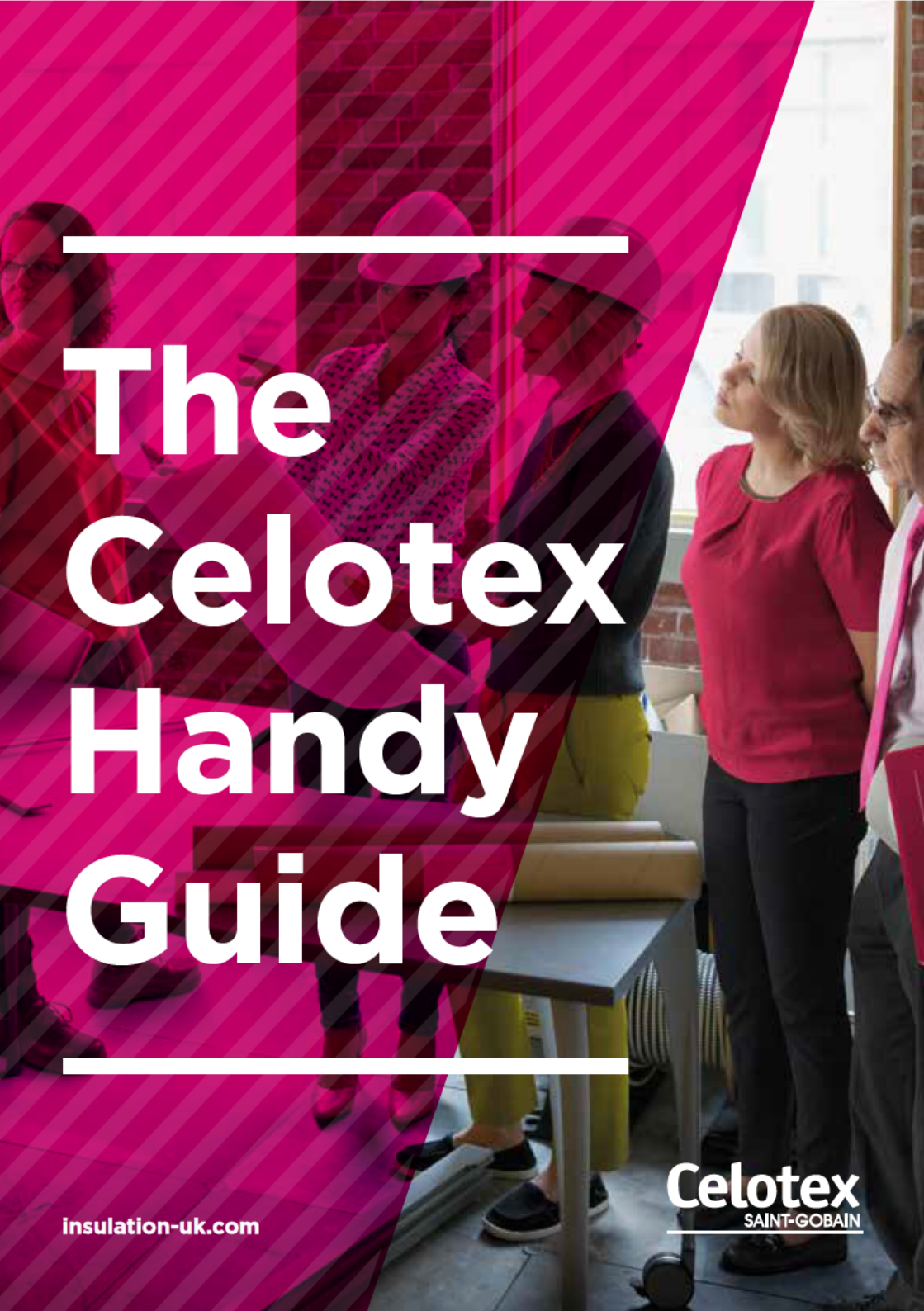
The Celotex Handy Guide



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Celotex
SAINT-GOBAIN


Calotex

Contents

Product descriptions

Celotex TB4000

Celotex TB4000 is an easy to install polyisocyanurate (PIR) insulation board with excellent thermal performance, featuring a low emissivity foil facing.

Available in thicknesses from 20mm to 40mm, it can be considered for floor, wall and roof applications.

Lambda
0.022 W/m.K
Board size
1200 x 2400mm
BBA certificates
17/5405 and 16/5352

Product code	Thickness (mm)	R Value (m^2.K/W)
TB4020	20	0.90
TB4025	25	1.10
TB4030	30	1.35
TB4040	40	1.80

Celotex GA4000

Celotex GA4000 is an easy to install polyisocyanurate (PIR) insulation board with excellent thermal performance, featuring a low emissivity foil facing.

Available in thicknesses from 50mm to 100mm, it can be considered for roof, wall and floor applications.

Lambda
0.022 W/m.K
Board size
1200 x 2400mm
BBA certificates
17/5405 and 16/5352

Product code	Thickness (mm)	R Value (m^2.K/W)
GA4050	50	2.25
GA4060	60	2.70
GA4070	70	3.15
GA4075	75	3.40
GA4080	80	3.60
GA4090	90	4.05
GA4100	100	4.50

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- **BBA certificates** (insulation-uk.com/BBA)
- **Declarations of Performance** (insulation-uk.com/ce-marking)
- **Health & safety datasheets** (insulation-uk.com/healthandsafety)
- **Product Datasheets** (insulation-uk.com/technical-services/resources/brochures-datasheets)

Celotex products should not be used in the external walls of buildings over 18 metres in height (England and Wales) or 11 metres in height (Scotland). Recent changes to Building Regulations mean that only non-combustible insulation or insulation of limited combustibility can be used in buildings of that height.

Product descriptions

Celotex XR4000

Celotex XR4000 is an easy to install polyisocyanurate (PIR) insulation board with excellent thermal performance, featuring a low emissivity foil facing.

Available in thicknesses from 110mm to 200mm, it can be considered for roof, wall and floor applications.

Lambda
0.022 W/m.K
Board size
1200 x 2400mm
BBA certificates
17/5405 and 16/5352

Product code	Thickness (mm)	R Value (m^2.K/W)
XR4110	110	5.00
XR4120	120	5.45
XR4130	130	5.90
XR4140	140	6.35
XR4150	150	6.80
XR4165	165	7.50
XR4200	200	9.05

Celotex PL4000

Celotex PL4000 is an easy to install polyisocyanurate (PIR) insulation board with a paper facing, laminated to a piece of 12.5mm tapered edge plasterboard.

Available in thicknesses from 25mm to 65mm (insulation only), it can be considered for use in roof and internal wall lining applications.

Lambda
0.022 W/m.K
Board size
1200 x 2400mm
BBA certificates
16/5357

Product code *	Thickness (mm)	R Value (m^2.K/W)
PL4025	25 + 12.5	1.20
PL4040	40 + 12.5	1.85
PL4050	50 + 12.5	2.30
PL4060	60 + 12.5	2.75
PL4065	65 + 12.5	3.00

* Product code excludes 12.5mm plasterboard laminate

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Product descriptions

Celotex CW4000

Celotex CW4000 is an easy to install polyisocyanurate (PIR) insulation board with excellent thermal performance, featuring a low emissivity foil facing.

