



U-Value of Elements

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A guide to the specification of insulation materials in domestic extensions to achieve compliance with Building Regulations Approved Document Part L
Volume 1

**NEW GOLD
GUIDE**

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Introduction

Hertfordshire Building Control has been pleased to work with prominent manufacturers in the insulation and concrete block industries to collate this useful guidance on the specification of floor, roof and wall elements in domestic extensions. The listed solutions can achieve the maximum U-Values listed in Table 4.2 of Approved Document L Volume 1 covering development in England. They are supported by calculations with appropriate third party accreditation under the BBA Competency Scheme for U-Values or an equivalent standard.

It is important to note that the listed specifications should always be constructed in strict accordance with the respective manufacturer's technical guidance. For the potential performance to be achieved there must be due regard for the need for continuity of insulation and a reasonable standard of airtightness.

The indicative U-Values and insulation specifications in the following tables are derived using various assumptions and input factors incorporated within manufacturers' software. Thermal performance can be affected by many factors including the method of construction and installation of the product and the end use application. When specifying products, you need to satisfy yourself that use of the system meets all relevant national Building Regulations such as those relating to fire safety and condensation risk. Your Local Authority Building Control team will be able to offer further advice in that respect if needed. Should you wish to receive a bespoke U-value calculation then these can usually be obtained from the various manufacturers included.



The guidance contained in this document has been prepared by Hertfordshire Building Control.

All data relating to specific products has been sourced from the manufacturers at the time of print. They are typical examples and are NOT specifically recommended by Local Authority Building Control. All the listed materials must be installed in strict accordance with manufacturers guidance and with due regard to the need to ensure continuity of insulation and a reasonable standard of airtightness.

The specifications listed are only suggestions as to how the necessary thermal performance can be achieved. Other specifications that can be shown to be compliant with the Building Regulations will be accepted by Building Control.

Designed by Building Control Communications on behalf of Hertfordshire Building Control - October 2023



Ground Floor

02

Ground floor insulation: Suspended timber floors

U-value to achieve maximum 0.18 W/m².K

Product	λ-value	Required thickness of insulation (mm)										Notes	
		Perimeter/Area ratio											
		1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1		
ROCKWOOL Roll	0.044	250	250	250	250	250	250	250	250	200	200	100	
ROCKWOOL Flexi	0.038 / 0.035*	220	220	210	210	210	200	180	170	140	140		*Flexi 50mm-120mm - 0.038W/(mK) & Flexi 140mm or above 0.035W/(mK)
ACTIS Hybris combined with Boost'R Hybrid'	0.033	105	105	90	75	75	60	60	50	50			
ACTIS HYBRIS	0.033	140	140	140	125	125	125	105	105	90			
Unilin Insulation XT/UF	0.022	150	150	150	150	140	140	130	120	110	50	Insulation is assumed to be installed between timber joists at 400mm centres with 22mm T+G chipboard deck over joists	
Unilin Insulation SR/UF	0.020	140	140	140	130	130	125	120	110	100			
Unilin Insulation SR/UF	0.021										50		
Celotex XR4000	0.022	150	150	150	150	140	140	130	120	110		Insulation is assumed to be installed between timber joists at 400mm centres with 18mm T+G chipboard deck over joists	
Polyfoam Floorboard Standard/Extra	0.033	200	195	185	185	180	175	165	155	130	60		
Kingspan Thermafloor TF70	0.022	130	130	130	120	110	110	100	100	80			

U-value to achieve maximum 0.15 W/m².K

Product	λ-value	Required thickness of insulation (mm)										Notes
		Perimeter/Area ratio										
		1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1	
ACTIS Hybris combined with Boost'R Hybrid'	0.033	140	140	140	125	105	105	125	90	75		Suspended timber floors
ACTIS Hybris	0.033	185	185	170	170	170	155	155	140	125		
ROCKWOOL Roll	0.044	300	300	300	300	300	300	300	250	250	250	
ROCKWOOL Flexi	0.038 / 0.035*	260	260	260	260	260	250	250	230	210	200	*Flexi 50mm-120mm - 0.038W/(mK) & Flexi 140mm or above 0.035W/(mK)
Unilin Insulation XT/UF	0.022	180	180	175	175	170	165	160	150	140	90	Insulation is assumed to be installed between timber joists at 400mm centres with 22mm T+G chipboard deck over joists (Total thickness using 2 layers)
Unilin Insulation SR/UF	0.020	175	175	175	175	160	160	160	140	125		
Unilin Insulation SR/UF	0.021										80	
Polyfoam Floorboard Standard/Extra	0.033	240	235	235	235	225	220	210	200	175	110	Insulation between timber joists at 400mm centres with 18mm T&G chipboard over joists
Kingspan Thermafloor TF70	0.022	170	170	160	150	150	150	140	130	120		

