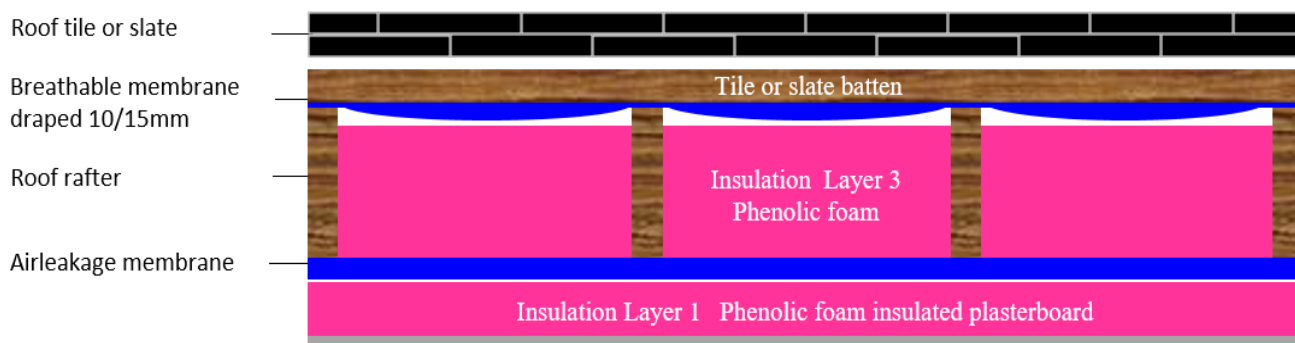


## Your One Stop Shop Insulation Provider

### Application: Rafter Insulation

- **100mm Kooltherm K7 Pitch roof boards** applied **Between** the roof rafters
- **Kooltherm K18 Insulated plasterboards** applied **Below** the roof rafters
- U Value Results **0.20, 0.19, 0.17, 0.16, 0.14, 0.13, 0.12 & 0.11 W/m<sup>2</sup>K**
- Calculation Reference: Rafter 100mm Kooltherm K7



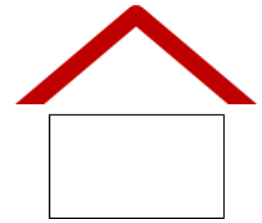
### Building Regulations ROI

The current back stop U Value for the roof rafters is **0.16 W/m<sup>2</sup>K**

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

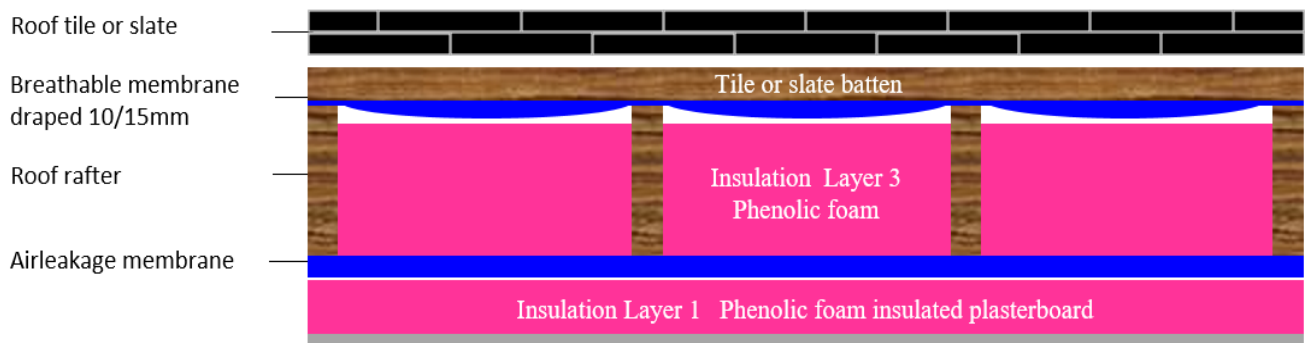
The insulation layer is simply the most important building material to consider when looking to achieve the best energy efficiency rating for your home. If the insulation layer is not fitted correctly it will fail. If the insulation fails, there will be no energy efficiency. The BER result does not take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



## Application: Rafter Insulation

- **100mm Kooltherm K7 Pitch roof boards** applied **Between** the roof rafters
- **37.5mm Kooltherm K18 Insulated plasterboards** applied **Below** the roof rafters

U-Value Calculation Method: I.S. EN ISO 6946 **U-Value Result 0.20 W/m<sup>2</sup>K**



