

# U-Values of Elements

**A guide to the specification of insulation materials in order to achieve compliance with Approved Document L1B 2010 of the Building Regulations for small domestic works.**



The guidance contained in this document has been prepared by the Hertfordshire Technical Forum for 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.

# CONTENTS

<b>Ground Floors</b>	Suspended Timber	3
	Floating Floor	3
	Suspended Beam & Block	4
	Ground Bearing Slab	4
<b>Walls</b>	Masonry Outer Leaf, Timber Frame Inner Leaf	5
	Timber Frame	5
	Solid Wall Construction	6
	Dry Lining Existing Solid Walls	6
	Full Fill Masonry Cavity Walls – Brick Outer Leaf	7
	Full Fill Masonry Cavity Walls – Rendered Block Outer Leaf	8
	Partial Fill Masonry Cavity Walls – Brick Outer Leaf	9
	Partial Fill Masonry Cavity Walls – Rendered Block Outer Leaf	9
	Block Technical Data	10
	<b>Roofs</b>	Vented Cold Deck Pitched Roof
Warm Deck Pitched Roof		12
Cold Deck Flat Roof		13
Warm Deck Flat Roof		13
Insulation Technical Data		14
Insulation from Recyclable or Natural Sources		16
<b>Glazing</b>		Double Glazing
	Triple Glazing	18

**Note Pages 10 and 14 give information on the thermal properties of many of the building block and insulation products currently on the market. This enables the designer to select alternatives to the listed specifications that have equivalent performance.**

**HERTS TECHNICAL FORUM TECHNICAL NOTE 10**  
**EXAMPLES OF GROUND FLOOR INSULATION**  
**Compliance with Approved Document L1B 2010**

**SUSPENDED TIMBER GROUND FLOOR**  
U-Value achieved maximum 0.22W/m<sup>2</sup>K

Required thickness of insulation/mm										
Product	λ-value	Perimeter/Area Ratio								
		1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2
Kingspan TF70	0.023	110	110	110	110	110	100	100	90	70
Celotex FR4000	0.022	110	110	110	110	110	100	100	90	70
EcoTherm Eco-Versal	0.022	100	100	100	95	90	90	80	70	55
Recticel Eurothane GP	0.022	125	120	120	120	115	115	105	95	80
Xtratherm XTUF	0.023	100	100	100	100	90	90	80	75	60
Jablite Jabfloor Premium 70	0.030	130	130	125	125	120	110	100	85	60
Jablite Jabfloor 70	0.038	160	150	150	145	140	130	120	105	70
Rockwool Flexi	0.038	140	140	140	140	140	140	140	120	90
Knauf Earthwool Loft Roll 40	0.040	200	200	200	200	200	170	150	150	150
Knauf Earthwool Loft Roll 44	0.044	200	200	200	200	200	170	150	150	150

**FLOATING FLOOR**  
U-Value achieved maximum 0.22W/m<sup>2</sup>K

Required thickness of insulation/mm										
Product	λ-value	Perimeter/Area Ratio								
		1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2
Kingspan* Kooltherm K3	0.021 – 0.024	100	95	95	90	85	80	70	60	40
Kingspan* Thermafloor TF70	0.022 – 0.023	105	100	100	95	90	85	75	65	40
Kingspan Thermafloor TF73	0.029	Nm	Nm	Nm	Nm	Nm	98	93	79	58
Celotex GA4000	0.023	105	100	100	95	90	85	75	65	40

Note: These are calculated figures and should be adjusted to the nearest manufactures thicknesses  
Nm: Not Manufactured  
\*Laid between battens at 600 centres

## SUSPENDED BEAM & BLOCK GROUND FLOOR

U-Value achieved maximum 0.22W/m<sup>2</sup>K

Required thickness of insulation (mm)											
Product	λ-value	Perimeter/Area Ratio									
		1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1
Kingspan Kooltherm K3	0.021 – 0.024	75	70	70	70	70	70	60	60	50	20
Celotex GA4000	0.022	75	75	75	75	70	70	65	60	50	20
Xtratherm Thin-R	0.023	90	90	80	75	70	65	60	50	35	-
QUINN-therm QF	0.023	75	75	75	70	70	65	60	50	30	25
Knauf Polyfoam Floorboard Standard	0.029	100	100	100	100	85	85	75	75	50	-
Jablite Jabfloor Premium	0.030	100	100	90	90	85	80	75	65	50	30
Styrofoam Floormate 300A	0.035	100	100	100	100	90	90	90	80	60	50
Rockwool Rockfloor	0.038	135	130	130	130	125	120	115	100	80	30

## GROUND BEARING SLAB

U-Value achieved maximum 0.22W/m<sup>2</sup>K

Required thickness of insulation (mm)											
Product	λ-value	Perimeter/Area Ratio									
		1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1
Kingspan Kooltherm K3	0.021 – 0.024	75	75	70	70	70	60	60	50	40	-
Celotex GA4000	0.022	75	75	75	70	65	65	55	50	50	-
Xtratherm Thin – R	0.023	90	90	80	75	70	65	60	50	30	-
QUINN-therm QF	0.023	75	75	75	70	70	65	60	50	30	25
Knauf Polyfoam Floorboard Standard	0.029	100	100	100	85	75	75	65	65	50	-
Jablite Jabfloor Premium	0.030	105	105	100	100	100	85	80	65	50	25
Sytrofoam Floormate 300A	0.035	110	100	100	100	90	90	80	70	50	-
Rockwool Rockfloor	0.038	130	125	120	115	110	105	95	80	50	-

**HERTS TECHNICAL FORUM TECHNICAL NOTE 10**  
**EXAMPLES OF WALL CONSTRUCTION**

**Compliance with Approved Document L1B 2010**  
**Small domestic works**

**CAVITY WALL - TIMBER FRAME** 150 & 100x50mm studs at 600 & 400mm centres  
 U-Value achieved maximum 0.28W/m<sup>2</sup>K. Wall heights up to max 10M.

