



Between and Under Rafter Applications

Pitched Roof Insulation

Celotex
Insulation Specialists

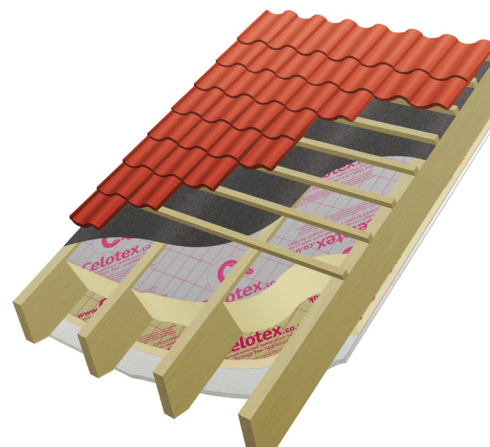
Introduction

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 GA4000** or **Celotex XR4000** with **Celotex PL4000** high 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 GA4000 & PL4000

Celotex GA4000 Technical Data

Product Code	Thickness (mm)	R-value (m ² K/W)	Weight (kg/m ²)
GA4050	50	2.25	1.55
GA4055	55	2.50	1.74
GA4060	60	2.70	1.90
GA4065	65	2.95	2.05
GA4070	70	3.15	2.19
GA4075	75	3.40	2.34
GA4080	80	3.60	2.48
GA4085	85	3.85	2.62
GA4090	90	4.05	2.76
GA4100	100	4.50	3.27

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



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Celotex XR4000 Technical Data

Product Code	Thickness (mm)	R-value (m ² K/W)	Weight (kg/m ²)
XR4110	110	5.00	3.58
XR4120	120	5.45	3.88
XR4130	130	5.90	4.19
XR4140	140	6.35	4.49
XR4150	150	6.80	4.79
XR4165	165	7.50	5.43
XR4200	200	9.05	6.53

Celotex PL4000 Technical Data

Product Code	Thickness (mm)	R-value (m ² K/W)	Weight (kg/m ²)
PL4015	15 + 9.5	0.70	6.62
PL4025	25 + 12.5	1.20	9.06
PL4040	40 + 12.5	1.85	9.52
PL4045	45 + 12.5	2.10	9.67
PL4050	50 + 12.5	2.30	9.83
PL4055	55 + 12.5	2.55	10.01
PL4060	60 + 12.5	2.75	10.15
PL4065	65 + 12.5	3.00	10.30

12.5mm tapered edge plasterboard is laminated to the specified insulation thickness
9.5mm tapered edge plasterboard is laminated to PL4015



For premium performance including Class O fire performance Celotex FR5000 is suitable for this application.

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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		-	-	-	-
Low emissivity cavity, between rafters (11.7% brg)		20	25	30	25
Celotex TB4000 between rafters @ 400 ctrs (11.7% brg)		GA4080	GA4100	XR4120	XR4150
Variable layer (for below rafters)		See below	See below	See below	See below
Inside surface resistance		-	-	-	-
Celotex Product - Variable layer	Thickness (mm)	U-value (W/m ² K)	U-value (W/m ² K)	U-value (W/m ² K)	U-value (W/m ² K)
Celotex PL4000	15 + 9.5	-	-	0.19	0.17
Celotex PL4000	25 + 12.5	-	0.20	0.17	0.15
Celotex PL4000	40 + 12.5	0.19	0.17	0.15	0.13
Celotex PL4000	45 + 12.5	0.18	0.16	0.15	0.13
Celotex PL4000	50 + 12.5	0.18	0.16	0.14	0.13
Celotex PL4000	55 + 12.5	0.17	0.15	0.14	0.12
Celotex PL4000	60 + 12.5	0.16	0.15	0.13	0.12
Celotex PL4000	65 + 12.5	0.16	0.14	0.13	0.12

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Example U-value Calculation: Ventilated 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	-	-	-	-
Sarking felt	-	-	-	-
Ventilated cavity	50	50	50	55
Celotex between rafters @ 400 ctrs (11.7% brg)	GA4050	GA4075	GA4100	XR4120
Variable layer (for below rafters)	See below	See below	See below	See below
Inside surface resistance	-	-	-	-
Celotex Product - Variable layer	Thickness (mm)	U-value (W/m ² K)	U-value (W/m ² K)	U-value (W/m ² K)
Celotex PL4000	25 + 12.5	-	-	0.19
Celotex PL4000	40 + 12.5	-	-	0.17
Celotex PL4000	45 + 12.5	-	-	0.16
Celotex PL4000	50 + 12.5	-	0.20	0.15
Celotex PL4000	55 + 12.5	-	0.19	0.15
Celotex PL4000	60 + 12.5	-	0.18	0.14
Celotex PL4000	65 + 12.5	0.20	0.17	0.14

GA=GA4000 XR=XR4000

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 PL4000 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 TB4000, GA4000, FR5000 and XR4000 are covered by BBA Agreement Certificate No 95/3197. To download a copy of this certificate, visit the 'literature' pages of the website at celotex.co.uk

Further Information

If you wish to contact Celotex, please visit 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

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