Layer	d (mm)	$\lambda$ layer	$\lambda$ bridge	Fraction	R layer	R bridge	Description
					0.100		Rsi
<b>1</b>	<b>37.5</b>	<b>R-value</b>			<b>1.256</b>		<b>Kooltherm K18 Ins-Plasterboard</b>
2							Airtight membrane
<b>3</b>	<b>100</b>	<b>0.020</b>	<b>0.130</b>	<b>0.110</b>	<b>5.000</b>	<b>0.769</b>	<b>Kooltherm K7 Pitch Roof board</b>
4	25	R-value					Air layer ventilated
5							Breathable roofing membrane
6	35	R-value					Air layer ventilated
7	15						Roof tile or slate
					<u>0.100</u>		Rse
	<u>213 mm</u> (total roof thickness)				<u>6.456</u>		

Total resistance: Upper limit: 5.339 Lower limit: 4.571 Ratio: 1.168 Average: 4.955 m<sup>2</sup>K/W

U-value (uncorrected) 0.202

### U-value corrections

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

No fixings in layer 1

Total  $\Delta U$  0.000

U-value (corrected) 0.202

## U-Value (rounded) 0.20 W/m<sup>2</sup>K

### Contact Your Local Insulation Provider

U Value Insulation

Unit 505B, Northwest Business Park,

Ballycoolin Dublin 15.

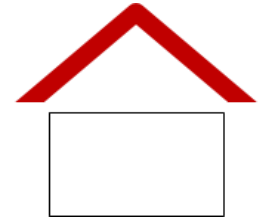
Phone (01) 861 2000

E Mail [sales@uvalue.ie](mailto:sales@uvalue.ie)

<http://www.uvalue.ie>

### Insulation Suggestions

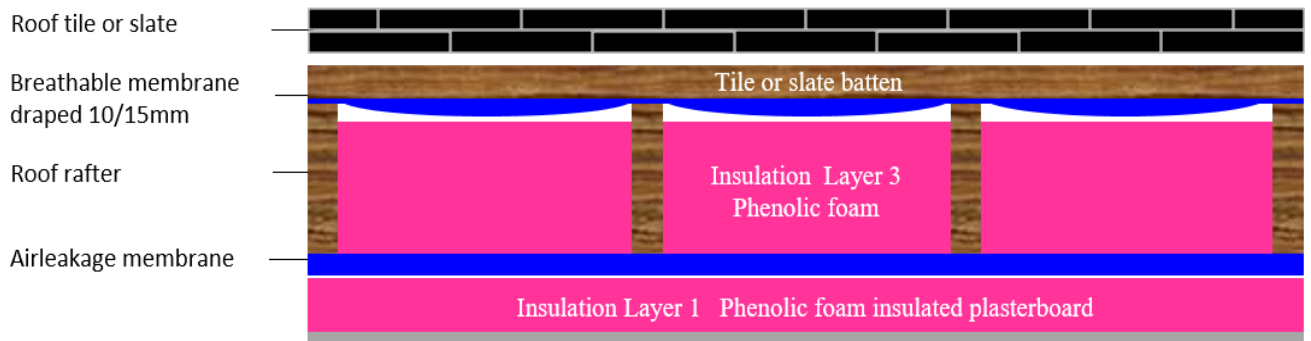
- **100mm** Kingspan K7 Pitch roof boards
- **37.5mm** Kingspan K18 Insulated plasterboard



## Application: Rafter Insulation

- **100mm Kooltherm K7 Pitch roof boards** applied **Between** the roof rafters
- **42.5mm Kooltherm K18 Insulated plasterboards** applied **Below** the roof rafters

U-Value Calculation Method: I.S. EN ISO 6946 **U-Value Result 0.19 W/m<sup>2</sup>K**



Layer	d (mm)	$\lambda$ layer	$\lambda$ bridge	Fraction	R layer	R bridge	Description
					0.100		Rsi
<b>1</b>	<b>42.5</b>	<b>R-value</b>			<b>1.495</b>		<b>Kooltherm K18 Ins-Plasterboard</b>
2							Airtight membrane
<b>3</b>	<b>100</b>	<b>0.020</b>	<b>0.130</b>	<b>0.110</b>	<b>5.000</b>	<b>0.769</b>	<b>Kooltherm K7 Pitch Roof board</b>
4	25	R-value					Air layer ventilated
5							Breathable roofing membrane
6	35	R-value					Air layer ventilated
7	15						Roof tile or slate
					<u>0.100</u>		Rse
	<u>218 mm</u> (total roof thickness)				<u>6.695</u>		

Total resistance: Upper limit: 5.631 Lower limit: 4.810 Ratio: 1.171 Average: 5.221 m<sup>2</sup>K/W

U-value (uncorrected) 0.192

### U-value corrections

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

No fixings in layer 1

Total  $\Delta U$  0.000

U-value (corrected) 0.192

## U-Value (rounded) 0.19 W/m<sup>2</sup>K

### Contact Your Local Insulation Provider

U Value Insulation

Unit 505B, Northwest Business Park,

Ballycoolin Dublin 15.

