

LIGNACITE

Sustainable Masonry

The Lignacite Technical Guide on U-values



Wall construction solutions for the Lignacite range of masonry blocks.

Ashlite | Fibo 850 |
Houseblock 1100 | Lignacite
Lignacrete | Facing Masonry

Brandon: 01842 810678 | Nazeing: 01992 464441

www.lignacite.co.uk

Wall U-values

Meeting Part L thermal standards demands a high level of energy performance from the building fabric. This trend will continue with projected changes to Part L of the Building Regulations and as well as additional energy targets imposed through the Planning system, such as the London Plan.

Presented are an extensive number of wall solutions featuring Lignacite's products in conjunction with the latest and most thermally efficient insulation products available. This combination allows walls to be selected to meet a range of performance values. In most cases the U-value requirement for a project will be set by the energy calculation for the building, such as SAP for new dwellings. In this case it will be straightforward to select a construction to match the required U-value.

Solutions are presented for cavity walls with partial and full fill cavity insulation as well as internally applied insulation as summarised below.

For constructions that are not featured please contact our Technical Services team who will be pleased to assist and provide supporting calculations.

Ref:	Type of insulation	Outer leaf	Inner leaf
Table 1	Partial cavity fill	Facing brick or Lignacite Facing Masonry	Ashlite, Fibo 850, Houseblock 1100, Lignacite, Lignacrete
Table 2	Partial cavity fill	16mm render applied to Lignacrete block	
Table 3	Full cavity fill	Outer leaf facing brick or Lignacite Facing Masonry	
Table 4	Full cavity fill	16mm render applied to Lignacrete block	
Table 5	Clear cavity with internal insulation	Outer leaf facing brick or Lignacite Facing Masonry	
Table 6	Full cavity fill and internal insulation	Outer leaf facing brick or Lignacite Facing Masonry	

Minimising heat loss through bridged areas is as important as the U-values in achieving a cost effective building design. The SAP procedure requires this aspect to be accounted for.

Heat loss through thermal bridges (known as non-repeating or linear thermal bridges) occur at junctions between elements or where the continuity of the external fabric insulation is interrupted (e.g. at junctions with external walls, floors and roof). As thermal standards continue to improve, the relative effect of thermal bridging becomes more significant as U-values are driven down.

Lignacite's range of aggregate blocks have reduced heat loss when compared to the Government's Accredited Construction Details and default values shown in Appendix K of SAP 2012.

This is as a result of collaborative work with the Concrete Block Association (CBA) and has resulted in a comprehensive set of junction details that have been independently assessed.

This information will be of prime interest to designers and SAP assessors as well as builders who will have the responsibility for correctly constructing the various junctions.

Click on the following links to see the different junction details available:

Junction ψ -values and f-values (walls with fully filled cavities)

<http://www.cba-blocks.org.uk/tech/junction-values-fully.html>

Junction ψ -values and f-values (walls with partially filled cavities)

<http://www.cba-blocks.org.uk/tech/junction-values-partially.html>

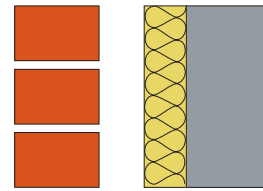
Junction ψ -values and f-values (walls with cavities fully filled with Xtratherm CavityTherm)

<http://www.cba-blocks.org.uk/tech/junction-values-fully-xtratherm.html>

Thermal Bridging

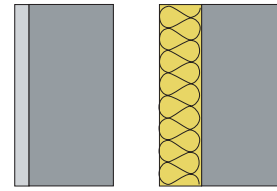


Table 1 - Partial cavity fill - Outer leaf facing brick or Lignacite Facing Masonry



