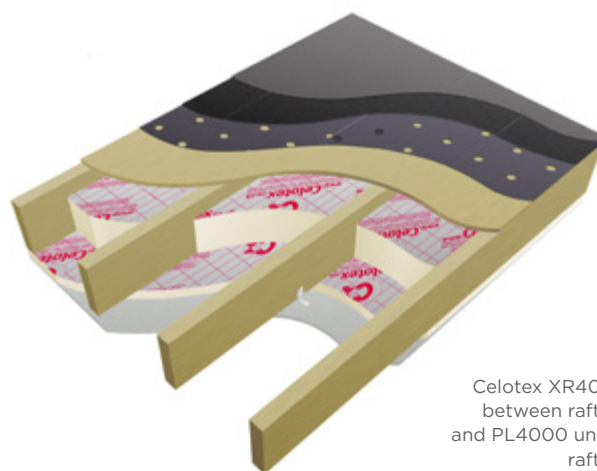


Garage Conversion - Between and Under Joist

Use a combination of [Celotex GA4000](#) or [Celotex XR4000](#) with [Celotex PL4000](#) high performance plasterboard thermal laminate in flat roof [between and under joist applications](#) to minimise insulation thickness and give the following benefits:

- Create additional, highly thermal efficient living space
- A perfect solution to upgrade older buildings
- Provides reliable long term energy savings for buildings
- Garage conversions deliver multiple energy efficient measures within one project



Celotex XR4000
between rafters
and PL4000 under
rafters

Celotex GA4000 Technical Data

Thickness (mm)	R-value (m ² K/W)	Maximum Board Weight (kg/m ²)
GA4050	2.25	1.92
GA4060	2.70	2.26
GA4070	3.15	2.61
GA4075	3.40	2.78
GA4080	3.60	2.96
GA4090	4.05	3.31
GA4100	4.50	4.15

Celotex XR4000 Technical Data

Thickness (mm)	R-value (m ² K/W)	Maximum Board Weight (kg/m ²)
XR4110	5.00	4.54
XR4120	5.45	4.93
XR4130	5.90	5.32
XR4140	6.35	5.71
XR4150	6.80	6.10
XR4165	7.50	6.69
XR4200	9.05	8.06

Celotex PL4000 Technical Data

Thickness (mm)	R-value (m ² K/W)	Maximum Board Weight (kg/m ²)
PL4015 + 12.5 [†]	0.70 [‡]	9.69 [‡]
PL4025 + 12.5 [†]	1.20 [‡]	9.99 [‡]
PL4040 + 12.5 [†]	1.85 [‡]	10.46 [‡]
PL4050 + 12.5 [†]	2.30 [‡]	10.96 [‡]
PL4060 + 12.5 [†]	2.75 [‡]	11.31 [‡]
PL4065 + 12.5 [†]	3.00 [‡]	11.48 [‡]

For product information for your project, please contact either our [technical team](#) or our [specification team](#).

[†] 12.5mm tapered edge plasterboard is laminated to the insulation thickness
[‡] insulation component only



We have an experienced team of energy assessors who can carry out SAP calculations, water calculations, airtightness testing and much more. [Contact us](#).



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Example U-value calculation: Cold Flat Roof - Between and Under Joists

Construction		100 deep joists Thickness (mm)	125 deep joists Thickness (mm)	150 deep joists Thickness (mm)	175 deep joists Thickness (mm)
Outside surface resistance		-	-	-	-
Weather-proofing 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/m ² K)	U-value (W/m ² K)	U-value (W/m ² K)	U-value (W/m ² K)
Celotex PL4000	15 + 12.5 [†]	-	-	-	-
Celotex PL4000	25 + 12.5 [†]	-	-	-	0.19
Celotex PL4000	40 + 12.5 [†]	-	-	0.19	0.17
Celotex PL4000	50 + 12.5 [†]	-	0.20	0.17	0.15
Celotex PL4000	60 + 12.5 [†]	-	0.18	0.16	0.14
Celotex PL4000	65 + 12.5 [†]	0.20	0.17	0.15	0.14

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

U-value

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

Installation Guidelines

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

- Make sure that there is enough joist 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 joists so that the bottom of the batten is 50mm below the decking.
- Measure the space to be filled between the inside face of the joists prior to cutting the board.
- The Celotex Insulation Clip is designed to allow insulation boards to be installed between timber joists quickly and without nails or screws.
- Fit the clips at one metre maximum centres along the insulation.
- Push the boards into the void between the joists until they are tight up to the underside of stop battens, ensuring that the lateral joints are tightly butted.
- Secure Celotex PL4000 to the underside of the joists.
- Joints between the boards must be tightly butted, taped and jointed using appropriate tape and jointing material to create the vapour control layer.