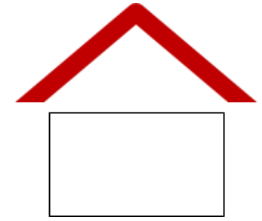
Phone (01) 861 2000

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<http://www.uvalue.ie>

### Insulation Suggestions

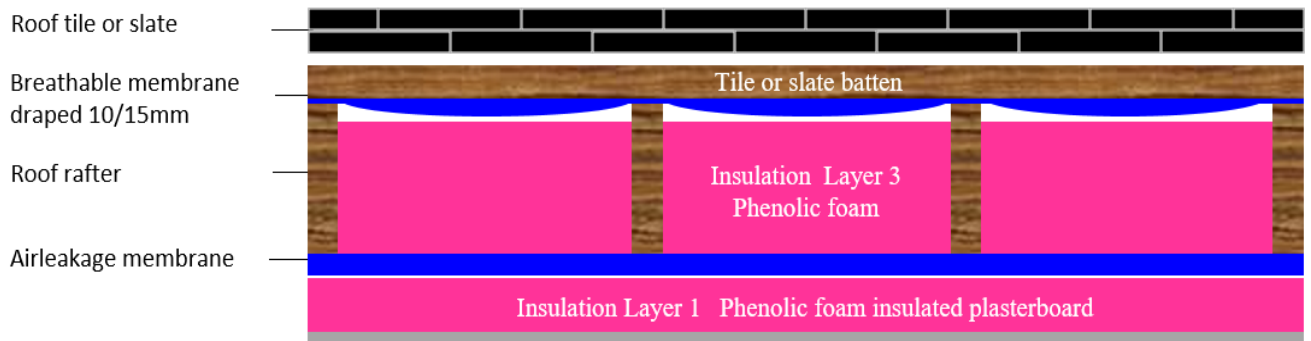
- **100mm** Kingspan K7 Pitch roof boards
- **42.5mm** Kingspan K18 Insulated plasterboard



## Application: Rafter Insulation

- **100mm Kooltherm K7 Pitch roof boards** applied **Between** the roof rafters
- **52.5mm Kooltherm K18 Insulated plasterboards** applied **Below** the roof rafters

U-Value Calculation Method: I.S. EN ISO 6946 **U-Value Result 0.17 W/m<sup>2</sup>K**



Layer	d (mm)	$\lambda$ layer	$\lambda$ bridge	Fraction	R layer	R bridge	Description
					0.100		Rsi
<b>1</b>	<b>52.5</b>	<b>R-value</b>			<b>1.971</b>		<b>Kooltherm K18 Ins-Plasterboard</b>
2							Airtight membrane
<b>3</b>	<b>100</b>	<b>0.020</b>	<b>0.130</b>	<b>0.110</b>	<b>5.000</b>	<b>0.769</b>	<b>Kooltherm K7 Pitch Roof board</b>
4	25	R-value					Air layer ventilated
5							Breathable roofing membrane
6	35	R-value					Air layer ventilated
7	15						Roof tile or slate
					<u>0.100</u>		Rse
	<u>228 mm</u> (total roof thickness)				<u>7.171</u>		

Total resistance: Upper limit: 6.191 Lower limit: 5.286 Ratio: 1.171 Average: 5.739 m<sup>2</sup>K/W

U-value (uncorrected) 0.174

### U-value corrections

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

No fixings in layer 1

Total  $\Delta U$  0.000

U-value (corrected) 0.174

## U-Value (rounded) 0.17 W/m<sup>2</sup>K

### Contact Your Local Insulation Provider

U Value Insulation

Unit 505B, Northwest Business Park,

Ballycoolin Dublin 15.

