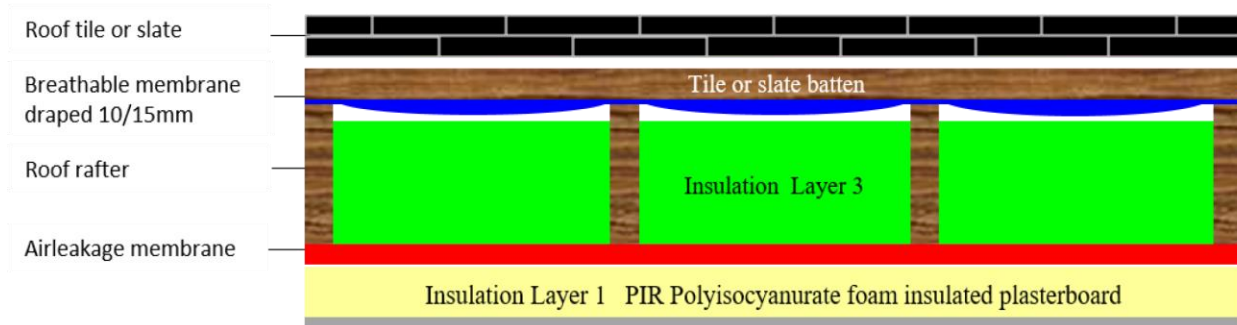
- **100mm** Quinnterm QR
- **100mm** Kingspan Therma Pitch TP 10
- **100mm** Ballytherm Pitch roof board
- **92.5mm** Warmline PIR Insulated plasterboard



Application: Rafter Insulation

- **100mm 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 0.13 W/m²K**



Layer	d (mm)	λ layer	λ bridge	Fraction	R layer	R bridge	Description
1	102.5	R-value			4.150		Warmline PIR Ins-plasterboard
2							Airtight membrane
3	100	0.022	0.130	0.110	4.545	0.769	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
	<u>273 mm</u> (total roof thickness)					<u>8.895</u>	

Total resistance: Upper limit: 8.228 Lower limit: 7.302 Ratio: 1.127 Average: 7.765 m²K/W

U-value (uncorrected) 0.129

U-value corrections

Air gaps in layer 1 $\Delta U = 0.000$ (Level 0)

Fixings in layer 1 $\Delta U = 0.001$ (4.00 per m², 7.5 mm² cross-section, $\lambda = 17.0$)

Total ΔU 0.001

U-value (corrected) 0.130

U-Value (rounded) 0.13 W/m²K

Contact Your Local Insulation Provider

U Value Insulation

Unit 505B, Northwest Business Park,
Ballycoolin Dublin 15.

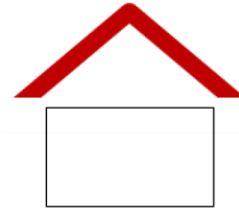
Phone (01) 861 2000

E Mail sales@uvalue.ie

<http://www.uvalue.ie>

Insulation Suggestions

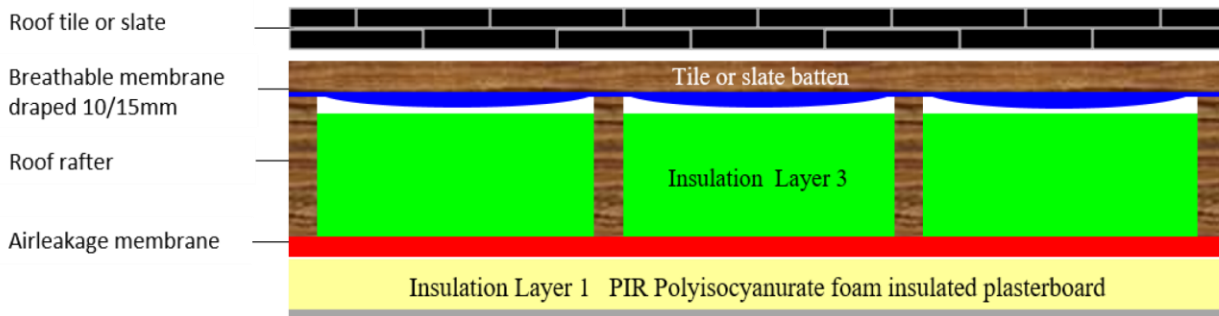
- **100mm** Quinnterm QR
- **100mm** Kingspan Therma Pitch TP 10
- **100mm** Ballytherm Pitch roof board
- **102.5mm** Warmline PIR Insulated plasterboard



Application: Rafter Insulation

- **100mm 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 0.12 W/m²K**



Layer	d (mm)	λ layer	λ bridge	Fraction	R layer	R bridge	Description
					0.100		Rsi
1	112.5	R-value			5.066		Warmline PIR Ins-plasterboard
2							Airtight membrane
3	100	0.022	0.130	0.110	4.545	0.769	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
	<u>283 mm</u> (total roof thickness)				<u>9.811</u>		

Total resistance: Upper limit: 9.180 Lower limit: 8.218 Ratio: 1.117 Average: 8.699 m²K/W

U-value (uncorrected) 0.115

U-value corrections

Air gaps in layer 1 $\Delta U = 0.000$ (Level 0)

Fixings in layer 1 $\Delta U = 0.001$ (4.00 per m², 7.5 mm² cross-section, $\lambda = 17.0$)

Total ΔU 0.001

U-value (corrected) 0.116

U-Value (rounded) 0.12 W/m²K

Contact Your Local Insulation Provider

U Value Insulation

Unit 505B, Northwest Business Park,

Ballycoolin Dublin 15.

Phone (01) 861 2000

E Mail sales@uvalue.ie

<http://www.uvalue.ie>

Insulation Suggestions

- **100mm** Quinnterm QR
- **100mm** Kingspan Therma Pitch TP 10
- **100mm** Ballytherm Pitch roof board
- **112.5mm** Warmline PIR Insulated plasterboard

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 is 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.

Insulation & Associated Building Materials Available from U Value Insulation

PIR Foil faced rigid insulation boards

- 100mm Quinnterm QR
- 100mm Kingspan Therma TP 10
- 100mm 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