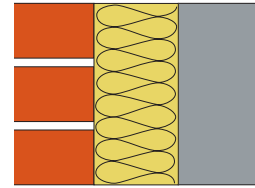
U-values (W/m²K)						
Insulation Option	Internal Finish	100mm Inner Leaf				
		Lignacrete	Lignacite	Ashlite	Fibo 850	Houseblock 1100
100mm cavity						
50mm Celotex CG5000	None e.g. Paint Grade block	0.29	0.29	-	-	-
	13mm Lightweight plaster	0.28	0.28	0.27	0.26	0.27
	12.5mm Plasterboard on dabs	0.27	0.27	0.26	0.25	0.26
	Typical wall width 302mm					
50mm Kingspan Kooltherm K108	None e.g. Paint Grade block	0.26	0.26	-	-	
	13mm Lightweight plaster	0.26	0.26	0.25	0.24	0.24
	12.5mm Plasterboard on dabs	0.25	0.25	0.24	0.23	0.24
	Typical wall width 302mm					
50mm Recticel Eurowall Cavity	None e.g. Paint Grade block	0.30	0.30	-	-	
	13mm Lightweight plaster	0.30	0.29	0.29	0.27	0.28
	12.5mm Plasterboard on dabs	0.29	0.28	0.28	0.26	0.27
	Typical wall width 302mm					
125mm cavity						
75mm Celotex CG5000	None e.g. Paint Grade block	0.22	0.21	-	-	-
	13mm Lightweight plaster	0.21	0.21	0.21	0.20	0.20
	12.5mm Plasterboard on dabs	0.21	0.21	0.20	0.20	0.20
	Typical wall width 327mm					
75mm Kingspan Kooltherm K108	None e.g. Paint Grade block	0.19	0.19	-	-	-
	13mm Lightweight plaster	0.19	0.19	0.19	0.18	0.18
	12.5mm Plasterboard on dabs	0.19	0.18	0.18	0.18	0.18
	Typical wall width 327mm					
75mm Recticel Eurowall Cavity	None e.g. Paint Grade block	0.23	0.22	-	-	-
	13mm Lightweight plaster	0.22	0.22	0.22	0.21	0.21
	12.5mm Plasterboard on dabs	0.22	0.21	0.21	0.20	0.21
	Typical wall width 327mm					
150mm cavity						
100mm Kingspan Kooltherm K108	None e.g. Paint Grade block	0.15	0.15	-	-	-
	13mm Lightweight plaster	0.15	0.15	0.15	0.14	0.15
	12.5mm Plasterboard on dabs	0.15	0.15	0.15	0.14	0.14
	Typical wall width 352mm					
100mm Recticel Eurowall Cavity	None e.g. Paint Grade block	0.18	0.18	-	-	-
	13mm Lightweight plaster	0.18	0.18	0.17	0.17	0.17
	12.5mm Plasterboard on dabs	0.17	0.17	0.17	0.17	0.17
	Typical wall width 352mm					

Table 2 - Partial cavity fill - Outer leaf 16mm render on 100mm Lignacrete block



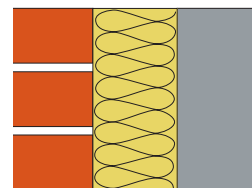
U-values (W/m²K)						
Insulation Option	Internal Finish	100mm Inner Leaf				
		Lignacrete	Lignacite	Ashlite	Fibo 850	Houseblock 1100
100mm cavity						
50mm Celotex CG5000	None e.g. Paint Grade block	0.29	0.29	-	-	-
	13mm Lightweight plaster	0.28	0.28	0.27	0.26	0.27
	12.5mm Plasterboard on dabs	0.27	0.27	0.26	0.25	0.26
	Typical wall width 316mm					
50mm Kingspan Kooltherm K108	None e.g. Paint Grade block	0.26	0.26	-	-	-
	13mm Lightweight plaster	0.26	0.26	0.25	0.24	0.24
	12.5mm Plasterboard on dabs	0.25	0.25	0.24	0.23	0.24
	Typical wall width 316mm					
50mm Recticel Eurowall Cavity	None e.g. Paint Grade block	0.30	0.30	-	-	-
	13mm Lightweight plaster	0.30	0.29	0.29	0.27	0.28
	12.5mm Plasterboard on dabs	0.29	0.28	0.28	0.26	0.27
	Typical wall width 316mm					
125mm cavity						
75mm Celotex CG5000	None e.g. Paint Grade block	0.22	0.21	-	-	-
	13mm Lightweight plaster	0.21	0.21	0.21	0.20	0.21
	12.5mm Plasterboard on dabs	0.21	0.21	0.20	0.20	0.20
	Typical wall width 341mm					
75mm Kingspan Kooltherm K108	None e.g. Paint Grade block	0.19	0.19	-	-	-
	13mm Lightweight plaster	0.19	0.19	0.19	0.18	0.18
	12.5mm Plasterboard on dabs	0.19	0.18	0.18	0.18	0.18
	Typical wall width 341mm					
75mm Recticel Eurowall Cavity	None e.g. Paint Grade block	0.23	0.22	-	-	-
	13mm Lightweight plaster	0.22	0.22	0.22	0.21	0.21
	12.5mm Plasterboard on dabs	0.22	0.21	0.21	0.20	0.21
	Typical wall width 341mm					
150mm cavity						
100mm Kingspan Kooltherm K108	None e.g. Paint Grade block	0.15	0.15	-	-	-
	13mm Lightweight plaster	0.15	0.15	0.15	0.14	0.15
	12.5mm Plasterboard on dabs	0.15	0.15	0.15	0.14	0.14
	Typical wall width 366mm					
100mm Recticel Eurowall Cavity	None e.g. Paint Grade block	0.18	0.18	-	-	-
	13mm Lightweight plaster	0.18	0.18	0.17	0.17	0.17
	12.5mm Plasterboard on dabs	0.17	0.17	0.17	0.17	0.17
	Typical wall width 366mm					