Available in thicknesses from 40mm to 100mm, it can be considered for use in partial fill cavity wall applications.

Lambda
0.022 W/m.K
Board size
1200 x 450mm
BBA certificates
16/5343

Product code	Thickness (mm)	R Value (m^2.K/W)
CW4040	40	1.80
CW4050	50	2.25
CW4060	60	2.70
CW4075	75	3.40
CW4085	85	3.85
CW4100	100	4.50

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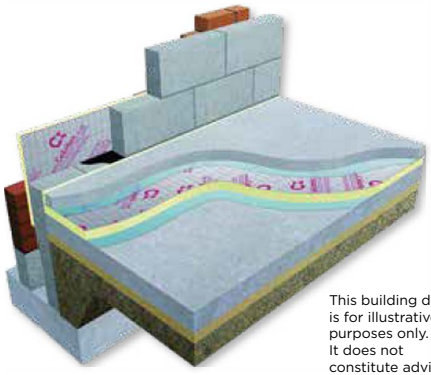
Floors

...by Celotex

Concrete slab floors

Celotex GA4000 and Celotex XR4000 high thermal performance insulation can be considered in concrete slab floor applications to minimise insulation thickness and give the following benefits:

- Excellent thermal performance to minimise depth of floor build-up.
- Can provide long term energy savings for buildings
- Square edges to help deliver insulation continuity
- Easy to cut boards to fit in most spaces
- Easy to install to quickly insulate large areas



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Indicative U-value (W/m².K) calculation: ground floor – concrete slab

	Perimeter / area ratio									
Celotex product	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**	**1.0**
XR4200	0.07	0.08	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10
XR4165	0.07	0.09	0.10	0.11	0.11	0.11	0.11	0.11	0.12	0.12
XR4150	0.08	0.10	0.11	0.11	0.12	0.12	0.12	0.12	0.13	0.13
XR4140	0.08	0.10	0.11	0.12	0.12	0.13	0.13	0.13	0.13	0.13
XR4130	0.08	0.11	0.12	0.13	0.13	0.14	0.14	0.14	0.14	0.14
XR4120	0.09	0.11	0.13	0.13	0.14	0.14	0.15	0.15	0.15	0.15
XR4110	0.09	0.12	0.13	0.14	0.15	0.15	0.16	0.16	0.16	0.16
GA4100	0.10	0.13	0.14	0.15	0.16	0.17	0.17	0.17	0.18	0.18
GA4090	0.10	0.14	0.15	0.16	0.17	0.18	0.18	0.19	0.19	0.19
GA4080	0.11	0.14	0.16	0.18	0.19	0.20	0.20	0.21	0.21	0.21
GA4075	0.11	0.15	0.17	0.19	0.20	0.20	0.21	0.22	0.22	0.22
GA4070	0.11	0.16	0.18	0.19	0.21	0.21	0.22	0.23	0.23	0.24
GA4060	0.12	0.17	0.20	0.21	0.23	0.24	0.25	0.25	-	-
GA4050	0.13	0.18	0.22	0.24	0.25	-	-	-	-	-

Based on 65mm screed and 20mm insulation as perimeter upstand

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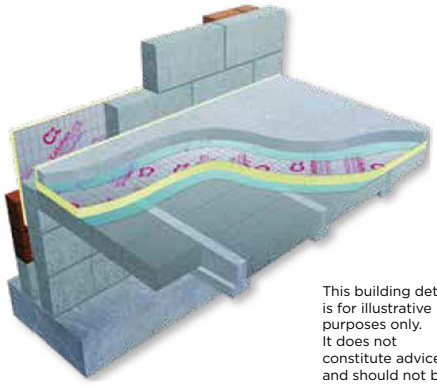
Beam and block floors

Celotex GA4000 and Celotex XR4000 high thermal performance insulation can be considered in beam and block floor applications to minimise insulation thickness and give the following benefits:

- Excellent thermal performance to minimise depth of floor build-up.
- Can provide long term energy savings for buildings
- Square edges to help deliver insulation continuity
- Easy to cut boards to fit in most spaces
- Easy to install to quickly insulate large areas



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Indicative U-value (W/m².K) calculation: ground floor – beam and block

	Perimeter / area ratio									
Celotex product	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**	**1.0**
XR4200	0.08	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.10
XR4165	0.09	0.10	0.11	0.11	0.11	0.11	0.11	0.11	0.12	0.12
XR4150	00.9	0.11	0.11	0.12	0.12	0.12	0.12	0.12	0.13	0.13
XR4140	0.10	0.11	0.12	0.12	0.13	0.13	0.13	0.13	0.13	0.13
XR4130	0.10	0.12	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.14
XR4120	0.10	0.12	0.13	0.14	0.14	0.15	0.15	0.15	0.15	0.15
XR4110	0.11	0.13	0.14	0.15	0.15	0.16	0.16	0.16	0.16	0.16
GA4100	0.11	0.14	0.15	0.16	0.16	0.17	0.17	0.17	0.18	0.18
GA4090	0.12	0.15	0.16	0.17	0.18	0.18	0.19	0.19	0.19	0.19
GA4080	0.13	0.16	0.18	0.19	0.19	0.20	0.20	0.21	0.21	0.21
GA4075	0.13	0.17	0.18	0.20	0.20	0.21	0.21	0.22	0.22	0.22
GA4070	0.14	0.17	0.19	0.20	0.21	0.22	0.22	0.23	0.23	0.23
GA4060	0.15	0.19	0.21	0.23	0.24	0.24	0.25	0.25	-	-
GA4050	0.16	0.21	0.23	0.25	-	-	-	-	-	-

Based on 65mm screed and 20mm insulation as perimeter upstand

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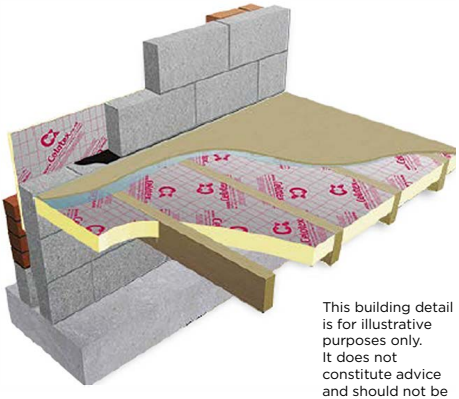
Suspended timber floors

Celotex GA4000 and Celotex XR4000 high thermal performance insulation can be considered for suspended timber floor applications to minimise insulation thickness and give the following benefits:

- Quick and easy to install insulation between joists in one layer
- Minimise air leakage by friction fitting the insulation
- Can provide long term energy savings for buildings
- Minimal load added to structure due to lightweight boards



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Indicative U-value (W/m².K) calculation: ground floor – suspended timber

