



## Between and Under Rafter Applications

Pitched Roof Insulation

**Celotex**  
Insulation Specialists

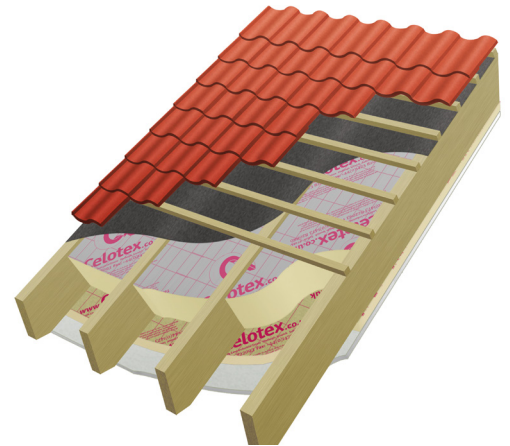
### Introduction

Celotex is the brand leading manufacturer of PIR insulation boards, with its range encompassing the thinnest and thickest boards available to the construction industry today. All of the Company's products are manufactured at its plant in Suffolk, from where the dedicated Celotex Technical Centre offers advice and calculations for compliance with current regulations and legislation.

Celotex: We know insulation inside and out.

Use a combination of **Celotex FR5000** with **Celotex GD5000** or **GS5000** premium performance plasterboard thermal laminate in pitched roof between and under rafter applications to minimise insulation thickness and give the following benefits:

- Provides both the below rafter insulation and plasterboard in one product helping reduce installation time
- Offers the installer maximum flexibility and installation speed due to the tapered edge plasterboard
- Ideal for use with shallow rafters
- Provides reliable long term energy savings for buildings
- Minimised additional loading to the structure
- Dimensionally stable
- Ideal for loft conversions / room in roof applications
- Upgrade existing ceilings to current standards



Celotex FR5000 & GD5000/GS5000

### Celotex FR5000 Technical Data

Product Code	Thickness (mm)	R-value (m <sup>2</sup> K/W)	Weight (kg/m <sup>2</sup> )
FR5025	25	1.15	1.01
FR5040	40	1.90	1.49
FR5050	50	2.35	1.81
FR5060	60	2.85	2.16
FR5070	70	3.30	2.48
FR5075	75	3.55	2.64
FR5080	80	3.80	2.80
FR5090	90	4.25	3.12
FR5100	100	4.75	3.38
FR5120	120	5.70	4.02
FR5150	150	7.10	4.98

### Sustainable Insulation

Celotex PIR insulation has been independently assessed by BRE Global and has been accredited with an A+ rating when compared to the BRE Green Guide.

The results also show that Celotex offers a lower environmental impact than other typical PIR manufacturers.

For further information about Celotex' sustainable insulation solutions, visit the sustainability pages of the website at [celotex.co.uk](http://celotex.co.uk)



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### Celotex GD5000 Technical Data

Product Code	Thickness (mm)	R-value (m <sup>2</sup> K/W)	Weight (kg/m <sup>2</sup> )
GD5025	25 + 9.5	1.20	7.02
GD5040	40 + 9.5	1.95	7.50
GD5050	50 + 9.5	2.40	7.82
GD5060	60 + 9.5	2.90	8.17

9.5mm tapered edge plasterboard is laminated to the specified insulation thickness

### Celotex GS5000 Technical Data

Product Code	Thickness (mm)	R-value (m <sup>2</sup> K/W)	Weight (kg/m <sup>2</sup> )
GS5025	25 + 9.5	1.20	7.20
GS5040	40 + 9.5	1.95	7.68
GS5050	50 + 9.5	2.40	8.00
GS5060	60 + 9.5	2.90	8.35

9.5mm tapered edge plasterboard is laminated to the specified insulation thickness

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### Example U-value Calculation: Unventilated Between and Under Rafters