Table 3 - Full cavity fill - Outer leaf facing brick or Lignacite Facing Masonry



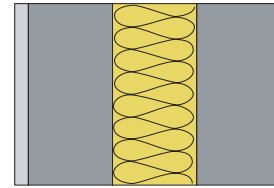
U-values (W/m²K)						
Insulation Option	Internal Finish	100mm Inner Leaf				
		Lignacrete	Lignacite	Ashlite	Fibo 850	Houseblock 1100
100mm cavity						
97mm Celotex CF5000	None e.g. Paint Grade block	0.20	0.20	-	-	-
	13mm Lightweight plaster	0.20	0.20	0.19	0.19	0.19
	12.5mm Plasterboard on dabs	0.19	0.19	0.19	0.18	0.19
	Typical wall width 302mm					
100mm CavityTherm CT/PIR	None e.g. Paint Grade block	0.20	0.20	-	-	-
	13mm Lightweight plaster	0.20	0.20	0.19	0.19	0.19
	12.5mm Plasterboard on dabs	0.19	0.19	0.19	0.18	0.18
	Typical wall width 302mm					
90mm Kingspan Kooltherm K106	None e.g. Paint Grade block	0.18	0.18	-	-	-
	13mm Lightweight plaster	0.18	0.18	0.18	0.17	0.17
	12.5mm Plasterboard on dabs	0.18	0.17	0.17	0.17	0.17
	Typical wall width 302mm					
90mm Recticel Eurowall +	None e.g. Paint Grade block	0.21	0.21	-	-	-
	13mm Lightweight plaster	0.20	0.20	0.20	0.19	0.20
	12.5mm Plasterboard on dabs	0.20	0.20	0.19	0.19	0.19
	Typical wall width 302mm					
100mm Dritherm Cavity Slab 32 Ultimate	None e.g. Paint Grade block	0.29	0.28	-	-	-
	13mm Lightweight plaster	0.28	0.28	0.27	0.26	0.26
	12.5mm Plasterboard on dabs	0.27	0.27	0.26	0.25	0.26
	Typical wall width 302mm					
100mm Platinum EcoBead (injected)	None e.g. Paint Grade block	0.29	0.29	-	-	-
	13mm Lightweight plaster	0.29	0.29	0.28	0.27	0.27
	12.5mm Plasterboard on dabs	0.28	0.28	0.27	0.26	0.26
	Typical wall width 302mm					
125mm cavity						
125mm CavityTherm CT/PIR	None e.g. Paint Grade block	0.16	0.15	-	-	-
	13mm Lightweight plaster	0.16	0.16	0.16	0.15	0.15
	12.5mm Plasterboard on dabs	0.16	0.16	0.15	0.15	0.15
	Typical wall width 327mm					
115mm Kingspan Kooltherm K106	None e.g. Paint Grade block	0.15	0.14	-	-	-
	13mm Lightweight plaster	0.14	0.14	0.14	0.14	0.14
	12.5mm Plasterboard on dabs	0.14	0.14	0.14	0.14	0.14
	Typical wall width 327mm					
115mm Recticel Eurowall +	None e.g. Paint Grade block	0.17	0.17	-	-	-
	13mm Lightweight plaster	0.17	0.17	0.16	0.16	0.16
	12.5mm Plasterboard on dabs	0.16	0.16	0.16	0.16	0.16
	Typical wall width 327mm					

Table 3 - Full cavity fill - Outer leaf facing brick or Lignacite Facing Masonry (cont)