Ground floor insulation: Suspended beam and block floors

U-value to achieve maximum 0.18 W/m².K

Product	λ-value	Required thickness of insulation (mm)										Notes	
		Perimeter/Area ratio											
		1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1		
ROCKWOOL Rockfloor	0.038	200	200	200	200	200	200	200	200	150	150	100	
Polyfoam Floorboard Standard/Extra	0.033	135	135	130	130	125	120	115	105	105	85	35	Insulation is assumed to be installed over blocks with lambda 0.18 W/m.K, under 65mm screed
Celotex GA4000	0.022	90	90	90	90	90	90	80	80	80	70		
Unilin Insulation XT/UF	0.022	90	90	90	90	90	90	80	80	80	70	25	
Unilin Insulation XT/HYF	0.021	100	100	100	100	100	75	75					Insulation based on available thicknesses
Unilin Insulation SR/UF	0.021	90	90	80	80	80	75	70	70	70	60		
Kingspan Kooltherm K103 Floorboard	0.019	90	90	90	90	80	80	75	75	75	70		Calculations assume dense block infill of λ-value (1.13 W/mK)

U-value to achieve maximum 0.15 W/m².K

Product	λ-value	Required thickness of insulation (mm)										Notes	
		Perimeter/Area ratio											
		1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1		
ROCKWOOL Rockfloor	0.038				200	200	200	200	200	200	200	150	Cannot install more than a double layer
Polyfoam Floorboard Standard/Extra	0.033	170	165	165	165	160	155	150	140	120	120	60	Insulation is assumed to be installed over blocks with lambda 0.18 W/m.K, under 65mm screed
Unilin Insulation XT/UF	0.022	110	110	110	110	110	110	100	90	80	50		
Unilin Insulation XT/HYF	0.021	125	125	125	125	100	100	100	100	75		Insulation based on available thicknesses	
Unilin Insulation SR/UF	0.020	100	100	100	100	100	100	100					
Unilin Insulation SR/UF	0.021								90	75	50		
Kingspan Kooltherm K103 Floorboard	0.019	110	110	110	110	100	100	100	100	90		Calculations assume dense block infill of λ-value (1.13 W/mK)	

Ground floor insulation: Ground bearing slab

U-value to achieve maximum 0.18 W/m².K

Product	λ-value	Required thickness of insulation (mm)										Notes
		Perimeter/Area ratio										
		1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1	
Celotex GA4000	0.022	100	100	100	100	100	90	90	80	70		Insulation is assumed to be installed over concrete slab under 65mm screed
ROCKWOOL Rockfloor	0.038	200	200	200	200	150	150	150	150	100	50	
Polyfoam Floorboard Standard/Extra	0.033	145	145	140	135	130	125	115	100	75	25	
Unilin Insulation XT/UF	0.022	100	100	100	100	100	90	90	80	70		
Unilin Insulation XT/HYF	0.021	100	100	100	100	100	75	75	75			
Unilin Insulation SR/UF	0.021	90	90	90	90	80	75	70	60	50	40	
Kingspan Kooltherm K103 Floorboard	0.019	100	100	100	90	80	80	75	70	60		

U-value to achieve maximum 0.15 W/m².K

Product	λ-value	Required thickness of insulation (mm)										Notes
		Perimeter/Area ratio										
		1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1	
ROCKWOOL Rockfloor	0.038	200	200	200	200	150	150	150	150	100	50	Insulation is assumed to be installed over concrete slab under 65mm screed
Polyfoam Floorboard Standard/Extra	0.033	180	180	175	170	165	160	150	135	110	35	
Unilin Insulation XT/UF	0.022	120	120	120	110	110	110	100	90	70	25	
Unilin Insulation XT/HYF	0.021	125	125	125	125	100	100	100	100	75		
Unilin Insulation SR/UF	0.020	110	110	100	100	100	100					
Unilin Insulation SR/UF	0.021							90	80	70	40	
Kingspan Kooltherm K103 Floorboard	0.019	110	100	100	100	100	100	100	90	75		

Ground floor insulation: Floating floors

U-value to achieve maximum 0.18 W/m².K

Product	λ-value	Required thickness of insulation (mm)										Notes
		Perimeter/Area ratio										
		1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1	
ROCKWOOL Rock-floor		200	200	200	180	150	150	150	150	100	50	
Polyfoam Floorboard Standard/Extra	0.033	145	140	140	135	130	125	115	100	75	25	Insulation is assumed to be installed over solid slab under minimum 18mm T+G chipboard covering
Celotex GA4000	0.022	100	100	100	90	90	90	80	70	50		
Unilin Insulation XT/UF	0.022	100	100	100	90	90	90	80	70	50	25	Insulation is assumed to be installed over solid slab under minimum 22mm T+G chipboard covering
Unilin Insulation XT/HYF	0.021	100	100	100	100	100	75	75				
Unilin Insulation SR/UF	0.021	90	90	90	90	80	75	70	60	50		
Kingspan Thermafloor TF70	0.022	100	100	100	100	90	90	90	75	60		