Composite systems can be used to combine Celotex insulation under joist lining with quilt type insulant between the joists which will provide acoustic, as well as thermal insulation. This option is particularly useful when upgrading to modern acoustic insulation standards.

When updating an existing ceiling, Celotex PL4000 can be fitted directly underneath the ceiling, providing there is no vapour check layer such as gloss paint or foil backed plasterboard. Always ensure that there is a 50mm minimum ventilation gap above any original insulation.

Ventilation must be provided above an insulated ceiling directly through the cold void. Failure to do so could result in serious condensation problems that may lead to decay and possible failure.

Where building regulation approval is required, you should take advice from your local building control authority and the building designer.

Installation guidelines

Installation of Celotex GA4000, XR4000 and PL4000 will depend on application type. For installation details please refer to our online '[applications](#)' pages.

Further information

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For information regarding storage, installation and handling of Celotex products, or for health & safety information, please refer to our online '[literature](#)' pages.

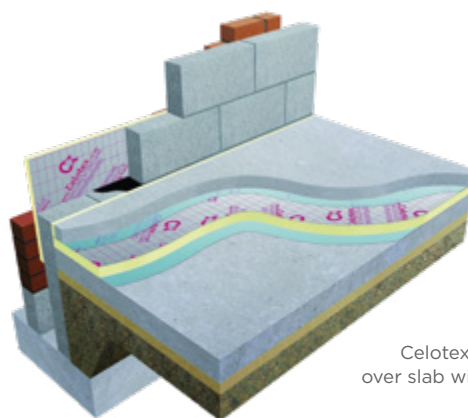
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Garage Conversion - Concrete Slab Floors

Use [Celotex GA4000](#) or [Celotex XR4000](#) high performance thermal insulation in concrete slab floor applications to minimise insulation thickness and give the following benefits:

- Easy to cut boards to fit in most spaces
- Provides reliable long term energy savings for buildings
- Excellent dimensional stability
- No thermal bridging at floor edges
- Tightly butted joints for insulation continuity



Celotex GA4000
over slab with screed

Celotex GA4000 Technical Data

Thickness (mm)	R-value (m ² K/W)	Maximum Board Weight (kg/m ²)
GA4050	2.25	1.92
GA4060	2.70	2.26
GA4070	3.15	2.61
GA4075	3.40	2.78
GA4080	3.60	2.96
GA4090	4.05	3.31
GA4100	4.50	4.15

Celotex XR4000 Technical Data

Thickness (mm)	R-value (m ² K/W)	Maximum Board Weight (kg/m ²)
XR4110	5.00	4.54
XR4120	5.45	4.93
XR4130	5.90	5.32
XR4140	6.35	5.71
XR4150	6.80	6.10
XR4165	7.50	6.69
XR4200	9.05	8.06

For product information for your project, please contact either our [technical team](#) or our [specification team](#).

