

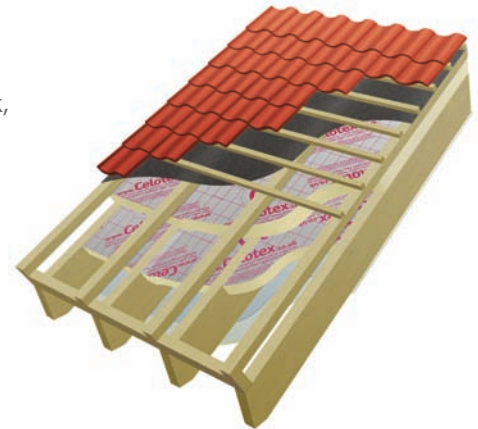
Between and over rafter applications

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 **Celotex TB4000**, **Celotex GA4000** and **XR4000** high performance thermal insulation in pitched roof between and over rafter applications to minimise insulation thickness and give the following benefits:

- Ideal for use where headroom is limited
- Provides reliable long term energy savings for buildings
- Creates a warm, habitable roof space
- No need to insulate water pipes and tanks
- Suitable for new build and major refurbishment projects
- Minimised additional loading to the structure



Celotex TB4000 & GA4000

Celotex TB4000 Technical Data

Product Code	Thickness (mm)	R-value (m ² K/W)	Weight (kg/m ²)
TB4012	12	0.50	0.50
TB4020	20	0.90	0.72
TB4025	25	1.10	0.85
TB4030	30	1.35	0.98
TB4035	35	1.55	1.11
TB4040	40	1.80	1.26
TB4045	45	2.00	1.40

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	1.68
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
GA4095	95	4.30	2.90
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 2008.

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



For premium performance including Class O fire performance Celotex FR4000 is suitable for this application.

Example U-value Calculation: between and over rafters

Construction	Thickness (mm)	
Outside surface resistance	-	
Tiling including batten space	-	
Counter batten	38	
Breather membrane	-	
Variable layer	See below	
Celotex TB4000 between rafters @ 400 ctrs (11.7% brg)	40	
Cavity (low emissivity) rafter space	110	
Polythene 1000 gauge, VCL	-	
Plasterboard	12.5	
Inside surface resistance	-	
Celotex Product - Variable layer	Thickness (mm)	U-value (W/m²K)
Celotex GA4000, over rafter	65	0.20
Celotex GA4000, over rafter	70	0.19
Celotex GA4000, over rafter	75	0.18
Celotex GA4000, over rafter	80	0.17
Celotex GA4000, over rafter	85	0.17
Celotex GA4000, over rafter	90	0.16
Celotex GA4000, over rafter	95	0.15
Celotex GA4000, over rafter	100	0.15
Celotex XR4000, over rafter	110	0.14
Celotex XR4000, over rafter	120	0.14
Celotex XR4000, over rafter	130	0.13
Celotex XR4000, over rafter	140	0.12
Celotex XR4000, over rafter	150	0.12
Celotex XR4000, over rafter	165	0.11
Celotex XR4000, over rafter	200	0.09

U-value
For U-values see **variable layer list**, or for more options, refer to our online U-value calculator at celotex.co.uk

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Installation Guidelines

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

Insulation over the rafters

- Note that specific fixing requirements should be determined for each roof, taking into account roof design and location.
- Fix a treated timber stop batten equal in thickness to the Celotex insulation across the rafters at the eaves. Butt boards directly against this batten.
- Install Celotex insulation boards with the long sides parallel to the rafter lines with both edges supported by rafters.
- Cut the boards using the **Celotex Insulation Saw** to rake and splay at ridge and verges to ensure close butted joints.
- Use large headed nails to temporarily fix board in place, until permanently secured by counter battens.
- Install a breather membrane over the insulation.
- Position a preservative-treated timber counter batten (minimum 38mm x 50mm) over the breather membrane and insulation on the line of each rafter. Nail the lower end of each counter batten directly into the stop batten.
- Calculate the length of the suitable fixings required by adding together the counter batten depth, the insulation thickness and depth of penetration required to the rafter (usually minimum 38mm).
- Fix at maximum 400mm centres along the counter batten. Pre-drill pilot holes in the counter battens to ensure ease of nailing and to reduce the possible splitting of the timber.
- Fix the tile battens to the counter battens at an appropriate gauge to suit the slates or tiles selected.

Insulation between the rafters

- For optimum thermal performance the unprinted foil surface should face the rafter air cavity.
- Accurately measure the width to be filled between the inside face of the rafters, prior to cutting the board.
- Use the **Celotex Insulation Saw** to cut the Celotex board at a slight angle, making the board width slightly oversized on one surface to achieve a 'friction fit'.
- Push the board into the void between the rafters until it is tight against the underside of the first layer of insulation.
- To hold the boards in place, use battens along the side of the rafters.
- Tightly fit the insulation to the ridge plate and carry over and tightly butt the wall plate at eaves.
- A vapour control layer (VCL) should be installed to the underside of the rafters. A polythene sheet of higher vapour resistance is recommended for high humidity areas such as kitchens or bathrooms.
- Finish with plasterboard or other suitable sheet material, fixed to the rafters.
- NB: This solution is not suitable for exposed rafters. Where exposed rafters are required, please refer to pitched roof sarking application.

Certifications and Accreditations

Celotex products TB4000, GA4000 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.

*Calls to the Celotex Technical Centre are charged at 30p per minute from a BT landline and lines are open Monday - Friday from 8.00am - 5.15pm. Details and pricing are correct at date of publication - January 2011.

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