	Perimeter / area ratio									
Celotex product	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**	**1.0**
XR4200	0.10	0.12	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.14
XR4165	0.11	0.13	0.14	0.15	0.15	0.16	0.16	0.16	0.16	0.17
XR4150	0.12	0.14	0.15	0.16	0.17	0.17	0.17	0.17	0.18	0.18
XR4140	0.12	0.15	0.16	0.17	0.17	0.18	0.18	0.18	0.19	0.19
XR4130	0.12	0.15	0.17	0.18	0.18	0.19	0.19	0.19	0.20	0.20
XR4120	0.13	0.16	0.18	0.19	0.19	0.20	0.20	0.21	0.21	0.21
XR4110	0.13	0.17	0.19	0.20	0.21	0.21	0.22	0.22	0.22	0.22
GA4100	0.14	0.18	0.20	0.21	0.22	0.23	0.23	0.23	0.24	0.24
GA4090	0.14	0.19	0.21	0.22	0.23	0.24	0.25	0.25	-	-
GA4080	0.15	0.20	0.22	0.24	0.25	-	-	-	-	-
GA4075	0.15	0.20	0.23	0.25	-	-	-	-	-	-
GA4070	0.16	0.21	0.24	-	-	-	-	-	-	-
GA4060	0.17	0.22	-	-	-	-	-	-	-	-
GA4050	0.17	0.24	-	-	-	-	-	-	-	-

Based on timber joists @ 400 ctrs

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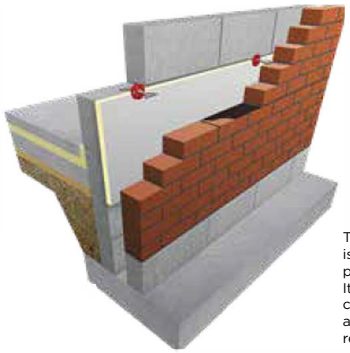
Walls

...by Celotex

Masonry partial fill cavity walls

Celotex CW4000 high thermal performance insulation can be considered in partial fill cavity wall applications to minimise insulation thickness and give the following benefits:

- Easy to install using retaining clips on wall ties
- Can provide long term energy savings for buildings
- Low emissivity foil facers give improved thermal insulation performance within sealed cavity air spaces
- Boards sized to fit standard wall tie spacing for ease of installation



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Indicative U-value (W/m².K) calculation: partial fill cavity wall with Celotex CW4000

Construction	103mm brick / Cavity / Celotex CW4000 / 100mm block (below) / plasterboard on dabs			
	Blocktype (lambda)			
Product thickness (mm)	Dense (1.13 W/m.K)	Medium dense (0.59 W/m.K)	Lightweight concrete (0.25 W/m.K)	Aircrete (0.15 W/m.K)
CW4040	0.33	0.32	0.30	0.28
CW4050	0.28	0.28	0.26	0.25
CW4060	0.25	0.25	0.24	0.23
CW4075	0.22	0.21	0.20	0.20
CW4085	0.20	0.19	0.19	0.18
CW4100	0.17	0.17	0.17	0.16

Construction	Rendered dense block / Cavity / Celotex CW4000 / 100mm block (below) / plasterboard on dabs			
	Blocktype (lambda)			
Product thickness (mm)	Dense (1.13 W/m.K)	Medium dense (0.59 W/m.K)	Lightweight concrete (0.25 W/m.K)	Aircrete (0.15 W/m.K)
CW4040	0.33	0.32	0.30	0.28
CW4050	0.29	0.28	0.27	0.25
CW4060	0.25	0.25	0.24	0.23
CW4075	0.22	0.21	0.20	0.20
CW4085	0.20	0.19	0.19	0.18
CW4100	0.17	0.17	0.17	0.16

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Celotex rigid PIR insulation should not be used in the external walls of buildings over 18 metres in height (England and Wales) or 11 metres in height (Scotland). Recent changes to Building Regulations mean that only non-combustible insulation or insulation of limited combustibility can be used in buildings of that height.

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Masonry cavity partial fill walls with plasterboard laminate

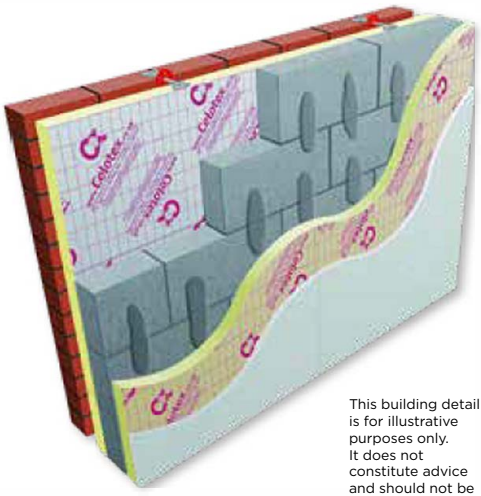
Celotex offers an alternative solution which can be considered for partial fill cavity wall applications enabling traditional sized cavity wall widths to be maintained.

Celotex CW4000 provides the partial fill cavity wall solution utilising the product's low lambda value of 0.022 W/m.K along with low emissivity aluminium foil facers which provide enhanced thermal performance within a sealed cavity air space.

As a secondary insulation measure, Celotex plasterboard thermal laminate PL4000 can be installed on the warm side of the inner leaf, providing additional thermal performance and plasterboard as one product.

This combined solution minimises insulation thickness and offers the following benefits:

- Allows for the traditional cavity space of 100mm to be maintained without changing construction methods and risking the loss of plot space
- Provides an alternative solution for meeting the improved U-values required for Part L
- CW4000 includes low emissivity foil facers giving improved thermal insulation within sealed cavity air spaces
- PL4000 provides insulation and plasterboard as one product helping reduce installation time and offering maximum flexibility to the installer
- PL4000 is suitable for both direct bonding (dot and dab) and mechanical fixing installations
- Can provide long term energy savings for buildings



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Indicative U-value (W/m².K) calculation: partial fill cavity wall with internal layer of Celotex PL4000

Construction 103mm brick or 100mm block / Cavity / 50mm Celotex CW4000 / 103mm brick or 100mm block / Celotex PL4000

All U-values shown below assume 50mm CW4000 as the partial fill cavity wall solution with a brick outer leaf (lambda 0.77 W/m.K) and a 3mm plaster skim. Installing alternative thicknesses of CW4000 within the cavity wall will have an impact on achieved U-value. This solution is also possible using Celotex PL4000 mechanically fixed using battens. For further information and U-values, please visit our online U-value calculator or contact the Technical Support Team

Block lambda (W/m.K)		Dot and Dab			Mechanically fixed direct to wall		
		1.13	0.59	0.15	1.13	0.59	0.15
Variable layer	Thickness (mm)	U-value (W/m²K)	U-value (W/m²K)	U-value (W/m²K)	U-value (W/m²K)	U-value (W/m²K)	U-value (W/m²K)
Celotex PL4000	65 + 12.5	0.15	0.15	0.14	0.16	0.16	0.15
Celotex PL4000	60 + 12.5	0.16	0.16	0.15	0.16	0.16	0.15
Celotex PL4000	50 + 12.5	0.17	0.17	0.16	0.18	0.17	0.16
Celotex PL4000	40 + 12.5	0.19	0.18	0.17	0.19	0.19	0.17
Celotex PL4000	25 + 12.5	0.21	0.21	0.19	0.22	0.22	0.20

