



# Single-ply Membrane Using Celotex TA4000

Flat Roof Insulation

**Celotex**  
 Insulation Specialists

## Introduction

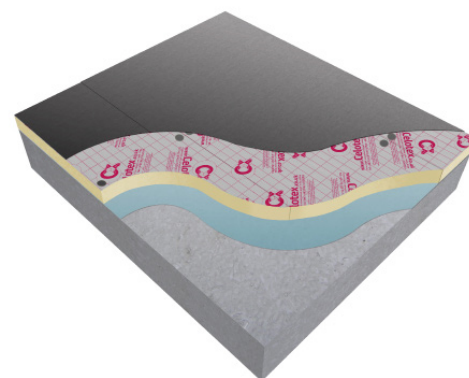
Celotex is the brand leading manufacturer of PIR insulation boards, with its range encompassing the thinnest and thickest boards available to the construction industry today. All of the Company's products are manufactured at its plant in Suffolk, from where the dedicated Celotex Technical Centre offers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

Celotex: We know insulation inside and out.

Use **Celotex TA4000** high performance insulation in mechanically fixed, single-ply flat roofing systems where the higher compressive strength of the board gives improved resistance to site traffic during installation.

When designing a flat roof using Celotex TA4000 boards, three basic principles apply:

1. Design to a fall of 1:80, 1:60 or 1:40 as appropriate to the weathering system, type of deck and construction tolerances.
2. Have due regard for the use and design of the building and the need to ensure that the design will not allow a build up of moisture below the waterproofing membrane.
3. Provide adequate protection for both insulation and waterproofing if significant foot traffic is expected either during or after the completion of the roof.



Celotex TA4000 over concrete deck

## Celotex TA4000 Technical Data

Product Code	Thickness (mm)	R-value (m <sup>2</sup> K/W)	Weight (kg/m <sup>2</sup> )
TA4050	50	2.25	1.98
TA4070	70	3.15	2.68
TA4085	85	3.85	3.21
TA4090	90	4.05	3.38
TA4100	100	4.50	3.73
TA4110*	110	5.00	4.08
TA4115	115	5.20	4.26
TA4120	120	5.45	4.43
TA4125	125	5.65	4.61
TA4130*	130	5.90	4.78
TA4135	135	6.10	4.96
TA4140*	140	6.35	5.13

\*Not available from stock. Minimum order quantity of 600m<sup>2</sup> and extended lead time applies

## 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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## Example U-value Calculation: TA4000 - Single-ply Membrane

Construction		Concrete Deck		Steel Deck		Timber Deck	
		MF	TB	MF	TB	MF	TB
Outside surface resistance		-	-	-	-	-	-
Single-ply membrane		1.5	1.5	1.5	1.5	1.5	1.5
Variable layer		See below	See below	See below	See below	See below	See below
Polythene 1000 gauge, VCL		-	-	-	-	-	-
Concrete deck		250	250	n/a	n/a	n/a	n/a
Steel deck		n/a	n/a	1.5	1.5	n/a	n/a
Timber deck plywood		n/a	n/a	n/a	n/a	19	19
Cavity between joist @ 11.7% bridging		n/a	n/a	n/a	n/a	150	150
Plasterboard		n/a	n/a	n/a	n/a	12.5	12.5
Inside surface resistance		-	-	-	-	-	-
Variable layer Celotex Product	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)	U-value (W/m <sup>2</sup> K)	U-value (W/m <sup>2</sup> K)
Celotex TA4000	85	-	0.24	-	0.25	0.24	0.23
Celotex TA4000	90	0.24	0.23	0.25	0.24	0.23	0.22
Celotex TA4000	100	0.22	0.21	0.23	0.21	0.21	0.20
Celotex TA4000	110	0.20	0.19	0.21	0.19	0.19	0.18
Celotex TA4000	115	0.19	0.18	0.20	0.19	0.18	0.17
Celotex TA4000	120	0.19	0.17	0.19	0.18	0.18	0.17
Celotex TA4000	125	0.18	0.17	0.18	0.17	0.17	0.16
Celotex TA4000	130	0.17	0.16	0.18	0.17	0.17	0.16
Celotex TA4000	135	0.17	0.16	0.17	0.16	0.16	0.15
Celotex TA4000	140	0.16	0.15	0.16	0.15	0.15	0.14

MF = Mechanically fixed  
TB = Thermally broken

## Installation Guidelines

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

### Laying pattern

It is recommended that Celotex TA4000 boards are laid with joints break-bonded. When used on metal decks, the Celotex TA4000 boards should be laid with the long sides at right angles to the corrugations.

### Single-ply systems

Different types of weathering systems require different installation instructions and guidelines. Advice on the installation of these weathering systems should be sought from the manufacturer or provider of the weathering system type.

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## Mechanical fastening

The boards should be laid with all joints tightly butted over the VCL and then mechanically secured through to the deck. When used on metal decks, these roof boards should be laid with the long edges at right angles to the corrugations. When mechanical fasteners are utilised, they should be selected to suit the type of deck used. Celotex recommends the use of thermally broken fixings. Fixings should have a minimum 50mm head or plate washer diameter. Fixings should be installed between 50mm – 150mm from the edges and corners of the board.

The exact number of fixings required for each zone on a flat roof must be calculated by the use of either BS6399: Part 2: 1997 Code of Practice for Wind Loads, or EN1991-1-4 used with the UK National Annex. A minimum of 6 fixings per board must be used. Where more than 6 fixings per board are required by the wind uplift calculation, the higher figure must be adopted.

Further guidance on fixings and patterns can be sought from fixing manufacturers and in the BRUFMA information document on mechanical fixings for rigid PIR roofboards.

## Trafficking

Celotex TA4000 boards are capable of withstanding the trafficking associated with normal roof laying work. However, flat roofs are generally only designed for occasional lightweight foot traffic for maintenance access. Where more frequent or heavier access is required, protected walkways should be provided. Under no circumstances should the roof be used as a working platform, either during or after the construction programme. Extra care should be taken to protect the insulation and weathering when ballasting.

## Loose-laid roof boards under ballasted systems

When the ballasting system is not installed immediately following the application of loose-laid roof boards, additional attachment is required. Please refer to BRUFMA Information Document "Securing PIR & PUR Roof Boards beneath Single-Ply Waterproofing Membranes" for further information.

## Vapour control layer (VCL)

The VCL should be minimum 1000 gauge polythene or reinforced aluminium foil. This should be fully sealed at all laps, prior to applying the insulation, using self-adhesive tape appropriate to the type of VCL used.

At perimeters and abutments the VCL should be turned up around the insulation board edges and a flap of approximately 300mm should be sealed and taped to the top face of the board. The VCL should be loose laid immediately prior to the installation of the roof insulation board.

## Upstands

Where an insulated upstand is needed, Celotex TB4000, GA4000 and XR4000 are suitable to meet this requirement.

## Supporting deck

The supporting deck must provide adequate support for the VCL and insulation board with joints being supported by the ridges of the deck. The deck must be structurally sound, dry, clean and where necessary, primed before application of the weathering and insulating system.

## 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.

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