Walls

03

Walls: Timber frame with brick or block external skin

U-value to achieve maximum 0.18 W/m².K

Outer Leaf	Cavity		Breather Membrane	Frame (mm)	Insulation Product		Vapour Control Layer	Service batten	Internal finish	
	Type	mm			Product	mm			Product	mm
Brick or Block	Clear Cavity	50	Standard	100	Celotex GA4000	70			Celotex PL4000	62.5
			Standard	100	ISOVER Timber Frame Roll/ Batt 32	90			Celotex PL4000	77.5
			Standard	140	ACTIS HYBRIS & HControl Hybrid	105	HControl Hybrid	38	P/board & Skim	15
			Reflective	140	ACTIS HYBRIS & HControl Hybrid	75	HControl Hybrid	38	P/board & Skim	15
			Boost'R Hybrid	140	ACTIS HYBRIS & Boost'R Hybrid	125	Standard		P/board & Skim	15
			Boost'R Hybrid	140	ACTIS HYBRIS & Boost'R Hybrid	90	Reflective	25	P/board & Skim	15
			Standard/ Foiled Faced	140	Kingspan Kooltherm K112 Framing Board	120	K118	0	Kingspan Kooltherm K118 Insulated Plasterboard	37.5
			Foil Faced Bubble	140	Kingspan Kooltherm K112 Framing Board	120	Standard	0	P/board & Skim	37.5
			Standard	150	Celotex XR4000	120			Celotex PL4000	37.5
			Standard	150	ISOVER Timber Frame Roll/ Batt 32	140			Celotex PL4000	52.5
			Reflective	175	ACTIS HYBRIS Insulation	140	Reflective	25	P/board & Skim	15
			Reflective	184	ACTIS HYBRIS Insulation	170	Standard		P/board & Skim	15
			Boost'R Hybrid	89	ACTIS HYBRIS, HControl Hybrid & Boost'R Hybrid	50	HControl Hybrid	38	P/board & Skim	15
			Standard	89	Kingspan Kooltherm K112 Framing Board	70	K118	0	Kingspan Kooltherm K118 Insulated P/Board	37.5
			Foil Faced	89	Kingspan Kooltherm K112 Framing Board	70	K118	0	Kingspan Kooltherm K118 Insulated P/Board	42.5
			Foil Faced Bubble	89	Kingspan Kooltherm K112 Framing Board	70	K118	0	Kingspan Kooltherm K118 Insulated P/Board	52.5

Walls: Timber frame wall

U-value to achieve maximum 0.18 W/m².K

Cladding	Cavity		Breather Membrane	Frame (mm)	Insulation Product		Vapour Control Layer	Service batten	Internal finish		
	Type	mm			Product	mm			Product	mm	
Block & Render	Clear Cavity	50	Standard	100	Unilin Insulation XT/TF	80			Unilin Insulation XT/TF	40	
				100	Unilin Insulation XO/FB	75			Unilin Insulation XO/FB	40	
				100	Unilin Insulation SR/FB	75			Unilin Insulation SR/FB	40	
				140	Unilin Insulation XT/TF	110			Unilin Insulation XT/TF	25	
				140	Unilin Insulation XO/FB	100			Unilin Insulation XO/FB	25	
				140	Unilin Insulation SR/FB	100			Unilin Insulation SR/FB	25	
				100	Celotex GA4000	70			Celotex PL4000	62.5	
				150	Celotex XR4000	120			Celotex PL4000	37.5	
				100	ISOVER Timber Frame Roll/ Batt 32	90			Celotex PL4000	77.5	
				150	ISOVER Timber Frame Roll/ Batt 32	140			Celotex PL4000	52.5	
Brick	Clear Cavity	50	Standard	100	Celotex GA4000	70			Celotex PL4000	62.5	
				150	Celotex XR4000	120			Celotex PL4000	37.5	
				100	ISOVER Timber Frame Roll/ Batt 32	90			Celotex PL4000	77.5	
				150	ISOVER Timber Frame Roll/ Batt 32	140			Celotex PL4000	52.5	
				100	Unilin Insulation XT/TF	80			Unilin Insulation XT/TF	40	
				100	Unilin Insulation XO/FB	75			Unilin Insulation XO/FB	40	
				100	Unilin Insulation SR/FB	75			Unilin Insulation SR/FB	40	
				140	Unilin Insulation XT/TF	110			Unilin Insulation XT/TF	25	
				140	Unilin Insulation XO/FB	100			Unilin Insulation XO/FB	25	
				140	Unilin Insulation SR/FB	100			Unilin Insulation SR/FB	25	
Brick or Block	Clear Cavity	50	Reflective	89	Actis Eolis HC	135	Eolis HC	50	25mm EPS Insulation	25 +15	
Cladding on battens	Ventilated		Standard	100	Celotex GA4000	75			Celotex PL4000	62.5	
				150	Celotex XR4000	120			Celotex PL4000	37.5	
				100	ISOVER Timber Frame Roll/ Batt 32	90			Celotex PL4000	77.5	
				150	ISOVER Timber Frame Roll/ Batt 32	140			Celotex PL4000	52.5	
				100	Unilin Insulation XT/TF	80			Unilin Insulation XT/TF	40	
				100	Unilin Insulation XO/FB	75			Unilin Insulation XO/FB	40	
				100	Unilin Insulation SR/FB	75			Unilin Insulation SR/FB	40	
				140	Unilin Insulation XT/TF	110			Unilin Insulation XT/TF	25	
				140	Unilin Insulation XO/FB	100			Unilin Insulation XO/FB	25	
				140	Unilin Insulation SR/FB	100			Unilin Insulation SR/FB	25	
				140	Kingspan Kooltherm K112 Framing Board	90			Kingspan Kooltherm K118 Insulated Plasterboard	37.5	
				89	Kingspan Kooltherm K112 Framing Board	70			Kingspan Kooltherm K118 Insulated Plasterboard	52.5	
				200	ACTIS HYBRIS Insulation	170	Reflective	25	P/board & Skim	15	
				150	ACTIS HYBRIS & HControl Hybrid	105	HControl Hybrid	38	P/board & Skim	15	
				Reflective	89	Actis Eolis HC	135	Eolis HC	50	50mm EPS Insulation	50 + 15
				Boost'R Hybrid	175	ACTIS HYBRIS & Boost'R Hybrid	140	Standard		P/board & Skim	15
					140	ACTIS HYBRIS & Boost'R Hybrid	125	Reflective	25	P/board & Skim	15
89	"ACTIS HYBRIS, HControl Hybrid & Boost'R Hybrid"	50	HControl Hybrid		38	P/board & Skim	15				