Thickness includes PIR insulation board plus 12.5mm plasterboard laminate

Note: Celotex PL4000 boards should be tightly butted, taped and jointed to create the vapour control layer (VCL)

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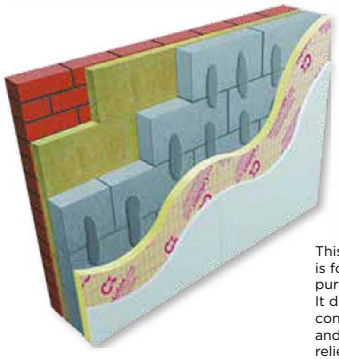
Top up cavity walls

Celotex PL4000 high thermal performance insulation can be considered in partial fill cavity wall applications to minimise insulation thickness and give the following benefits:

- Suitable for multiple installation techniques
- Provides a vapour control layer when board joints are taped and jointed
- Can provide long term energy savings for buildings
- Tapered edge plasterboard offers the installer maximum installation flexibility and speed



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Indicative U-value (W/m².K) calculation: top up cavity walls using plasterboard thermal laminate

Construction		50mm clear cavity	50mm cavity filled with mineral wool
Outside surface resistance		–	–
Brickwork		-	-
Cavity		-	-
Blockwork dense		100	100
Plaster dabs cavity		15	15
Variable layer		See below	See below
Board joints sealed to form VCL		–	–
Plaster skim		–	–
Variable layer	**Thickness (mm)**	**U-value (W/m²K)**	**U-value (W/m²K)**
Celotex PL4000	65 + 12.5	0.27	0.21
Celotex PL4000	60 + 12.5	0.29	0.22
Celotex PL4000	50 + 12.5	0.33	0.24
Celotex PL4000	40 + 12.5	–	0.27
Celotex PL4000	25 + 12.5	–	0.34

Thickness includes PIR insulation board plus 12.5mm plasterboard laminate

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Celotex rigid PIR insulation should not be used in the external walls of buildings over 18 metres in height (England and Wales) or 11 metres in height (Scotland). Recent changes to Building Regulations mean that only non-combustible insulation or insulation of limited combustibility can be used in buildings of that height.

Please refer to the following product documents:

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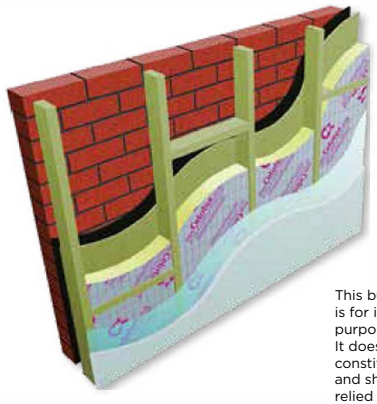
- **Product Datasheets** (insulation-uk.com/technical-services/resources/brochures-datasheets)

Timber frame wall lining

Celotex GA4000 and Celotex XR4000 high thermal performance insulation can be considered in timber frame wall lining applications to minimise insulation thickness and give the following benefits:

- Can provide long term energy savings for buildings
- Low emissivity foil facers give improved thermal insulation within sealed cavity air spaces
- Provides cavity for services



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Indicative U-value (W/m².K) calculation: timber frame wall lining

Construction	Thickness (mm)	
Outside surface resistance	-	
Brick	103	
Cavity	50	
Plywood	9	
Variable layer between stud	See below	
Cavity (low emissivity) between studs (15% brg)	5.0/10.0/15.0/20.0/25.0	
Polythene 1000 gauge, VCL	-	
Plasterboard	12.5	
Inside surface resistance	-	
Variable layer	**Thickness (mm)**	**U-value (W/m²K)**
Celotex XR4000 between 175 stud (15% brg)	150	0.20
Celotex XR4000 between 150 stud (15% brg)	140	0.22
Celotex XR4000 between 150 stud (15% brg)	130	0.22
Celotex GA4000 between 125 stud (15% brg)	100	0.26

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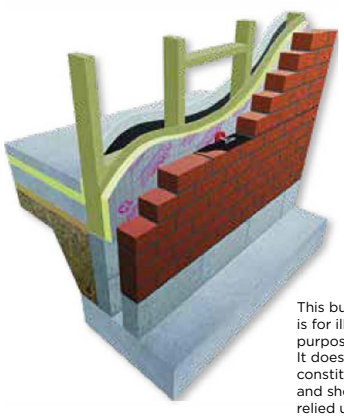
Timber frame wall sheathing

Celotex GA4000 and Celotex XR4000 high thermal performance insulation can be considered in timber frame wall sheathing applications to minimise insulation thickness and give the following benefits:

- Eliminates thermal bridging of timber
- Can provide long term energy savings for buildings
- Low emissivity foil facers give improved thermal insulation performance within sealed cavity air spaces
- Sheathing encapsulates the timber frame
- No threat of interstitial condensation
- Voids between studs free for services



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Indicative U-value (W/m².K) calculation: timber frame wall sheathing

Construction	Thickness (mm)	
Outside surface resistance	–	
Brick	103	
Cavity (low emissivity)	50	
Variable layer	See below	
Plywood	9	
Cavity between studs	89	
Polythene 1000 gauge, VCL	–	
Plasterboard	12.5	
Inside surface resistance	–	
Variable layer	**Thickness (mm)**	**U-value (W/m²K)**
Celotex GA4000	100	0.18
Celotex GA4000	90	0.19
Celotex GA4000	80	0.21
Celotex GA4000	70	0.22
Celotex GA4000	60	0.25
Celotex GA4000	50	0.28

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Single timber frame wall lining and dormer cheeks

Celotex offers two solutions which can be considered for single timber frame wall lining applications. The first using GA4000 or Celotex XR4000 between the studs, followed by an internal lining of Celotex PL4000 over the studs. This solution provides the thinnest build-up with better thermal insulation. The Celotex PL4000 provides the over stud insulation and plasterboard in one product; helping reduce the installation time. The second option is to use glass mineral wool insulation fitted between the studs, followed by an internal lining of Celotex PL4000 over the studs. This solution gives a thicker build-up but offers improved acoustic insulation.

weatherboarding

Rendered

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Indicative U-value (W/m².K) calculation: single timber frame wall lining

Construction		Weather-boarding Thickness (mm)	Tile hung Thickness (mm)	Rendered Thickness (mm)	Lead clad Thickness (mm)
Outside surface resistance		–	–	–	–
Weatherboard – Tiles – Rendered – Code 4 lead		any	any	20	1.8
Ventilated cavity batten air space		25	n/a	25	25
Breather membrane		–	–	–	–
Plywood		12	12	12	12†
Celotex between 100mm studs @ 400 ctrs (15% brg)		GA4060	GA4060	GA4060	GA4060
Low E cavity between studs @ 400 ctrs (15% brg)		40	40	40	40
Variable layer (for over studs)		See below	See below	See below	See below
Board joints sealed for VCL		–	–	–	–
Plaster skim		–	–	–	–
Inside surface resistance		–	–	–	–
Variable layer	**Thickness (mm)**	**U-value (W/m²K)**	**U-value (W/m²K)**	**U-value (W/m²K)**	**U-value (W/m²K)**
Celotex PL4000	65 + 12.5	0.17	0.17	0.17	0.17
Celotex PL4000	60 + 12.5	0.18	0.18	0.18	0.18
Celotex PL4000	50 + 12.5	0.19	0.19	0.19	0.20
Celotex PL4000	40 + 12.5	0.21	0.21	0.21	0.22
Celotex PL4000	25 + 12.5	0.25	0.25	0.25	0.26