Example U-value calculation: Ground Floor - Concrete Slab

Celotex Product	Thickness (mm)	Perimeter / Area Ratio									
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Celotex GA4000	50	0.13	0.18	0.22	0.24	0.25	-	-	-	-	-
Celotex GA4000	60	0.12	0.17	0.20	0.21	0.23	0.24	0.25	0.25	-	-
Celotex GA4000	70	0.11	0.16	0.18	0.19	0.21	0.21	0.22	0.23	0.23	0.24
Celotex GA4000	75	0.11	0.15	0.17	0.19	0.20	0.20	0.21	0.22	0.22	0.22
Celotex GA4000	80	0.11	0.14	0.16	0.18	0.19	0.20	0.20	0.21	0.21	0.21
Celotex GA4000	90	0.10	0.14	0.15	0.16	0.17	0.18	0.18	0.19	0.19	0.19
Celotex GA4000	100	0.10	0.13	0.14	0.15	0.16	0.17	0.17	0.17	0.18	0.18
Celotex XR4000	110	0.09	0.12	0.13	0.14	0.15	0.15	0.16	0.16	0.16	0.16
Celotex XR4000	120	0.09	0.11	0.13	0.13	0.14	0.14	0.15	0.15	0.15	0.15
Celotex XR4000	130	0.08	0.11	0.12	0.13	0.13	0.14	0.14	0.14	0.14	0.14
Celotex XR4000	140	0.08	0.10	0.11	0.12	0.12	0.13	0.13	0.13	0.13	0.13
Celotex XR4000	150	0.08	0.10	0.11	0.11	0.12	0.12	0.12	0.12	0.13	0.13
Celotex XR4000	165	0.07	0.09	0.10	0.11	0.11	0.11	0.11	0.11	0.12	0.12
Celotex XR4000	200	0.07	0.08	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10

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

U-value

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

Installation Guidelines

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

Over slab installation guidelines

- Install a damp proof membrane below the Celotex. This can either be over the top or below the slab. The damp proof membrane must provide continuity with the damp proof course in the surrounding walls.
- Level the surface of the slab; it should be smooth and free of projections.
- If required, use a thin layer of sand blinding on a rough, tamped slab to ensure that the insulation boards are continuously supported.
- Use the Celotex Insulation Saw to cut and fit insulation upstand to floor perimeter, to meet a minimum R-value of 0.75m²K/W, (i.e. Celotex TB4020). The upstand depth should be equal to the sum of the slab insulation and the screed thickness. The upstand thickness should not exceed the combined thickness of the wall linings.
- Lay the insulation boards directly onto the prepared slab with closely-butted, staggered cross-joints.
- Lay a polythene vapour control layer (VCL) over the insulation to minimise the risk of condensation forming at the insulation/slab interface and to prevent liquid screed migration. This separating layer will also prevent any reaction between the wet screed and foil facer. The VCL should be turned up at the edge of the floor to run up the surface of the upstand insulation to finish level with this and the top of screed. It is good practice that all joints should be lapped 150mm and sealed.
- Apply a sand/cement or self levelling screed over the VCL and Celotex insulation boards to a minimum thickness of 65mm.

Use scaffold boards or other protection to prevent wheelbarrows and other traffic damaging the insulation.

- These guidelines apply to normal domestic floor loadings. If higher loadings are required, it may be necessary to increase the screed thickness and provide reinforcement within the screed. Consult a structural engineer or a specialist flooring contractor.

Where building regulation approval is required, you should take advice from your local building control authority and the building designer.

Under slab installation guidelines

- Level hardcore and blind with sand,
- Install damp proof membrane and lap into damp proof course,
- Use the Celotex Insulation Saw to cut and fit insulation, thickness to achieve required U-value
- Use the Celotex Insulation Saw to cut and fit insulation upstand to floor perimeter, to meet a minimum R-value of 0.75m²K/W, (i.e. Celotex TB4020). Height of insulation to coincide with required finished floor level.
- Lay a polythene vapour control layer (VCL) over the insulation to minimise the risk of condensation forming at the insulation/slab interface and to prevent liquid screed migration. This separating layer will also prevent any reaction between the wet screed and foil facer. The VCL should be turned up at the edge of the floor to run up the surface of the upstand insulation to finish level with this and the top of screed. It is good practice that all joints should be lapped 150mm and sealed.
- Lay concrete to required finished floor level and smooth over with float finish.

Chipboard floor finish

A VCL should be laid over the Celotex insulation boards and turned up 100mm at room perimeters, behind the skirting. It is recommended good practice that all joints should be lapped 150mm and sealed.

The chipboard must be minimum 18mm tongued and grooved flooring grade type C4 to BS 5669. Lay the chipboard with staggered joints, glued with a woodworking adhesive.

Provide a 10mm–12mm gap at all perimeters and abutments to allow for expansion. This can be achieved by the use of temporary wedges.