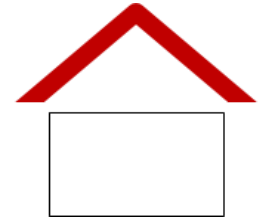
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<http://www.uvalue.ie>

### Insulation Suggestions

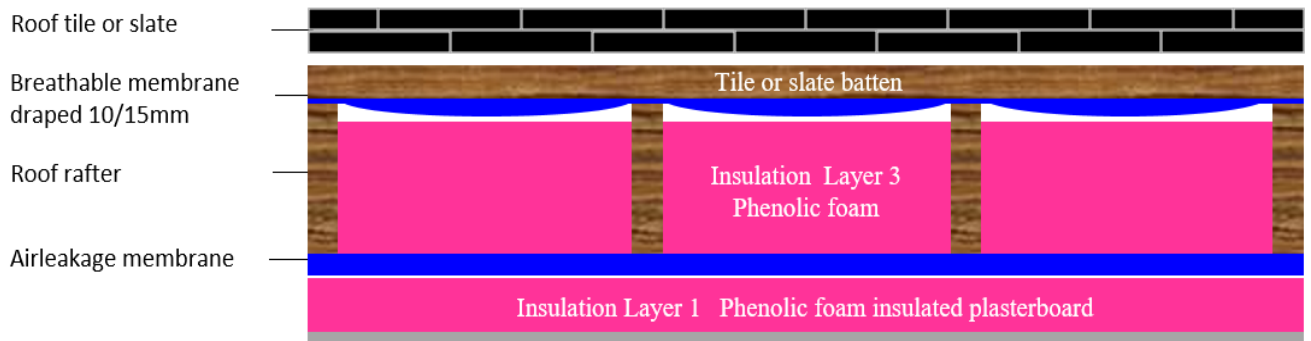
- **100mm** Kingspan K7 Pitch roof boards
- **52.5mm** Kingspan K18 Insulated plasterboard



## Application: Rafter Insulation

- **100mm Kooltherm K7 Pitch roof boards** applied **Between** the roof rafters
- **62.5mm Kooltherm K18 Insulated plasterboards** applied **Below** the roof rafters

U-Value Calculation Method: I.S. EN ISO 6946 **U-Value Result 0.16 W/m<sup>2</sup>K**



Layer	d (mm)	$\lambda$ layer	$\lambda$ bridge	Fraction	R layer	R bridge	Description
					0.100		Rsi
<b>1</b>	<b>62.5</b>	<b>R-value</b>			<b>2.566</b>		<b>Kooltherm K18 Ins-Plasterboard</b>
2							Airtight membrane
<b>3</b>	<b>100</b>	<b>0.020</b>	<b>0.130</b>	<b>0.110</b>	<b>5.000</b>	<b>0.769</b>	<b>Kooltherm K7 Pitch Roof board</b>
4	25	R-value					Air layer ventilated
5							Breathable roofing membrane
6	35	R-value					Air layer ventilated
7	15						Roof tile or slate
					<u>0.100</u>		Rse
	<u>238 mm</u> (total roof thickness)				<u>7.766</u>		

Total resistance: Upper limit: 6.863 Lower limit: 5.881 Ratio: 1.167 Average: 6.372 m<sup>2</sup>K/W

U-value (uncorrected) 0.157

### U-value corrections

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

No fixings in layer 1

Total  $\Delta U$  0.000

U-value (corrected) 0.157

## U-Value (rounded) 0.16 W/m<sup>2</sup>K

### Contact Your Local Insulation Provider

U Value Insulation

Unit 505B, Northwest Business Park,

Ballycoolin Dublin 15.

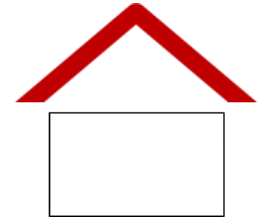
Phone (01) 861 2000

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<http://www.uvalue.ie>

### Insulation Suggestions

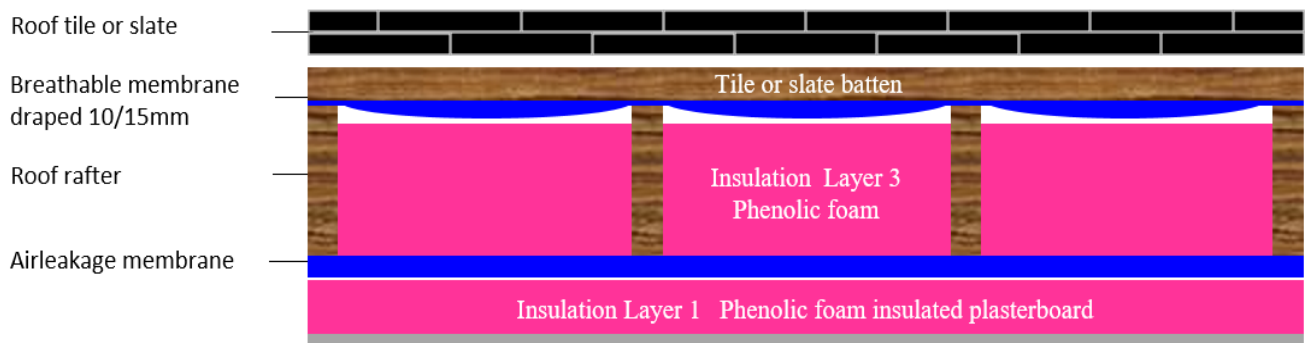
- **100mm** Kingspan K7 Pitch roof boards
- **62.5mm** Kingspan K18 Insulated plasterboard