Walls: Full fill cavity wall - brick and block

U-value to achieve maximum 0.18 W/m².K

Outer Leaf		Cavity (mm)	Insulation Product		Inner Leaf		Internal finish	
Type	mm		Product	mm	Block	mm	Product	mm
Brick	103	100	Celotex ThermaClass 21 Cavity Wall	90	Aggregate block (0.21-0.31 W/m.K)	100	P/Board on dabs	12.5
		100	Kingspan Kooltherm K106 Cavity Board	90	Dense block (1.13 W/m.K)			
		110	Unlin Insulation CavityTherm	110	Dense block (1.13 W/m.K)			
		125	Celotex ThermaClass 21 Cavity Wall	115	Dense block (1.13 W/m.K)			
		140	ISOVER CWS 32	140	Aircrete block (0.11 W/m.K)			
		150	ISOVER CWS 32	150	Aggregate block (0.21-0.31 W/m.K)			
		150	Rockwool NyRock Cavity Batt	150	Aircrete block (0.11 W/m.K)			
		160	Rockwool NyRock Cavity Batt	160	Dense block (1.13 W/m.K)			
		160	Rockwool NyRock Cavity Batt	160	Aircrete block (0.15 W/m.K)			
		165	ISOVER CWS 32	165	Dense block (1.13 W/m.K)			
		175	Rockwool Full Fill Cavity Batt	175	Aircrete block (0.11 W/m.K)			
		180	Rockwool Full Fill Cavity Batt	180	Dense block (1.13 W/m.K)			

Walls: Full fill cavity wall - block and block

U-value to achieve maximum 0.18 W/m².K

External Finish	Outer Leaf		Cavity (mm)	Insulation Product		Inner Leaf		Internal finish	
	Type	mm		Product	mm	Block	mm	Product	mm
20mm Render	Dense block (1.13 W/m.K)	100	100	Celotex ThermaClass 21 Cavity Wall	90	Aggregate block (0.21-0.31 W/m.K)	100	P/Board on dabs	12.5
			100	Kingspan Kooltherm K106 Cavity Board	90	Dense block (1.13 W/m.K)			
			100	Unlin Insulation CavityTherm	100	Aggregate block (0.21-0.30 W/m.K)			
			110	Unlin Insulation CavityTherm	110	Dense block (1.13 W/m.K)			
			125	Celotex ThermaClass 21 Cavity Wall	115	Dense block (1.13 W/m.K)			
			150	ISOVER CWS 32	150	Aggregate block (0.21-0.31 W/m.K)			
			150	ISOVER CWS 32	150	Aircrete block (0.11-0.15 W/m.K)			
			150	Rockwool NyRock Cavity Batt	150	Aggregate block (0.24-0.31 W/m.K)			
			160	Rockwool NyRock Cavity Batt	160	Dense block (1.13 W/m.K)			
			165	ISOVER CWS 32	165	Aggregate block (0.41 W/m.K)			
			165	ISOVER CWS 32	165	Dense block (1.13 W/m.K)			
			175	Rockwool Full Fill Cavity Batt	175	Aggregate block (0.24-0.31 W/m.K)			
			180	Rockwool Full Fill Cavity Batt	180	Aggregate block (0.41 W/m.K)			
			200	Rockwool Full Fill Cavity Batt	200	Dense block (1.13 W/m.K)			