Thickness includes PIR insulation board plus 12.5mm plasterboard laminate

Low E = Low emmissivity

When using lead clad, the plywood layer is moved to outside the ventilated batten airspace

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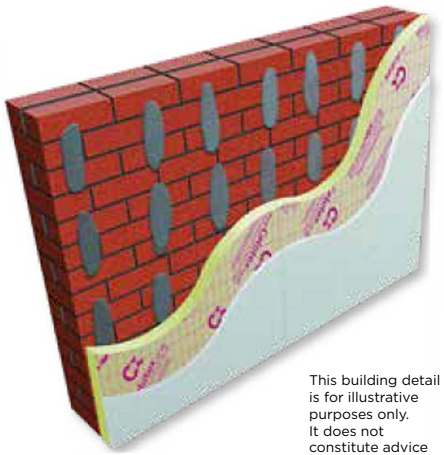
Upgrading internal solid walls

Celotex GA4000 or Celotex PL4000 high thermal performance insulation can be considered in internal solid wall applications to minimise insulation thickness and give the following benefits:

- Deliver improved U-values and thinner solutions compared to many other insulation materials
- Reduces heat bridges formed by mortar joints
- Can be considered where no wall cavity exists
- Can help provide long term energy savings for buildings
- Provides a vapour control layer (VCL) when board joints are taped
- Can be particularly suited to refurbishment projects



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Indicative U-value (W/m².K) calculation: Dry line wall with Celotex GA4000

Construction		Dot and dab
Outside surface resistance		-
Brick		215
Variable layer		See below
Board joints sealed to VCL & air leakage barrier		-
Cavity (low emissivity) - 25 x 47 battens @ 600 ctrs		25
Plasterboard		12.5
Inside surface resistance		-
Variable layer	**Thickness (mm)**	**U-value (W/m².K)**
Celotex GA4000	50	0.30
Celotex GA4000	60	0.26
Celotex GA4000	70	0.23
Celotex GA4000	75	0.22
Celotex GA4000	80	0.21
Celotex GA4000	90	0.19
Celotex GA4000	100	0.18

Note: these solutions are only suitable with walls at at least 200mm thickness - tor thinner walls, contact the Technical Support Centre on 01473 822093 or email technicalsupport@saint-gobain.com

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Indicative U-value (W/m².K) calculation: Internal solid wall with Celotex PL4000

Construction		Dot & Dab	Direct Fix	Timber Battens	Metal Lining Systems
Outside surface resistance		-	-	-	-
Brick		215	215	215	215
Cavity		15	-	25	25
Variable layer		See below	See below	See below	See below
Board joints sealed to VCL		-	-	-	-
Plaster skim		-	-	-	-
Inside surface resistance		-	-	-	-
Variable layer	**Thickness (mm)**	**U-value (W/m².K)**	**U-value (W/m².K)**	**U-value (W/m².K)**	**U-value (W/m².K)**
Celotex PL4000	60 + 12.5	0.30	-	0.29	0.30
Celotex PL4000	65 + 12.5	0.28	0.29	0.28	0.28

Thickness includes PIR insulation board plus 12.5mm plasterboard laminate

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www.
Lady Lane Industrial Estate
01473 822093

Pitched Roofing

...by Celotex

Pitched roof sarking

Celotex GA4000 or Celotex XR4000 high thermal performance insulation can be considered in pitched roof sarking applications to minimise insulation thickness and give the following benefits:

- **Can help provide long term energy savings for buildings**
- Low emissivity foil facers give improved thermal insulation performance within sealed cavity air spaces
- Can minimise thermal bridging
- Optional single layer system
- **Can be suitable for new build and major refurbishment projects**
- Air-tight construction method with the use of taped joints & junctions

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Indicative U-value (W/m².K) calculation: pitched roof sarking

Construction	Thickness (mm)	
Outside surface resistance	–	
Tiling including batten space	–	
Counter batten	38	
Breather membrane	–	
Variable layer	See below	
Cavity (low emissivity) rafter space (11.7% brg)	150	
Polythene 1000 gauge, VCL	–	
Plasterboard	12.5	
Inside surface resistance	–	
Variable layer	**Thickness (mm)**	**U-value (W/m²K)**
Celotex XR4000 over rafter	200	0.10
Celotex XR4000 over rafter	165	0.12
Celotex XR4000 over rafter	150	0.13
Celotex XR4000 over rafter	140	0.14
Celotex XR4000 over rafter	130	0.15
Celotex XR4000 over rafter	120	0.16
Celotex XR4000 over rafters	110	0.17
Celotex GA4000 over rafter	100	0.19
Celotex GA4000 over rafter	90	0.20
Celotex GA4000 over rafter	80	-
Celotex GA4000 over rafter	75	-
Celotex GA4000 over rafter	70	-

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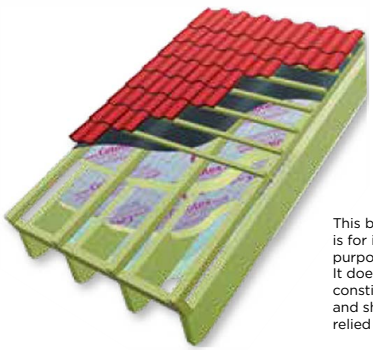
Insulation between and over rafters

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

- Can be considered for use where headroom is limited
- Can help provide long term energy savings for buildings
- Creates a warm, habitable roof space
- Can be suitable for new build and major refurbishment projects
- Minimised additional loading to the structure



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Indicative U-value (W/m².K) 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	–	
Variable layer	**Thickness (mm)**	**U-value (W/m²K)**
Celotex XR4000 over rafter	200	0.09
Celotex XR4000 over rafter	165	0.10
Celotex XR4000 over rafter	150	0.11
Celotex XR4000 over rafter	140	0.12
Celotex XR4000 over rafter	130	0.12
Celotex XR4000 over rafter	120	0.13
Celotex XR4000 over rafter	110	0.14
Celotex GA4000 over rafter	100	0.15
Celotex GA4000 over rafter	90	0.16
Celotex GA4000 over rafter	80	0.17
Celotex GA4000 over rafter	75	0.18
Celotex GA4000 over rafter	70	0.19

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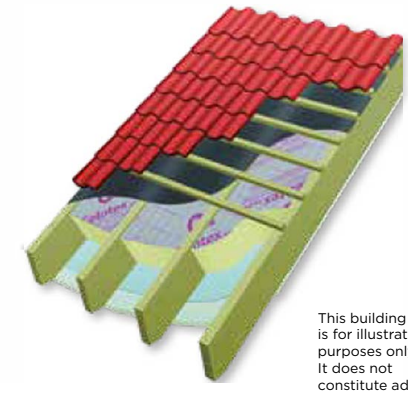
Insulation between rafters