## Application: Rafter Insulation

- **100mm Kooltherm K7 Pitch roof boards** applied **Between** the roof rafters
- **72.5mm Kooltherm K18 Insulated plasterboards** applied **Below** the roof rafters

U-Value Calculation Method: I.S. EN ISO 6946 **U-Value Result 0.14 W/m<sup>2</sup>K**



Layer	d (mm)	$\lambda$ layer	$\lambda$ bridge	Fraction	R layer	R bridge	Description
					0.100		Rsi
<b>1</b>	<b>72.5</b>	<b>R-value</b>			<b>3.066</b>		<b>Kooltherm K18 Ins-Plasterboard</b>
2							Airtight membrane
<b>3</b>	<b>100</b>	<b>0.020</b>	<b>0.130</b>	<b>0.110</b>	<b>5.000</b>	<b>0.769</b>	<b>Kooltherm K7 Pitch Roof board</b>
4	25	R-value					Air layer ventilated
5							Breathable roofing membrane
6	35	R-value					Air layer ventilated
7	15	1.000					Roof tile or slate
					<u>0.100 #</u>		Rse
	<u>248 mm</u> (total roof thickness)					<u>8.266</u>	

Total resistance: Upper limit: 7.411 Lower limit: 6.381 Ratio: 1.161 Average: 6.896 m<sup>2</sup>K/W

U-value (uncorrected) 0.145

### U-value corrections

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

No fixings in layer 1

Total  $\Delta U$  0.000

U-value (corrected) 0.145

## U-Value (rounded) 0.14 W/m<sup>2</sup>K

### Contact Your Local Insulation Provider

U Value Insulation

Unit 505B, Northwest Business Park,

Ballycoolin Dublin 15.

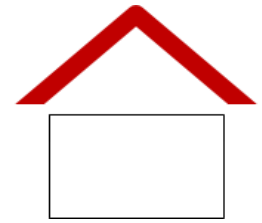
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### Insulation Suggestions

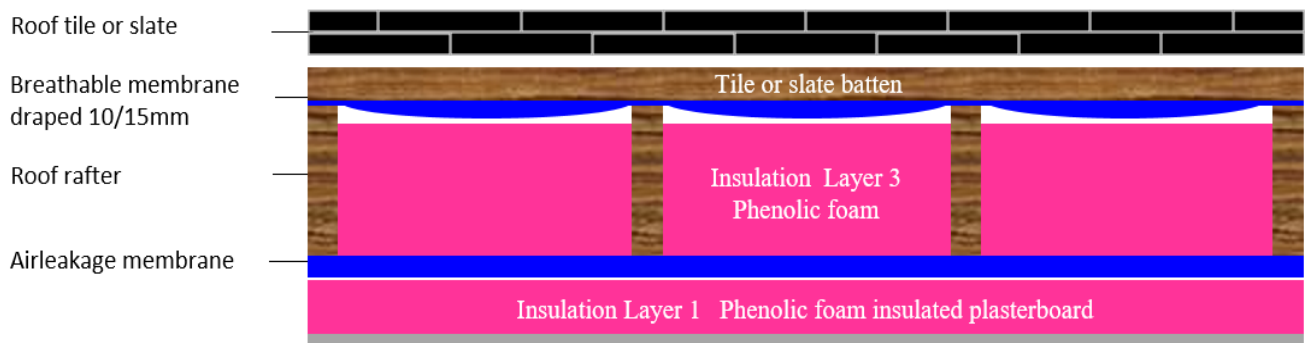
- **100mm** Kingspan K7 Pitch roof boards
- **72.5mm** Kingspan K18 Insulated plasterboard



## Application: Rafter Insulation

- **100mm Kooltherm K7 Pitch roof boards** applied **Between** the roof rafters
- **82.5mm Kooltherm K18 Insulated plasterboards** applied **Below** the roof rafters

U-Value Calculation Method: I.S. EN ISO 6946 **U-Value Result 0.13 W/m<sup>2</sup>K**