Walls: Partial fill cavity wall – brick and block

U-value to achieve maximum 0.18 W/m².K

Outer Leaf		Cavity (mm)	Insulation Product		Inner Leaf		Internal finish	
Type	mm		Product	mm	Block	mm	Product	mm
Brick	103	120	Kingspan Kooltherm K108 Cavity Board	70	Aircrete block (0.11-15 W/m.K)	100	Plaster or P/Board on dabs	13
		125	Kingspan Kooltherm K108 Cavity Board	75	Aggregate block (0.21 W/m.K)			
		125	Unilin Insulation XT/CWP	75	Aircrete block (0.11 W/m.K)			
		130	Kingspan Kooltherm K108 Cavity Board	80	Aggregate block (0.31-41 W/m.K)			
		130	Unilin Insulation XT/CW	80	Aircrete block (0.11 W/m.K)			
		130	Unilin Insulation XT/CWP	80	Aircrete block (0.11-0.15 W/m.K)			
		135	Celotex CW4000	85	Aircrete block (0.11-15 W/m.K)			
		140	Kingspan Kooltherm K108 Cavity Board	90	Dense block (1.13 W/m.K)			
		140	Unilin Insulation XT/CW	90	Aggregate block (0.21-0.31 W/m.K)			
		140	Unilin Insulation XT/CWP	90	Dense block (1.13 W/m.K)			
		150	Celotex CW4000	100	Dense block (1.13 W/m.K)			
		150	Rockwool HP Partial Fill	150	Aircrete block (0.15 W/m.K)			
		150	Rockwool NyRock Cavity Batt	150	Aircrete block (0.15 W/m.K)			
		150	Unilin Insulation XT/CW	100	Dense block (1.13 W/m.K)			

Walls: Partial fill cavity wall – block and block

U-value to achieve maximum 0.18 W/m².K

External Finish	Outer Leaf		Cavity (mm)	Insulation Product		Inner Leaf		Internal finish	
	Type	mm		Product	mm	Block	mm	Product	mm
20mm Render	Dense block (1.13 W/m.K)	100	120	Kingspan Kooltherm K108 Cavity Board	70	Aircrete block (0.11-15 W/m.K)	100	Plaster or P/Board on dabs	13
			125	Kingspan Kooltherm K108 Cavity Board	75	Aggregate block (0.21 W/m.K)			
			125	Unilin Insulation XT/CWP	75	Aircrete block (0.11 W/m.K)			
			130	Kingspan Kooltherm K108 Cavity Board	80	Aggregate block (0.31-41 W/m.K)			
			130	Unilin Insulation XT/CW	80	Aircrete block (0.11-0.15 W/m.K)			
			130	Unilin Insulation XT/CWP	80	Aircrete block (0.11-15 W/m.K)			
			135	Celotex CW4000	85	Aggregate block (0.21 W/m.K)			
			140	Kingspan Kooltherm K108 Cavity Board	90	Dense block (1.13 W/m.K)			
			140	Unilin Insulation XT/CW	90	Aggregate block (0.21-0.41 W/m.K)			
			140	Unilin Insulation XT/CWP	90	Dense block (1.13 W/m.K)			
			150	Celotex CW4000	100	Dense block (1.13 W/m.K)			
			150	Rockwool HP Partial Fill	150	Aircrete block (0.15 W/m.K)			
			150	Rockwool NyRock Cavity Batt	150	Medium Dense Block 0.47W/(mK)			
			150	Unilin Insulation XT/CW	100	Dense block (1.13 W/m.K)			
			160	Rockwool NyRock Cavity Batt	160	Dense block (1.13 W/m.K)			
			180	Rockwool HP Partial Fill	180	Dense block (1.13 W/m.K)			
			190	ISOVER CWS 32	140	Aircrete block (0.11-15 W/m.K)			
			200	ISOVER CWS 32	150	Aggregate block (0.21-0.31 W/m.K)			
215	ISOVER CWS 32	165	Dense block (1.13 W/m.K)						