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

- Optional single layer insulation reduces cutting
- Can provide long term energy savings for buildings
- Easy to dry line with plasterboard once installed
- No loss of internal headroom
- Can be considered for loft conversions / room in the roof applications



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Indicative U-value (W/m².K) calculation: un-ventilated between rafters

Construction		200mm deep rafters Thickness (mm)	175mm deep rafters Thickness (mm)	150mm deep rafters Thickness (mm)
Outside surface resistance		–	–	–
Tiling including batten space		–	–	–
Breather membrane		–	–	–
Low E cavity, remainder of rafter depth		Various	Various	Various
Variable layer (for between rafters)		See below	See below	See below
Polythene, 1000 gauge VCL		–	–	–
Plasterboard		12.5	12.5	12.5
Inside surface resistance		–	–	–
Variable layer	**Thickness (mm)**	**U-value (W/m².K)**	**U-value (W/m².K)**	**U-value (W/m².K)**
Celotex XR4000 @ 400 ctrs	200	0.17*	–	–
Celotex XR4000 @ 400 ctrs	165	0.18	0.19*	–
Celotex XR4000 @ 400 ctrs	150	0.19	0.20	–
Celotex XR4000 @ 400 ctrs	140	0.20	0.21	–
Celotex XR4000 @ 600 ctrs	200	0.15*	–	–
Celotex XR4000 @ 600 ctrs	150	0.18	0.18	0.20*
Celotex XR4000 @ 600 ctrs	140	0.19	0.19	0.20*
Celotex XR4000 @ 600 ctrs	130	0.20	0.20	0.20

* = Counter batten over membrane – see installation guidelines

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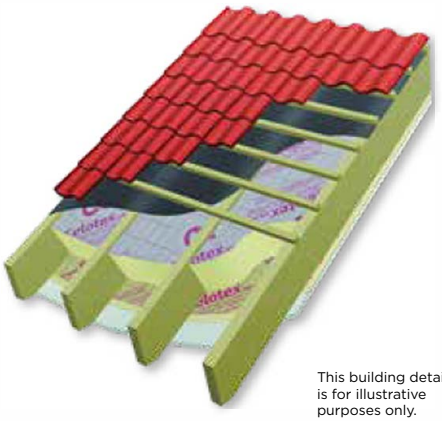
Insulation between and under rafters

Celotex GA4000 or Celotex XR4000, with Celotex PL4000 high thermal performance plasterboard thermal laminate can be considered 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
- Can be considered for use with shallow rafters
- Can help provide long term energy savings for buildings
- Minimised additional loading to the structure
- Can be considered for loft conversions/ room in the roof applications
- Upgrade existing ceilings



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Indicative U-value (W/m².K) calculation: un-ventilated between and under rafters

Construction		100mm deep rafters Thickness (mm)	125mm deep rafters Thickness (mm)	150mm deep rafters Thickness (mm)	175mm deep rafters Thickness (mm)
Outside surface resistance		-	-	-	-
Tiling including batten space		-	-	-	-
Breather membrane		-	-	-	-
Low E cavity between rafters (11.7% brg)		20	25	30	25
Celotex between rafters @ 400 ctrs (11.7% brg)		GA4080	GA4100	XR4120	XR4150
Variable layer (for below rafters)		See below	See below	See below	See below
Board joints taped for VCL		-	-	-	-
Plaster skim		-	-	-	-
Inside surface resistance		-	-	-	-
Variable layer	Thickness (mm)	U-value (W/m²K)	U-value (W/m²K)	U-value (W/m²K)	U-value (W/m²K)
Celotex PL4000	65 + 12.5†	0.16	0.14	0.13	0.12
Celotex PL4000	60 + 12.5†	0.16	0.15	0.13	0.12
Celotex PL4000	50 + 12.5†	0.18	0.16	0.14	0.13
Celotex PL4000	40 + 12.5†	0.19	0.17	0.15	0.14
Celotex PL4000	25 + 12.5†	-	0.20	0.17	0.15

† 12.5mm tapered edge plasterboard is laminated to the insulation thickness

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Indicative U-value (W/m².K) calculation: ventilated between and under rafters

Construction	100mm deep rafters Thickness (mm)	125mm deep rafters Thickness (mm)	150mm deep rafters Thickness (mm)	175mm deep rafters Thickness (mm)
Outside surface resistance	-	-	-	-
Tiling including batten space	-	-	-	-
Sarking felt	-	-	-	-
Ventilated cavity	50	50	50	50
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
Board joints taped for VCL	-	-	-	-
Plaster skim	-	-	-	-
Inside surface resistance	-	-	-	-
Variable layer	**Thickness (mm)**	**U-value (W/m²K)**	**U-value (W/m²K)**	**U-value (W/m²K)**	**U-value (W/m²K)**
Celotex PL4000	65 + 12.5	0.20	0.17	0.15	0.14
Celotex PL4000	60 + 12.5	-	0.18	0.16	0.14
Celotex PL4000	50 + 12.5	-	0.20	0.17	0.15
Celotex PL4000	40 + 12.5	-	-	0.19	0.17
Celotex PL4000	25 + 12.5	-	-	-	0.19

† 12.5mm tapered edge plasterboard is laminated to the insulation thickness

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Insulation at ceiling level

Celotex GA4000 or Celotex XR4000 high thermal performance insulation can be considered in top up joist upgrade applications to deliver the following benefits:

- Upgrade existing roof spaces to current building regulation compliance levels
- Provide energy efficient insulation measures without impacting on internal space
- Insulating over joists provides a lightweight storage solution when insulation fixed into joists
- Minimal load added to the structure due to lightweight boards

This building detail is for illustrative purposes only. It does not constitute advice and should not be relied upon.

Indicative U-value (W/m².K) calculation: insulating at ceiling level

Construction		100mm deep joists Thickness (mm)	150mm deep joists Thickness (mm)
Outside surface resistance		-	-
Tiling including batten space		-	-
Loft space		-	-
Variable layer over joists		-	-
ISOVER mineral wool between joists @ 400 ctrs		100	150
Polythene VCL		-	-
Plasterboard		12.5	12.5
Inside surface resistance		-	-
Variable layer	**Thickness (mm)**	**U-value (W /m²K)**	**U-value (W /m²K)**
Celotex XR4000	130	0.12	0.11
Celotex XR4000	120	0.13	0.11
Celotex GA4000	100	0.14	0.12
Celotex GA4000	90	0.15	0.13
Celotex GA4000	80	0.16	0.14
Celotex GA4000	75	-	0.14
Celotex GA4000	70	-	0.15
Celotex GA4000	60	-	0.16

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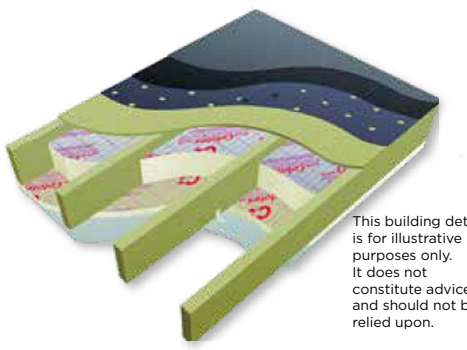
Flat Roofing