Layer	d (mm)	$\lambda$ layer	$\lambda$ bridge	Fraction	R layer	R bridge	Description
					0.100		Rsi
<b>1</b>	<b>82.5</b>	<b>R-value</b>			<b>3.566</b>		<b>Kooltherm K18 Ins-Plasterboard</b>
2							Airtight membrane
<b>3</b>	<b>100</b>	<b>0.020</b>	<b>0.130</b>	<b>0.110</b>	<b>5.000</b>	<b>0.769</b>	<b>Kooltherm K7 Rigid insulation</b>
4	25	R-value					Air layer ventilated
5							Breathable roofing membrane
6	35	R-value					Air layer ventilated
7	15						Roof tile or slate
					<u>0.100</u>		Rse
	<u>258 mm</u> (total roof thickness)				<u>8.766</u>		

Total resistance: Upper limit: 7.950 Lower limit: 6.881 Ratio: 1.155 Average: 7.416 m<sup>2</sup>K/W

U-value (uncorrected) 0.135

### U-value corrections

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

No fixings in layer 1

Total  $\Delta U$  0.000

U-value (corrected) 0.135 (0.1348)

## U-Value (rounded) 0.13 W/m<sup>2</sup>K

### Contact Your Local Insulation Provider

U Value Insulation

Unit 505B, Northwest Business Park,

Ballycoolin Dublin 15.

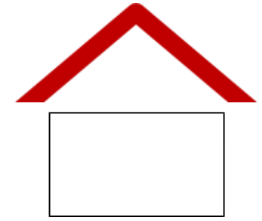
Phone (01) 861 2000

E Mail [sales@uvalue.ie](mailto:sales@uvalue.ie)

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### Insulation Suggestions

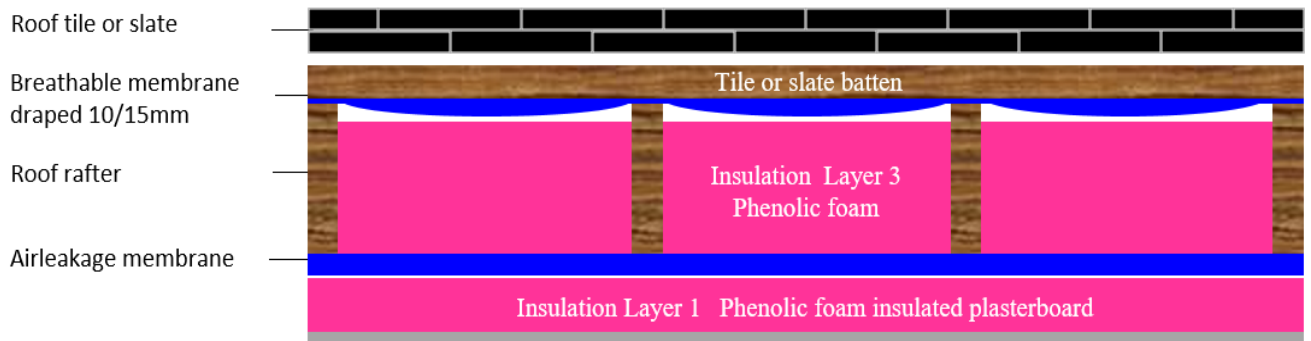
- **100mm** Kingspan K7 Pitch roof boards
- **82.5mm** Kingspan K18 Insulated plasterboard



## Application: Rafter Insulation

- **100mm Kooltherm K7 rigid insulation boards** applied **Between** the roof rafters
- **92.5mm Kooltherm K18 Insulated plasterboards** applied **Below** the roof rafters

U-Value Calculation Method: I.S. EN ISO 6946 **U-Value Result 0.13 W/m<sup>2</sup>K**



Layer	d (mm)	$\lambda$ layer	$\lambda$ bridge	Fraction	R layer	R bridge	Description
					0.100		Rsi
<b>1</b>	<b>92.5</b>	<b>R-value</b>			<b>4.066</b>		<b>Kooltherm K18 Ins-Plasterboard</b>
2							Airtight membrane
<b>3</b>	<b>100</b>	<b>0.020</b>	<b>0.130</b>	<b>0.110</b>	<b>5.000</b>	<b>0.769</b>	<b>Kooltherm K7 Pitch Roof board</b>
4	25	R-value					Air layer ventilated
5							Breathable roofing membrane
6	35	R-value					Air layer ventilated
7	15	1.000					Roof tile or slate
					<u>0.100 #</u>		Rse
	<u>268 mm</u> (total roof thickness)					<u>9.266</u>	

Total resistance: Upper limit: 8.482 Lower limit: 7.381 Ratio: 1.149 Average: 7.932 m<sup>2</sup>K/W

U-value (uncorrected) 0.126

### U-value corrections

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

No fixings in layer 1

Total  $\Delta U$  0.000

U-value (corrected) 0.126

## U-Value (rounded) 0.13 W/m<sup>2</sup>K

### Contact Your Local Insulation Provider

U Value Insulation

Unit 505B, Northwest Business Park,

Ballycoolin Dublin 15.