Pitched Roofs

Pitched Roofs: Vented cold deck

U-value to achieve maximum 0.15 W/m².K

Product	λ-value	Solution (mm)	Notes
Celotex GA4000	0.022	100mm GA4000 between rafters, 50mm GA4000 under with service void & 12.5mm plasterboard	Insulation between and under rafters
Celotex XR4000 with PL4000 insulated plasterboard	0.022	150mm XR4000 between rafters & 37.5mm PL4000 under rafters	
Celotex GA4000	0.022	90mm between joists with 70mm over	
Isover Spacesaver	0.044	100mm between joists with 200mm over	
Isover Spacesaver Plus	0.04	100mm between joists with 200mm over	
Kingspan Kooltherm K118 Insulated Plasterboard + K107 Pitched Roof Board	0.019	100mm K107 Pitched Roof Board between + 57.5mm Kingspan Kooltherm K118 Insulated Plasterboard	
Unilin Insulation XT/PR	0.022	100mm XT/PR between rafters, 50mm XT/PR under with service void & 12.5mm plasterboard	
Unilin Insulation XT/PR with XT/TL MF insulated plasterboard	0.022	150mm XT/PR between rafters & 37.5mm XT/TL MF under rafters	
Unilin Insulation XT/PR with XT/TL MF insulated plasterboard	0.022	100mm XT/PR between joists with XT/TL MF 60mm under	Twin roll (100mm) triple layered
ROCKWOOL Roll	0.044	100mm in between joists with 200mm over	
ROCKWOOL Flexi	0.035 / 0.038	320 mm ROCKWOOL Flexi insulation between rafters	Insulation between rafters
HYBRIS Insulation (600mm timber centres)	0.033	250mm timber: 2x 105mm insulation between rafters	Unventilated air cavities associated with ACTIS products
HYBRIS & HControl Hybrid (600mm timber centres)	0.033	175mm timber: 140mm insulation between / HControl Hybrid rafters & 38mm service batten	
HYBRIS Insulation (400mm timber centres)	0.033	275mm timber: 125mm & 105mm insulation between rafters	
HYBRIS & HControl Hybrid (400mm timber centres)	0.033	200mm timber: 155mm insulation between / Hcontrol Hybrid rafters & 38mm service batten	
EOLIS HC & Insulated Plasterboard (400mm & 600mm timber centres)	0.031	150mm timber: 135mm insulation between / under rafters & 25mm service batten & 72.5mm PIR insulated plasterboard	

Pitched Roofs: Warm deck

U-value to achieve maximum 0.15 W/m².K

Product	λ-value	Solution (mm)	Notes
Celotex GA4000	0.022	75mm GA4000 over rafters with 75mm GA4000 between rafters	Insulation above or Insulation between and above
Celotex GA4000 + Isover Timber Frame Roll/ Batt 35	0.022 + 0.035	90mm GA4000 over rafters with 140mm Timber Frame Roll/ Batt 35 between rafters	
Kingspan Kooltherm K107 Pitched Roof Board	0.019	70mm between + 70mm over	
Celotex XR4000	0.022	130mm XR4000 over rafters with breathable membrane beneath counter battens	Insulation above and in between rafters
Unilin Insulation XT/PR	0.022	75mm XT/PR over rafters with 75mm XT/PR between rafters	
ROCKWOOL Flexi & Hardrock Multifix	0.038 + 0.039	140mm Flexi in between rafters with 115mm Hardrock Multifix above	
Unilin Insulation XT/PR	0.022	130mm XT/PR over rafters with breathable membrane beneath counter battens	Insulation above rafters
Unilin Insulation XO/SK	0.021	125mm XO/SK over rafters with breathable membrane beneath counter battens	
HYBRIS & Boost'R Hybrid Roof (600mm timber centres)	0.033	225mm timber: 170mm insulation between / Boost'R Hybrid & over rafters	Unventilated air cavities associated with Hybris and Hcontrol Hybrid
HYBRIS, HControl Hybrid & Boost'R Hybrid Roof (600mm timber centres)	0.033	150mm timber: 90mm insulation between / Hcontrol Hybrid under & Boost'R Hybrid over rafters	
HYBRIS & Boost'R Hybrid Roof (400mm timber centres)	0.033	250mm timber: 185mm insulation between / Boost'R Hybrid & over rafters	
HYBRIS, HControl Hybrid & Boost'R Hybrid Roof (400mm timber centres)	0.033	175mm timber: 105mm insulation between / Hcontrol Hybrid under & Boost'R Hybrid over rafters	



Flat Roofs

Flat Roofs: Cold deck

U-value to achieve maximum 0.15 W/m².K

Product	λ-value	Solution (mm)
Celotex GA4000 with PL4000 insulated plasterboard	0.022	100mm GA4000 between joists with 77.5mm PL4000 under
Celotex GA4000 + Isover Timber Frame Roll/ Batt 35	0.022 + 0.035	100mm Timber Frame Roll/ Batt 35 between joists with 90mm GA4000 under
ROCKWOOL Nyrock Frame Slab	0.032	100mm Nyrock Frame Slab in between + 150mm Nyrock Frame Slab below in battens
ROCKWOOL Flexi	0.035 / 0.038	170mm in between joists (220mm Joist Depth) + 120mm below joists supported in battens
Unilin Insulation XT/PR with XT/TL MF insulated plasterboard	0.022	100mm XT/PR between joists with 77.5mm XT/TL MF under
HYBRIS & HControl Hybrid* (400mm Timber centres)	0.33	Timber size 200+50mm: 170mm Insulation between and under or over rafters + 38mm Service Batten**
HYBRIS & Boost'R Hybrid Roof (400mm Timber centres)	0.33	Timber size 200+50mm : 185mm Insulation between and under or over rafters**
HYBRIS, HControl Hybrid & Boost'R Hybrid Roof (400mm Timber centres)	0.33	Timber size 175mm: 105mm Insulation between and under or over rafters + 38mm Service Batten**
Kingspan Kooltherm K118 Insulated Plasterboard + Kingspan Kooltherm K107 Pitched Roof Board	0.019	100mm Kingspan Kooltherm K107 Pitched Roof Board between + 62.5mm Kingspan Kooltherm K118 Insulated Plasterboard