...by Celotex

Upgrading flat roof: Insulation between and under joists

Celotex GA4000 or Celotex XR4000 with Celotex PL4000 high thermal performance insulation can be considered in flat roof between and under joist applications to minimise insulation thickness and give the following benefits:

- Celotex PL4000 provides both the below joist insulation and plasterboard in one product helping reduce installation time
- Celotex PL4000 offers the installer maximum flexibility and installation speed due to the tapered edge plasterboard
- An effective solution to upgrade older buildings
- Can help provide long term energy savings for buildings
- Ventilated cold roof construction



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- Can be considered for renovation/ conversion solutions
- Helps to minimise any loss of internal headroom

Indicative U-value (W/m².K) calculation: cold flat roof – between and under joists

Construction		100mm deep joists Thickness (mm)	125mm deep joists Thickness (mm)	150mm deep joists Thickness (mm)	175mm deep joists Thickness (mm)
Outside surface resistance		–	–	–	–
Weatherproofing system		n/a	n/a	n/a	n/a
Plywood		18	18	18	18
Ventilated cavity		50	50	50	55
Celotex between joists @ 400 ctrs (11.7% brg)		GA4050	GA4075	GA4100	XR4120
Variable layer (for below joists)		See below	See below	See below	See below
Board joints taped for VCL		-	-	-	-
Plaster skim		-	-	-	-
Inside surface resistance		–	–	–	–
Variable layer	**Thickness (mm)**	**U-value (W/m²K)**	**U-value (W/m²K)**	**U-value (W/m²K)**	**U-value (W/m²K)**
Celotex PL4000	65 + 12.5†	0.20	0.17	0.15	0.14
Celotex PL4000	60 + 12.5†	–	0.18	0.16	0.14
Celotex PL4000	50 + 12.5†	–	0.20	0.17	0.15
Celotex PL4000	40 + 12.5†	–	–	0.19	0.17
Celotex PL4000	25 + 12.5†	–	–	–	0.19

† 12.5mm tapered edge plasterboard is laminated to the insulation thickness

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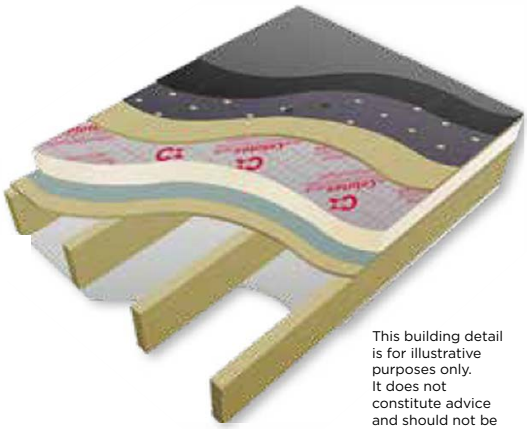
Balcony and terrace

Celotex GA4000 or Celotex XR4000 high thermal performance insulation between 19mm plywood sheeting can be considered in warm flat roof deck balcony applications to minimise insulation thickness and give the following benefits:

- Warm roof construction due to over joist insulation
- Can help provide long term energy savings for buildings
- Eliminates the need to insulate between joists
- Ventilation not required through roof void
- Robust deck structure copes with regular foot traffic
- Easily installed and weatherproofed



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Indicative U-value (W/m².K) calculation: flat roof insulating deck – balcony

Construction		Terrace Bur Thickness (mm)	Terrace SPM Thickness (mm)	Terrace BUR Ex-J Thickness (mm)
Outside surface resistance		–	–	–
Built-up roofing or single ply membrane		12	1.5	12
Plywood		18	18	18
Variable layer		See below	See below	See below
Polythene 1000 gauge, VCL		–	–	–
Plywood		18	18	18
Cavity between joists @ 400 ctrs – 11.7% bridging		150	150	n/a
Plasterboard		12.5	12.5	n/a
Plasterboard between joist – 11.7%		n/a	n/a	12.5
Inside surface resistance		–	–	–
Variable layer	**Thickness (mm)**	**U-value (W /m²K)**	**U-value (W /m²K)**	**U-value (W /m²K)**
Celotex XR4000	200	0.12	0.12	0.12
Celotex XR4000	165	0.14	0.14	0.14
Celotex XR4000	150	0.15	0.15	0.16
Celotex XR4000	140	0.16	0.16	0.17
Celotex XR4000	130	0.17	0.17	0.18
Celotex XR4000	120	0.18	0.18	0.19

Terrace BUR = Built-up roofing Terrace SPM = Single ply membrane Terrace BUR EX-J = Built-up roofing, exposed joist

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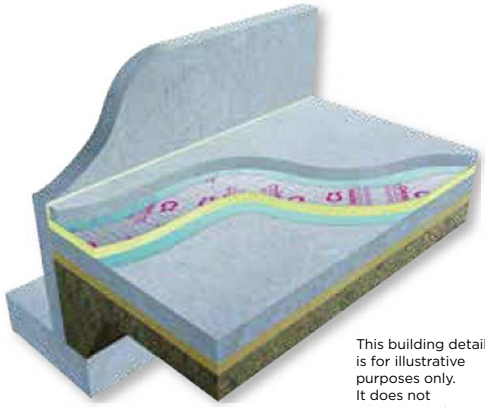
Conversions

...by Celotex

Basements

Celotex GA4000 or Celotex XR4000 high thermal performance insulation can be considered in basement refurbishment projects to deliver the following benefits:

- Excellent thermal performance to minimise depth of floor build-up.
- Can help provide long term energy savings for buildings
- Square edges to help deliver insulation continuity
- Easy to cut boards to fit in most spaces
- Easy to install to quickly insulate large areas



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Indicative U-value (W/m².K) calculation: basement floors

	Perimeter / area ratio									
Celotex product	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**	**1.0**
XR4150	0.07	0.09	0.10	0.11	0.11	0.11	0.11	0.11	0.12	0.12
XR4120	0.08	0.10	0.12	0.12	0.13	0.13	0.13	0.14	0.14	0.14
XR4110	0.09	0.11	0.12	0.13	0.14	0.14	0.14	0.15	0.15	0.15
GA4100	0.09	0.12	0.13	0.14	0.15	0.15	0.15	0.16	0.16	0.16
GA4090	0.09	0.12	0.14	0.15	0.16	0.16	0.16	0.17	0.17	0.17
GA4080	0.10	0.13	0.15	0.16	0.17	0.17	0.18	0.18	0.18	0.19
GA4075	0.10	0.14	0.15	0.17	0.17	0.18	0.19	0.19	0.19	0.19
GA4070	0.10	0.14	0.16	0.17	0.18	0.19	0.19	0.20	0.20	0.20
GA4060	0.11	0.15	0.17	0.19	0.20	0.21	0.21	0.22	0.22	0.22
GA4050	0.11	0.16	0.19	0.20	0.22	0.23	0.23	0.24	0.25	0.25

Based on 65mm screed and 20mm insulation as perimeter upstand. A basement depth of 2.00m with all walls fully retained to earth and a surrounding soil of clay / silt

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Celotex requirement to meet target U-values for a basement floor are determined by a number of variable factors.