Phone (01) 861 2000

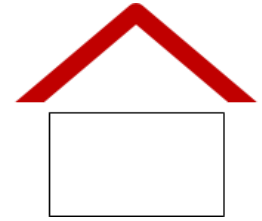
E Mail [sales@uvalue.ie](mailto:sales@uvalue.ie)

<http://www.uvalue.ie>

### Insulation Suggestions

- **100mm** Kingspan K7 Pitch roof boards
- **92.5mm** Kingspan K18 Insulated plasterboard

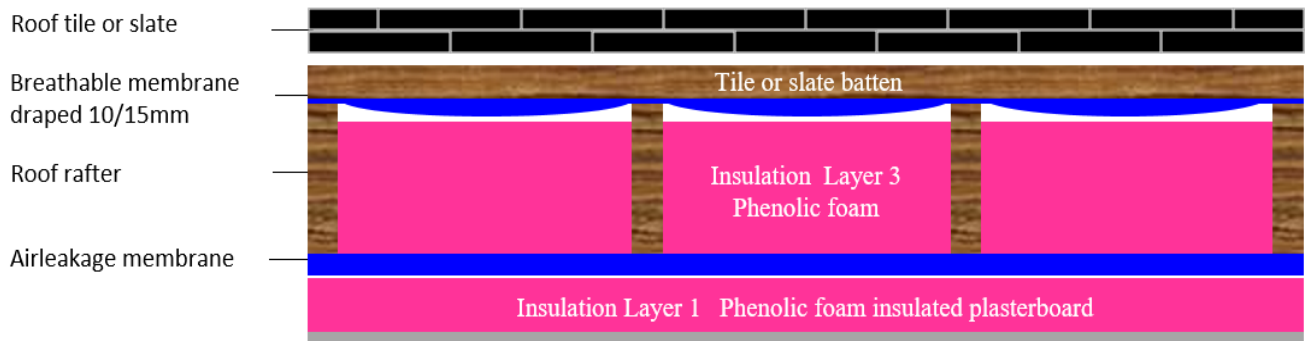




## Application: Rafter Insulation

- **100mm Kooltherm K7 Pitch roof boards** applied **Between** the roof rafters
- **102.5mm Kooltherm K18 Insulated plasterboards** applied **Below** the roof rafters

U-Value Calculation Method: I.S. EN ISO 6946 **U-Value Result 0.12 W/m<sup>2</sup>K**



Layer	d (mm)	$\lambda$ layer	$\lambda$ bridge	Fraction	R layer	R bridge	Description
					0.100		Rsi
<b>1</b>	<b>102.5</b>	<b>R-value</b>			<b>4.566</b>		<b>Kooltherm K18 Ins-Plasterboard</b>
2							Airtight membrane
<b>3</b>	<b>100</b>	<b>0.020</b>	<b>0.130</b>	<b>0.110</b>	<b>5.000</b>	<b>0.769</b>	<b>Kooltherm K7 Pitch Roof board</b>
4	25	R-value					Air layer ventilated
5							Breathable roofing membrane
6	35	R-value					Air layer ventilated
7	15						Roof tile or slate
					<u>0.100</u>		Rse
	<u>278 mm</u> (total roof thickness)				<u>9.766</u>		

Total resistance: Upper limit: 9.009 Lower limit: 7.881 Ratio: 1.143 Average: 8.445 m<sup>2</sup>K/W

U-value (uncorrected) 0.118

### U-value corrections

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

No fixings in layer 1

Total  $\Delta U$  0.000

U-value (corrected) 0.118

## U-Value (rounded) 0.12 W/m<sup>2</sup>K

### Contact Your Local Insulation Provider

U Value Insulation

Unit 505B, Northwest Business Park,

Ballycoolin Dublin 15.