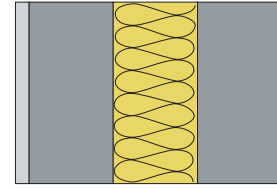
U-values (W/m²K)						
Insulation Option	Internal Finish	100mm Inner Leaf				
		Lignacrete	Lignacite	Ashlite	Fibo 850	Houseblock 1100
125mm cavity						
125mm Dritherm Cavity Slab 32 Ultimate	None e.g. Paint Grade block	0.23	0.23	-	-	-
	13mm Lightweight plaster	0.23	0.23	0.22	0.22	0.22
	12.5mm Plasterboard on dabs	0.22	0.22	0.22	0.21	0.21
	Typical wall width 327mm					
125mm Platinum EcoBead (injected)	None e.g. Paint Grade block	0.24	0.24	-	-	-
	13mm Lightweight plaster	0.24	0.23	0.23	0.22	0.22
	12.5mm Plasterboard on dabs	0.23	0.23	0.22	0.22	0.22
	Typical wall width 327mm					
150mm cavity						
150mm CavityTherm CT/PIR	None e.g. Paint Grade block	0.14	0.13	-	-	-
	13mm Lightweight plaster	0.13	0.13	0.13	0.13	0.13
	12.5mm Plasterboard on dabs	0.13	0.13	0.13	0.13	0.13
	Typical wall width 352mm					
140mm Recticel Eurowall +	None e.g. Paint Grade block	0.14	0.14	-	-	-
	13mm Lightweight plaster	0.14	0.14	0.14	0.13	0.14
	12.5mm Plasterboard on dabs	0.14	0.14	0.14	0.13	0.13
	Typical wall width 352mm					
150mm Dritherm Cavity Slab 32 Ultimate	None e.g. Paint Grade block	0.20	0.20	-	-	-
	13mm Lightweight plaster	0.20	0.19	0.19	0.19	0.19
	12.5mm Plasterboard on dabs	0.19	0.19	0.19	0.18	0.18
	Typical wall width 352mm					
150mm Platinum EcoBead (injected)	None e.g. Paint Grade block	0.20	0.20	-	-	-
	13mm Lightweight plaster	0.20	0.20	0.20	0.19	0.19
	12.5mm Plasterboard on dabs	0.20	0.20	0.19	0.19	0.19
	Typical wall width 352mm					

Table 4 - Full cavity fill - Outer leaf 16mm render on 100mm Lignacrete



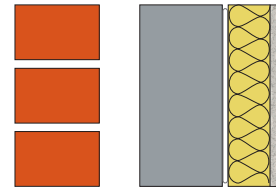
U-values (W/m²K)						
Insulation Option	Internal Finish	100mm Inner Leaf				
		Lignacrete	Lignacite	Ashlite	Fibo 850	Houseblock 1100
100mm cavity						
97mm Celotex CF5000	None e.g. Paint Grade block	0.20	0.20	-	-	-
	13mm Lightweight plaster	0.20	0.20	0.19	0.19	0.19
	12.5mm Plasterboard on dabs	0.19	0.19	0.19	0.18	0.19
	Typical wall width 302mm					
100mm CavityTherm CT/PIR	None e.g. Paint Grade block	0.20	0.20	-	-	-
	13mm Lightweight plaster	0.20	0.20	0.19	0.19	0.19
	12.5mm Plasterboard on dabs	0.19	0.19	0.19	0.18	0.18
	Typical wall width 302mm					
90mm Kingspan Kooltherm K106	None e.g. Paint Grade block	0.18	0.18	-	-	-
	13mm Lightweight plaster	0.18	0.18	0.18	0.17	0.17
	12.5mm Plasterboard on dabs	0.18	0.17	0.17	0.17	0.17
	Typical wall width 302mm					
90mm Recticel Eurowall +	None e.g. Paint Grade block	0.21	0.21	-	-	-
	13mm Lightweight plaster	0.20	0.20	0.20	0.19	0.20
	12.5mm Plasterboard on dabs	0.20	0.20	0.19	0.19	0.19
	Typical wall width 302mm					
100mm Dritherm Cavity Slab 32 Ultimate	None e.g. Paint Grade block	0.29	0.28	-	-	-
	13mm Lightweight plaster	0.28	0.28	0.27	0.26	0.26
	12.5mm Plasterboard on dabs	0.27	0.27	0.26	0.25	0.26
	Typical wall width 302mm					
100mm Platinum EcoBead (injected)	None e.g. Paint Grade block	0.29	0.29	-	-	-
	13mm Lightweight plaster	0.29	0.29	0.28	0.27	0.27
	12.5mm Plasterboard on dabs	0.28	0.28	0.27	0.26	0.26
	Typical wall width 302mm					
125mm cavity						
125mm CavityTherm CT/PIR	None e.g. Paint Grade block	0.16	0.15	-	-	-
	13mm Lightweight plaster	0.16	0.16	0.16	0.15	0.15
	12.5mm Plasterboard on dabs	0.16	0.16	0.15	0.15	0.15
	Typical wall width 327mm					
115mm Kingspan Kooltherm K106	None e.g. Paint Grade block	0.15	0.14	-	-	-
	13mm Lightweight plaster	0.14	0.14	0.14	0.14	0.14
	12.5mm Plasterboard on dabs	0.14	0.14	0.14	0.14	0.14
	Typical wall width 327mm					
115mm Recticel Eurowall +	None e.g. Paint Grade block	0.17	0.17	-	-	-
	13mm Lightweight plaster	0.17	0.17	0.16	0.16	0.16
	12.5mm Plasterboard on dabs	0.16	0.16	0.16	0.16	0.16
	Typical wall width 327mm					