- Type of surrounding retaining soil. This can be clay/silt, sand/gravel or rock.
- The thickness of basement walls.
- The height of basement walls from finished floor level to ground level.
- The ratio of exposed floor perimeter to the total floor area (PA ratio).

In addition to the above, basement walls take into account the thermal performance of the basement floor. Please contact the Technical Support Centre on 01473 822093 or technicalsupport@saint-gobain.com to confirm which boards meet target u-values.

Room in the roof

Celotex GA4000, Celotex TB4000 and Celotex PL4000 high thermal performance insulation can be considered in loft conversion projects to deliver the following benefits:

- Create additional, highly thermal efficient living space
- Can help provide long term energy savings for buildings
- Loft conversions deliver multiple energy efficient measures within one project

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Indicative U-value (W/m².K) calculation: attic walls

Construction	Thickness (mm)	
Outside surface resistance	–	
Tiling including batten space	–	
Breathable membrane	–	
Roof void	–	
Celotex GA4000	80	
Cavity (low emissivity) between studwork	20	
Variable layer	See below	
Board joints sealed to form vapour barrier	–	
Inside surface resistance	–	
Variable layer	**Thickness (mm)**	**U-value (W/m²K)**
Celotex PL4000	65 + 12.5	0.16
Celotex PL4000	60 + 12.5	0.17
Celotex PL4000	50 + 12.5	0.18
Celotex PL4000	40 + 12.5	0.20
Celotex PL4000	25 + 12.5	0.23

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Indicative U-value (W/m².K) calculation: horizontal ceiling

Construction		100mm joists	150mm joists
Outside surface resistance		-	-
Tiling including batten space		-	-
Loft space		-	-
Celotex between joists @ 400 ctrs		GA4090	XR4140
Variable layer		See below	See below
Board joints sealed to form vapour barrier		-	-
Inside surface resistance		-	-
Variable layer	**Thickness (mm)**	**U-value (W/m²K)**	**U-value (W /m²K)**
Celotex PL4000	65 + 12.5 †	0.15	0.12
Celotex PL4000	60 + 12.5 †	0.16	0.12
Celotex PL4000	50 + 12.5 †	0.17	0.13
Celotex PL4000	40 + 12.5 †	0.19	0.14
Celotex PL4000	25 + 12.5 †	-	0.16

† 12.5mm tapered edge plasterboard is laminated to the insulation thickness

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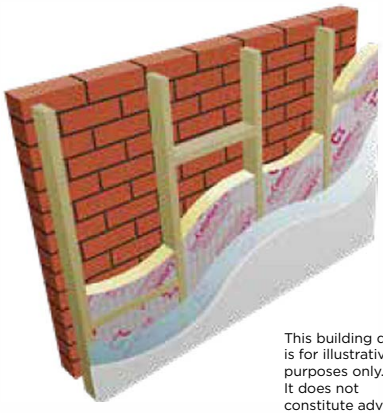
Garage conversions

Celotex GA4000, Celotex XR4000 and Celotex PL4000 high thermal performance insulation can be considered in garage conversion projects to deliver the following benefits:

- Create additional, highly thermal efficient living space
- Can be considered for upgrading older buildings
- Can help provide long term energy savings for buildings
- Garage conversions deliver multiple energy efficient measures within on project



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Indicative U-value (W/m².K) calculation: timber frame wall lining

Construction	Thickness (mm)	
Outside surface resistance	-	
Brick	103	
Cavity (low emissivity)	50	
Variable layer	See below	
Polythene 1000 gauge, VCL	-	
Plasterboard	12.5	
Inside surface resistance	-	
Variable layer	**Thickness (mm)**	**U-value (W/m².K)**
Celotex GA4000	120	0.23
Celotex GA4000	110	0.24
Celotex GA4000	100	0.25
Celotex XR4000	90	0.27
Celotex XR4000	80	0.29

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Other applications involved in converting most garages:

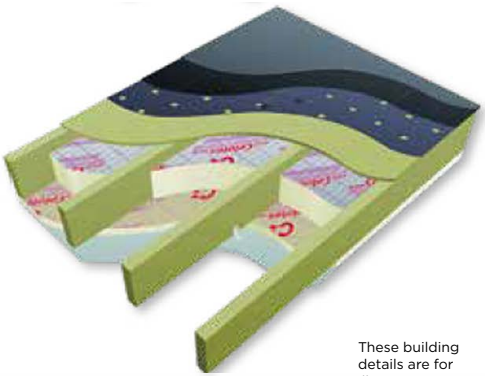
Upgrading concrete slab floor

For U-value calculations please see page 8 of the Handy Guide.

Upgrading flat roofs

For U-value calculations please see page 32 of the Handy Guide. Please note that Celotex also offer solutions if the existing weatherproof cover is being replaced.

For further information please contact the Technical Support Centre on 01473 822093 or technicalsupport@saint-gobain.com



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Essential information

- It is critical that all works are detailed in accordance to BBA guidance, which is available at insulation-UK.com/BBA.
- Eye protection and face masks should be worn at all times when handling/installing the boards. In addition, gloves should be worn when cutting boards or handling cut boards.
- Aluminium foil edges may be sharp so avoid sliding bare hands along board edges.
- Dust or particles in the eyes should be washed out with liberal quantities of water. If skin is sensitive to fibre irritation, apply a barrier cream to exposed areas before handling.
- Site conditions should be well ventilated.
- When cutting the boards, use a sharp specialist insulation saw or insulation knife. Use a straight edge to ensure an accurate butt edge or mitre joint.
- Celotex rigid PIR insulation boards should not be installed when the temperature is at or below 4°C and falling.
- Ensure that all exposed areas of insulation are protected with a weatherproof material or board when work is suspended or during rain.
- Celotex boards must not be exposed to open flame or other ignition sources, or to solvents or other chemicals
- Take care not to drop boards; any damaged boards should not be used.
- The boards feature a branded foil facer on one side and an unbranded facer on the other. This is for cosmetic reasons only – there is no performance variation between these facers.
- Seek advice from a fixing manufacturer for the most suitable fixings for the construction.

Storage

- Celotex rigid PIR insulation boards must be protected from prolonged exposure to sunlight. It should be stored dry, flat and raised above ground level (to avoid contact with ground moisture).
- Where possible, packs should be stored inside. If stored outside, they should be under cover, or protected with opaque polythene sheeting. If boards are stored under tarpaulins, care should be taken to prevent rope damage.
- Only as much material as can be installed during a single working period should be removed from storage at any one time.

Waste management and recycling

- Celotex continually monitors the levels of waste from its activities and drives and implements procedures which reduce the amount produced. The company ensures that all employees are aware of the importance of reducing waste in all activities.
- The majority of Celotex products are packaged without the requirement for shrink wrap and instead use recyclable materials such as cardboard banding. Waste PIR is inert and landfill safe with no known effect on ground water. For further information on the Sustainability credentials of Celotex, please visit insulation-uk.com/about/corporateand-social-responsibility

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Celotex products should not be used in the external walls of buildings over 18 metres in height (England and Wales) or 11 metres in height (Scotland). Recent changes to Building Regulations mean that only non-combustible insulation or insulation of limited combustibility can be used in buildings of that height.

Celotex
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