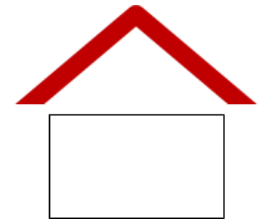
Phone (01) 861 2000

E Mail [sales@uvalue.ie](mailto:sales@uvalue.ie)

<http://www.uvalue.ie>

### Insulation Suggestions

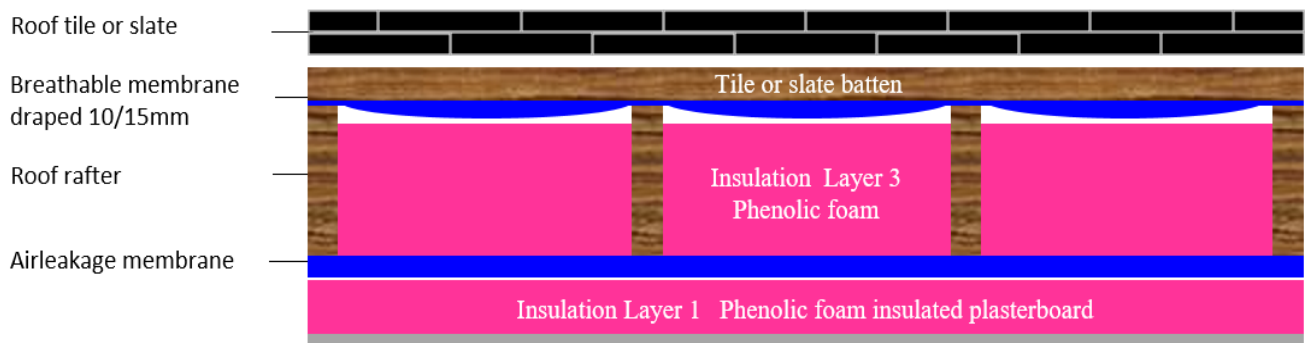
- **100mm** Kingspan K7 Pitch roof boards
- **102.5mm** Kingspan K18 Insulated plasterboard



## Application: Rafter Insulation

- **100mm Kooltherm K7 Pitch roof boards** applied **Between** the roof rafters
- **112.5mm Kooltherm K18 Insulated plasterboards** applied **Below** the roof rafters

U-Value Calculation Method: I.S. EN ISO 6946 **U-Value Result 0.11 W/m<sup>2</sup>K**



Layer	d (mm)	$\lambda$ layer	$\lambda$ bridge	Fraction	R layer	R bridge	Description
					0.100		Rsi
<b>1</b>	<b>112.5</b>	<b>R-value</b>			<b>5.066</b>		<b>Kooltherm K18 Ins-Plasterboard</b>
2							Airtight membrane
<b>3</b>	<b>100</b>	<b>0.020</b>	<b>0.130</b>	<b>0.110</b>	<b>5.000</b>	<b>0.769</b>	<b>Kooltherm K7 Pitch Roof board</b>
4	25	R-value					Air layer ventilated
5							Breathable roofing membrane
6	35	R-value					Air layer ventilated
7	15	1.000					Roof tile or slate
					<u>0.100 #</u>		Rse
	<u>288 mm</u> (total roof thickness)				<u>10.266</u>		

Total resistance: Upper limit: 9.531 Lower limit: 8.381 Ratio: 1.137 Average: 8.956 m<sup>2</sup>K/W

U-value (uncorrected) 0.112

### U-value corrections

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

No fixings in layer 1

Total  $\Delta U$  0.000

U-value (corrected) 0.112

## U-Value (rounded) 0.11 W/m<sup>2</sup>K

### 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](mailto:sales@uvalue.ie)

<http://www.uvalue.ie>

### Insulation Suggestions

- **100mm** Kingspan K7 Pitch roof boards
- **112.5mm** Kingspan K18 Insulated plasterboard

# Simple Insulation Solutions - Rafter Insulation

- **100mm Kingspan K7 Pitch roof boards** applied **Between** the roof rafters
- **Kingspan K18 Insulated plasterboards** applied **Below** the roof Rafters

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

### Note:

When applying foil faced rigid insulation boards a 25mm airspace space between the top side of the insulation layer and the breathable membrane is recommended by most 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**

### **Phenolic Foam, foil faced rigid insulation boards**

- 100mm Kingspan Kooltherm K7 Pitch roof boards

### **PIR Insulated plasterboards**

- 37.5mm Kingspan Kooltherm K18 Insulated plasterboard
- 42.5mm Kingspan Kooltherm K18 Insulated plasterboard
- 52.5mm Kingspan Kooltherm K18 Insulated plasterboard
- 62.5mm Kingspan Kooltherm K18 Insulated plasterboard
- 72.5mm Kingspan Kooltherm K18 Insulated plasterboard
- 82.5mm Kingspan Kooltherm K18 Insulated plasterboard
- 92.5mm Kingspan Kooltherm K18 Insulated plasterboard
- 102.5mm Kingspan Kooltherm K18 Insulated plasterboard
- 112.5mm Kingspan Kooltherm K18 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

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