Table 4 - Full cavity fill - Outer leaf 16mm render on 100mm Lignacrete (cont)



U-values (W/m²K)						
Insulation Option	Internal Finish	100mm Inner Leaf				
		Lignacrete	Lignacite	Ashlite	Fibo 850	Houseblock 1100
125mm cavity						
125mm Dritherm Cavity Slab 32 Ultimate	None e.g. Paint Grade block	0.23	0.23	-	-	-
	13mm Lightweight plaster	0.23	0.23	0.22	0.22	0.22
	12.5mm Plasterboard on dabs	0.22	0.22	0.22	0.21	0.21
	Typical wall width 327mm					
125mm Platinum EcoBead (injected)	None e.g. Paint Grade block	0.24	0.24	-	-	-
	13mm Lightweight plaster	0.24	0.23	0.23	0.22	0.22
	12.5mm Plasterboard on dabs	0.23	0.23	0.22	0.22	0.22
	Typical wall width 327mm					
150mm cavity						
150mm CavityTherm CT/PIR	None e.g. Paint Grade block	0.14	0.13	-	-	-
	13mm Lightweight plaster	0.13	0.13	0.13	0.13	0.13
	12.5mm Plasterboard on dabs	0.13	0.13	0.13	0.13	0.13
	Typical wall width 352mm					
140mm Recticel Eurowall +	None e.g. Paint Grade block	0.14	0.14	-	-	-
	13mm Lightweight plaster	0.14	0.14	0.14	0.13	0.14
	12.5mm Plasterboard on dabs	0.14	0.14	0.14	0.13	0.13
	Typical wall width 352mm					
150mm Dritherm Cavity Slab 32 Ultimate	None e.g. Paint Grade block	0.20	0.20	-	-	-
	13mm Lightweight plaster	0.20	0.19	0.19	0.19	0.19
	12.5mm Plasterboard on dabs	0.19	0.19	0.19	0.18	0.18
	Typical wall width 352mm					
150mm Platinum EcoBead (injected)	None e.g. Paint Grade block	0.20	0.20	-	-	-
	13mm Lightweight plaster	0.20	0.20	0.20	0.19	0.19
	12.5mm Plasterboard on dabs	0.20	0.20	0.19	0.19	0.19
	Typical wall width 352mm					

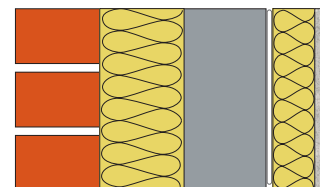
Table 5 - Clear cavity with internal insulation - Outer leaf facing brick or Lignacite Facing Masonry



U-values (W/m²K)					
Thermal plasterboard laminate	100mm Inner Leaf				
	Lignacrete	Lignacite	Ashlite	Fibo 850	Houseblock 1100
60mm Gyproc Thermaline Super (R=2.56m² K/W)	0.31	0.31	0.30	0.28	0.29
Typical wall width	327mm				
70mm Gyproc Thermaline Super (R=3.06m² K/W)	0.27	0.27	0.26	0.25	0.25
Typical wall width	337mm				
80mm Gyproc Thermaline Super (R=3.56m² K/W)	0.24	0.23	0.23	0.22	0.22
Typical wall width	347mm				
90mm Gyproc Thermaline Super (R=4.06m² K/W)	0.21	0.21	0.21	0.20	0.20
Typical wall width	357mm				
62.5mm Kingspan Kooltherm K118 (R=2.84m² K/W)	0.29	0.29	0.28	0.27	0.27
Typical wall width	329mm				
72.5mm Kingspan Kooltherm K118 (R=3.35m² K/W)	0.25	0.25	0.25	0.24	0.24
Typical wall width	339mm				
82.5mm Kingspan Kooltherm K118 (R=3.95m² K/W)	0.22	0.22	0.21	0.21	0.21
Typical wall width	349mm				
92.5mm Kingspan Kooltherm K118 (R=4.50m² K/W)	0.20	0.20	0.19	0.19	0.19
Typical wall width	359mm				