Where chipboard is butted together without a tongued and grooved joint and all external doorways (for the width of the threshold), a treated timber batten must be used in lieu of the insulation boards.



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Certifications and accreditations

Celotex products GA4000 and XR4000 are covered by BBA Agrément Certificate No [17/5405](#). To download a copy of this certificate, visit the 'literature' pages on our website.

Further information

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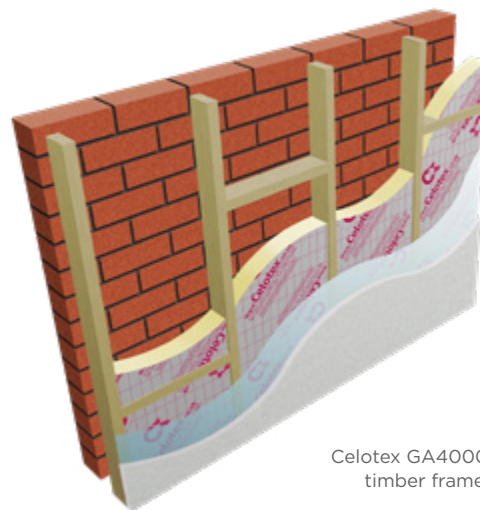
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Garage Conversion - Wall Upgrade

Use [Celotex GA4000](#) and [Celotex XR4000](#) high performance thermal insulation in [timber frame wall lining](#) applications to minimise insulation thickness and give the following benefits:

- Offers some of the thinnest solutions available
- Provides reliable long term energy savings for buildings
- Low emissivity foil facers give improved thermal insulation performance within cavity air spaces
- Provides cavity for services



Celotex GA4000 in a timber frame wall

Celotex GA4000 Technical Data

Thickness (mm)	R-value (m ² K/W)	Maximum Board Weight (kg/m ²)
GA4050	2.25	1.92
GA4060	2.70	2.26
GA4070	3.15	2.61
GA4075	3.40	2.78
GA4080	3.60	2.96
GA4090	4.05	3.31
GA4100	4.50	4.15

Celotex XR4000 Technical Data

Thickness (mm)	R-value (m ² K/W)	Maximum Board Weight (kg/m ²)
XR4110	5.00	4.54
XR4120	5.45	4.93
XR4130	5.90	5.32
XR4140	6.35	5.71
XR4150	6.80	6.10
XR4165	7.50	6.69
XR4200	9.05	8.06

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Example U-value 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/m ² K)
Celotex GA4000	80	0.29
Celotex GA4000	90	0.27
Celotex GA4000	100	0.25
Celotex XR4000	110	0.24
Celotex XR4000	120	0.23

U-value

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

Installation Guidelines

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

- Install a new independently supported timber stud frame.
- This should be set away from the internal face of the existing brick wall by a clear 50mm cavity to ensure that moisture cannot transfer through the construction.
- Make sure all studs and rails are flush, with no projections, and that services are correctly installed.
- Insert insulation into the framing.
- Use the Celotex Insulation Saw to cut the boards to fit tightly between all studs and rails.
- For optimum thermal performance, the unprinted foil surface should face the air cavity.
- Use the Celotex Insulation Saw to cut the boards for infill panels, using off-cuts where possible, making sure there are no gaps at wall abutments.
- Ensure that the wall insulation is continuous with the floor perimeter insulation.
- A vapour control layer (VCL) should be installed over the warm side of the studwork.
- Fix plasterboard lining over the VCL using plasterboard nails or screws.

Some building insurance companies may require additional third party approval when using insulation in timber frame applications. Advice should be sought from the relevant parties prior to specifying the insulation required. Celotex GA4000 and XR4000 insulation are covered by BBA certificate number [16/5352](http://www.bba.co.uk/certificates/16/5352) for use in walls of conventional timber frame dwellings up to 18m in height.

Where building regulation approval is required, you should take advice from your local building control authority and the building designer.

Certifications and accreditations

Celotex products GA4000 and XR4000 are covered by BBA Agrément Certificate No [16/5352](http://www.bba.co.uk/certificates/16/5352). To download a copy of this certificate, visit the 'literature' pages on our website.

Further information

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