Flat Roofs: Warm deck

U-value to achieve maximum 0.15 W/m².K

Product	λ-value	Solution (mm)
Unilin Insulation FR-ALU	0.022	140mm FR-ALU fixed over timber deck and VCL with mechanically fixed membrane
Unilin Insulation FR-ALU	0.022	150mm FR-ALU fixed over concrete deck and VCL with mechanically fixed membrane
Unilin Insulation FR-MG	0.024	150mm FR-MG adhered over timber deck and VCL with adhered membrane
Unilin Insulation FR-MG	0.024	150mm FR-MG adhered over VCL and concrete deck with adhered membrane
Unilin Insulation FR-BGM	0.024	150mm FR-BGM adhered over timber deck and VCL with torch on felt
Unilin Insulation FR-BGM	0.024	150mm FR-BGM adhered over VCL and concrete deck with torch on felt
ROCKWOOL Hardrock Multifix (above deck)	0.039	255mm insulation above deck (150mm + 105mm insulation)
Kingspan Thermaroom TR27	0.024	150mm Kingspan Thermaroom TR27 finished with single ply membranes or 3 layer partially bonded felts on timber deck and 12.5mm plasterboard ceiling
Kingspan Thermaroom TR26	0.022	140mm Kingspan Thermaroom TR26 finished with mechanically fixed single ply membrane on timber deck and 12.5mm plasterboard ceiling
Kingspan Thermaroom TR24	0.024	150mm Kingspan Thermaroom TR24 finished with 2 or 3 layer torch on felts on timber deck and 12.5mm plasterboard ceiling



Blocks

06

Blocks: Block thermal conductivity

Manufacturer	Product type & Strength	Brand	Thermal Conductivity W/mK
Besblock	Medium density block (3.6, 7.3 & 10.4 N/mm ²)	Star Performer	0.65
Besblock	Medium density block (3.6,7.3,10.4 n/mm ²)	Insulite	0.45
Besblock	Lightweight block (3.6, 7.3n/mm ²)	Bestherm 18	0.28
Besblock	Lightweight block (3.5, 7.3n/mm ²)	Pumice	0.31
Besblock	Dense aggregate block (7.3, 10.4, 17.5,22.5n/mm ²)	Bescrete	0.99
Besblock	Lightweight aggregate block (3.6,7.3n/mm ²)	Masterite Ultra	0.23
Breedon	Lightweight concrete block (3.6 & 7.3 N/mm ²)	Lightweight	0.33
Breedon	Lightweight concrete block (7.3 - 10.4 N/mm ²)	Medium Dense	0.57
Breedon	Dense concrete block (7.3 -10.4 N/mm ²)	Dense	1.17
Broome Bros	Lightweight concrete block (3.6 & 7.3N/mm ²)	Donlite	0.41
Broome Bros	Lightweight concrete block (10.4N/mm ²)	Donlite	0.48
Broome Bros	Dense concrete block (7.3N/mm ²)	Doncrete	1.15
Broome Bros	Dense concrete block (10.4N/mm ²)	Doncrete	1.15
Cemex	Lightweight concrete block (3.6N/mm ²)	Readyblock 1100	0.36
Cemex	Lightweight concrete block (7.3 & 10.4N/mm ²)	Readyblock 1400	0.46
Cemex	Dense concrete block (7.3,10.4,17.5 & 22.0N/mm ²)	Readyblk Dense	1.29
CCP	Lightweight concrete block (4.2N/mm ²)	Lay-Lite	0.30
CCP	Lightweight concrete block (7.3N/mm ²)	Lay-Lite	0.31
CCP	Medium dense concrete block (3.6 & 7.3N/mm ²)	Modulite	0.46
CCP	Medium dense concrete block (10.4N/mm ²)	Modulite	0.48
CCP	Dense concrete block (7.3, 10.4, 17.5 & 22N/mm ²)	Solid Dense	1.13
Forterra	Background aggregate block (7.3N/mm ²)	Fenlite Background 1500	0.48
Forterra	Background aggregate block (3.6-10.4N/mm ²)	Fenlite Background 1350	0.45
Forterra	Aircrete block (2.9N/mm ²)	Turbo	0.11
Forterra	Aircrete block (3.6N/mm ²)	Shield	0.15
Forterra	Aircrete block (7.3N/mm ²)	High Strength 7	0.18
Forterra	Dense aggregate block (7.3-30N/mm ²)	Evalast	1.32
H+H UK	Aircrete block (2.9N/mm ²)	Celcon Solar	0.11
H+H UK	Aircrete block (3.6N/mm ²)	Celcon Standard	0.15
H+H UK	Aircrete block (7.3N/mm ²)	Celcon High Strength	0.18
H+H UK	Aircrete block (8.7N/mm ²)	Celcon Super Strength	0.18
Interfuse Blocks	Lightweight aggregate block (3.6N/mm ²)	Optilyte	0.19
Interfuse Blocks	Lightweight aggregate block (3.6N/mm ²)	Interlyte	0.45
Interfuse Blocks	Medium aggregate block (7.3N/mm ²)	Interlyte	0.47
Interfuse Blocks	Ultra Lightweight aggregate block (3.6N/mm ²)	Interlyte Ultra	0.23
Interfuse Blocks	Dense aggregate block (7.3N/mm ²)	Intercrete	0.31
Interfuse Blocks	Ultra Lightweight aggregate block (7.3N/mm ²)	Interlyte Ultra	1.33
Masterblock	Lightweight concrete block (7.3N/mm ²)	Masterlite Pro Eco	0.57
Masterblock	Lightweight concrete block (3.6 - 10.4N/mm ²)	Masterlite Pro	0.57
Masterblock	Lightweight concrete block (3.6N/mm ²)	Masterlite Ultra	0.23
Masterblock	Dense concrete block (7.3N/mm ²)	Masterdenz Eco	1.06
Masterblock	Dense concrete block (7.3 - 22.5N/mm ²)	Masterdenz (Solid)	1.08
Plasmor	Ultra-lightweight Aggregate Block (3.6N/mm ²)	Fibolite	0.24
Plasmor	Ultra-lightweight Aggregate Block (7.3N/mm ²)	Fibolite	0.28
Plasmor	Lightweight Aggregate Block (4.2 & 7.3N/mm ²)	Aglite Ultima	0.31