Table 6 - Full cavity fill and internal insulation (Thermal plasterboard laminate) Outer leaf facing brick or Lignacite Facing Masonry.

In situations where a low wall U-value is required and it is not possible to increase the cavity width, a possible solution is to use cavity insulation in conjunction with a thermal plasterboard laminate. Some examples are shown in Table 6 and assume 100mm cavity insulation. If required a narrower cavity can be specified, or partial cavity fill used in lieu of full cavity fill. Other sizes of thermal plasterboard laminates are available.



U-values (W/m²K)						
Cavity fill - 100mm cavity	Thermal Plasterboard Laminate	100mm Inner Leaf				
		Lignacrete	Lignacite	Ashlite	Fibo 850	Houseblock 1100
97mm Celotex CF5000 plus	62.5mm Kingspan Kooltherm K118 (R=2.84m² K/W)	0.13	0.13	0.13	0.12	0.12
100mm CavityTherm CT/PIR	62.5mm Kingspan Kooltherm K118 (R=2.84m² K/W)	0.13	0.13	0.12	0.12	0.12
90mm Kingspan Kooltherm K106	62.5mm Kingspan Kooltherm K118 (R=2.84m² K/W)	0.12	0.12	0.12	0.12	0.12
90mm Recticel Eurowall +	62.5mm Kingspan Kooltherm K118 (R=2.84m² K/W)	0.13	0.13	0.13	0.13	0.13
100mm Dritherm Cavity Slab 32 Ultimate	62.5mm Kingspan Kooltherm K118 (R=2.84m² K/W)	0.16	0.16	0.15	0.15	0.15
100mm Platinum EcoBead (injected)	62.5mm Kingspan Kooltherm K118 (R=2.84m² K/W)	0.16	0.16	0.16	0.15	0.15

Notes: The typical wall width of the above constructions is 379mm.

Notes to tables:

1. The U-values shown are based on the use of various proprietary insulation products described. Alternative products can be used, provided they can achieve an equivalent thermal resistance (m^2K/W) of the product and, where applicable, enhanced low emissivity values of the airspace in cavity walls.

2. The U-values shown have been calculated using Lignacite's concrete blocks with a face size of 440 x 215mm and with mortar joints assumed to be 10mm wide. Wall ties are assumed to be stainless steel with a cross-sectional area of no more than 12.5mm² for structural cavities up to 175mm wide. Above 175mm, the cross-sectional area of wall ties is assumed to be 25mm².

3. The typical wall widths shown are for illustrative purposes only. They do not include the thickness of any internal finishes except for wall solutions with thermal insulation laminates. Thermal laminates are assumed to have a minimum 15mm airspace between the laminate and the block-work. Traditional renders are assumed to be 16mm thick.

The wall widths shown for Lignacite's blocks in conjunction with partial cavity fill assume that a residual clear cavity of 50mm will be maintained. In some cases it may be possible to reduce the cavity width to a minimum of 25mm. The insulation manufacturer should be consulted for guidance.

The U-values given in this Brochure are correct at the time of going to press and are based on manufacturers' details available at that time. Details of insulation products featured in the constructions solutions can be obtained as follows:

Insulation product	Manufacturer	Contact details
Cavitytherm	Xtratherm Ltd	www.cavitytherm.co.uk
Celotex CG 5000	Celotex Ltd	www.celotex.co.uk
Drittherm Cavity Slab 32 Ultimate	Knauf Insulation Ltd	www.knaufinsulation.co.uk
Gyproc Thermaline Super	British Gypsum	www.british-gypsum.com
Ecobead injected cavity fill	Springvale EPS Ltd	www.springvale.com
Gyproc Thermaline Super	British Gypsum	www.british-gypsum.com
Recticel Eurowall full and partial fill	Recticel Insulation Products	www.recticelinsulation.co.uk
Kingspan full and partial fill, insulated plasterboard	Kingspan Insulation Ltd	www.kingspaninsulation.co.uk