Construction		100 deep rafters Thickness (mm)	125 deep rafters Thickness (mm)	150 deep rafters Thickness (mm)	175 deep rafters Thickness (mm)
Outside surface resistance		-	-	-	-
Tiling including batten space		-	-	-	-
Breather membrane		-	-	-	-
IQ emissivity cavity, between rafters (11.7% brg)		20	25	30	25
Celotex between rafters @ 400 ctrs (11.7% brg)		FR5080	FR5100	FR5120	FR5150
<b>Variable layer</b> (for below rafters)		See below	See below	See below	See below
Inside surface resistance		-	-	-	-
Celotex Product - Variable layer	Thickness (mm)	U-value (W/m <sup>2</sup> K)	U-value (W/m <sup>2</sup> K)	U-value (W/m <sup>2</sup> K)	U-value (W/m <sup>2</sup> K)
Celotex GD/GS5000	25 + 9.5	-	0.19	0.17	0.15
Celotex GD/GS5000	40 + 9.5	0.19	0.17	0.15	0.13
Celotex GD/GS5000	50 + 9.5	0.17	0.15	0.14	0.12
Celotex GD/GS5000	60 + 9.5	0.16	0.14	0.13	0.12

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## Between and Under Rafter Applications

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### Example U-value Calculation: Ventilated Between and Under Rafters

Construction	125 deep rafters Thickness (mm)	150 deep rafters Thickness (mm)	175 deep rafters Thickness (mm)	
Outside surface resistance	-	-	-	
Tiling including batten space	-	-	-	
Sarking felt	-	-	-	
Ventilated cavity	50	50	55	
Celotex between rafters @ 400 ctrs (11.7% brg)	FR5075	FR5100	FR5120	
<b>Variable layer</b> (for below rafters)	See below	See below	See below	
Inside surface resistance	-	-	-	
Celotex Product - Variable layer	Thickness (mm)	U-value (W/m <sup>2</sup> K)	U-value (W/m <sup>2</sup> K)	U-value (W/m <sup>2</sup> K)
Celotex GD/GS5000	25 + 9.5	-	-	0.19
Celotex GD/GS5000	40 + 9.5	-	0.18	0.16
Celotex GD/GS5000	50 + 9.5	0.19	0.17	0.15
Celotex GD/GS5000	60 + 9.5	0.18	0.15	0.14

### Installation Guidelines

Celotex insulation boards should not be installed when the temperature is at or below 4°C and falling.

#### Unventilated

- Install the breather membrane over the rafters. Fix battens to the side of the rafters to allow the membrane to sag between the rafters. Alternatively, fix counter battens over the membrane, leaving the entire rafter depth to be filled with insulation. All details are to be in accordance with the membrane manufacturer's recommendations.

#### Ventilated

- Make sure there is enough rafter depth to accommodate not only the thickness of the Celotex insulation but also a 50mm ventilated airspace above the boards.
- Fix battens to the inside face of the rafter so that the bottom of the batten is 50mm below the sarking felt.

#### Ventilated and Unventilated

- Measure the space to be filled between the inside face of the rafter prior to cutting the board.
- Use the [Celotex Insulation Saw](#) to cut the boards at a slight angle, making the board width slightly oversized on one surface to achieve a 'friction fit'.
- Push the boards into the void between the rafters until they are tight up to the battens or the membrane, ensuring that lateral joints are closely butted. Secure Celotex GD5000/GS5000 to the underside of the rafters with suitable mechanical fixings. Fixing details should be in accordance with the fixing manufacturer's instructions.
- Joints between boards must be tightly butted, taped and jointed using appropriate tape and jointing material to create the vapour control layer.

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### Certifications and Accreditations

Celotex products FR5000 and GD5000/GS5000 are covered by BBA Agreement Certificate No 95/3197 & 12/4926. To download a copy of this certificate, visit the 'literature' pages of the website at [celotex.co.uk](http://celotex.co.uk)

### Further Information

If you wish to contact Celotex, please visit [celotex.co.uk](http://celotex.co.uk) and click on the 'contact us' page.

For information regarding [storage, installation and handling](#) of Celotex products, or for [Health and Safety](#) advice, please refer to the 'literature' pages of the website at [celotex.co.uk](http://celotex.co.uk)

Celotex has a policy of continuous product development and reserves the right to alter product designs or specifications without prior notice.

**Celotex Limited**  
Lady Lane Industrial Estate,  
Hadleigh, Ipswich  
Suffolk IP7 6BA

**T: 01473 820850**

**W: [celotex.co.uk](http://celotex.co.uk)**