Blocks: Block thermal conductivity (continued)

Manufacturer	Product type & Strength	Brand	Thermal Conductivity W/mK
Plasmor	Lightweight Aggregate Block (4.2 & 7.3N/mm ²)	Stranlite	0.41
Plasmor	Lightweight Aggregate Block (4.2 & 7.3N/mm ²)	Stranlite Elevate.18	0.39
S Morris Ltd	Dense 7.3/ 10.4 (N/mm ²)	S Morris Ltd	1.11
S Morris Ltd	Medium Dense 7.3/10.4 (N/mm ²)	S Morris Ltd	0.60
S Morris Ltd	Dense 17.5/22.5 (N/mm ²)	S Morris Ltd	1.27
Stowell Concrete	Fibotherm insulating block (3.6N/mm ²)	Fibotherm	0.29
Stowell Concrete	Medium dense block (7.3N/mm ²)	Stowlite	0.63
Stowell Concrete	Medium dense block (10.4N/mm ²)	Stowlite	0.71
Stowell Concrete	Dense concrete block (7.3N/mm ²)	Dense	1.33
Stowell Concrete	Dense concrete block (10.4N/mm ²)	Dense	1.39
Stowell Concrete	Dense concrete block (17.5N/mm ²)	Dense	1.46
Stowell Concrete	Dense concrete block (22.5N/mm ²)	Dense	1.52
Stowell Concrete	Dense concrete block (7.3N/mm ²)	Dense Close-TEX	1.33
Stowell Concrete	Dense concrete block (10.4N/mm ²)	Dense Close-TEX	1.39
Stowell Concrete	Medium dense blocks (7.3N/mm ²)	Stowlite medium dense Close-TEX	0.63
Tarmac	Dense Aggregate Block (7.3-22.5N/mm ²)	Topcrete	1.07
Tarmac	Medium Dense Aggregate Block (3.6-10.4N/mm ²)	Hemelite	0.57
Tarmac	Aircrete Block (3.6N/mm ²)	Toplite Standard	0.16
Tarmac	Aircrete Block (2.9N/mm ²)	Toplite GT1	0.11
Tarmac	Aircrete Block (7.3N/mm ²)	Toplite 7	0.19
Tarmac	Aircrete Block (3.6N/mm ²)	Durox Supabloc	0.11
Tarmac	Aircrete Block (4.2N/mm ²)	Durox Supabloc 4	0.16
Tarmac	Aircrete Block (7.3N/mm ²)	Durox Supabloc 7	0.19
Tarmac	Aircrete Block (8.7N/mm ²)	Durox Supabloc 8	0.19
Thakeham	Dense concrete block (7.3 & 10.4 N/mm ²)	Calxite	1.18
Thakeham	Medium Dense Concrete Block (7.3 N/mm ²)	Teklite	0.49
Thomas Armstrong	Aircrete / aerated concrete (2.9N/mm ²)	Airtec XL	0.09
Thomas Armstrong	Aircrete / aerated concrete (3.6N/mm ²)	Airtec Standard	0.11
Thomas Armstrong	Aircrete / aerated concrete (7.3N/mm ²)	Airtec Seven	0.17
Thomas Armstrong	Low density aggregate (3.6, 4.2 & 7.3N/mm ²)	Ultralite	0.32
Thomas Armstrong	Medium-density aggregate (7.3 & 10.4N/mm ²)	Insulite	0.49
Thomas Armstrong	Dense concrete (7.3, 10.4 & 15N/mm ²)	Solid Dense	1.17