Outer Leaf		Cavity		Inner Leaf		Internal Finish	
mm		mm		mm		mm	
105	Brick	50	Clear Cavity	140	Crown Frametherm roll 32	22.5	Knauf thermal laminate Plasterboard
105	Brick	50	Clear Cavity	90	Crown Frametherm 32	45	Knauf thermal laminate Plasterboard
105	Brick	50	Clear Cavity	70	Kingspan Kooltherm K12 Framing board between studs	12.5	P/board & skim
105	Brick	50	Clear Cavity	50	Kingspan Kooltherm K12 Framing board between studs	32.5	Kooltherm K18 insulated dry lining board
105	Brick	50	Clear Cavity	70	Kingspan Thermawall TW55 between studs using foil faced breathable membrane	32.5	Kooltherm K18 insulated dry lining board
100	Dense Block K value of 1.13 or lower	50	Clear Cavity	90	Celotex FR4000 between studs	12.5	P/board & skim

**TIMBER FRAME WALL**

U-Value achieved maximum 0.28W/m<sup>2</sup>K

External finish	100 x 50 Stud Wall		Internal Finish	
	mm		mm	
Tiles & battens	70	Kingspan Thermawall TW55	35	Gyproc Thermaline Basic
Tiles & battens or render	100	Kingspan Thermalwall TW55	22.0	Gyproc Thermaline Basic
Tiles & battens or render	60	Celotex FR4000 between studs	37.5	Celotex PL4000 with lightweight skim
Tiles & battens (or 12.5mm Fireline Board if protected from elements)	75	Celotex FR4000	37.5	Celotex PL4000 with lightweight skim
Tiles & battens / render	100	Celotex FR4000	12.5	Knauf wallboard
125 x 50 studwall with tiled or render finish externally	110	Celotex FR4000	12.5	Knauf Wallboard
125 x 50 studwall with tiled or render finish externally	95	Kingspan TW55	12.5	Knauf Wallboard

## TYPICAL SOLID WALL CONSTRUCTION

U-Value achieved minimum 0.28W/m<sup>2</sup>K

External mm		Block Type mm		Internal Finish mm	
20	Render	215	Celcon Solar $\lambda$ (0.11)	50	Gyproc Thermaline Super
20	Render	215	Topblock Toplite Standard, Celcon Standard $\lambda$ (0.15)	65	Gyproc Thermaline Super
20	Render	215	Durox Supablock, Topblock GTI, Thermalite Turbo $\lambda$ (0.11)	47.5	Kooltherm K18 dry-lining board mechanically fixed to timber battens
20	Render	215	Lightweight Block $\lambda$ (0.11)	50	Knauf Phenolic Laminate board
20	Render	215	Block $\lambda$ (0.32) i.e. Plasmor Aglite	67.5	Celotex PL4000
20	Render	215	215 Block $\lambda$ (0.15) i.e. Tarmac topblock standard	57.5	Celotex PL 4000
20	Render	215	215 Block $\lambda$ (0.11) i.e. Celcon solar	52.5	Celotex PL 4000
20	Render	215	215 Block $\lambda$ (0.11) i.e. Celcon solar	25	Celotex TB4000 & Plasterboard on 25 x 50mm battens

## DRY LINING TO EXISTING SOLID WALL

U-Value achieved maximum 0.30W/m<sup>2</sup>K

Existing wall mm	Dry lining product mm		Internal Finish mm	
215 Brick	62.5	Kingspan Kooltherm K18 insulated dry lining board fixed to 25 x 50mm battens	5	Skim coat
215 Brick or Dense Block ( $\lambda$ 1.13) e.g. Armstrong	72.5	Celotex PL4000	5	Skim coat
102.5 Brick	77.5	Celotex PL4000	5	Skim coat

## FULL FILL CAVITY WALL – BLOCK INNER LEAF and BRICK OUTER LEAF

U-Value achieved maximum 0.28W/m<sup>2</sup>K

Outer Leaf		Full Fill Cavity*		Inner Leaf		Internal finish	
mm		mm		mm		mm	
102.5	Brick	85	Dritherm 32	100	Block $\lambda$ value of 0.15 or lower e.g. Celcon Standard/ Toplite Standard	13	Dense or lightweight plaster
102.5	Brick	85	Dritherm 34	100	Block $\lambda$ value of 0.11 or lower e.g. Celcon Solar/ Thermalite Turbo/ Durox Supablock	13	Dense or lightweight plaster
102.5	Brick	85	Dritherm 37	100	Block $\lambda$ value of 0.11 or lower, e.g. Celcon Solar/ Thermalite Turbo/ Durox Supablock	12.5	Plasterboard on dabs
102.5	Brick	100	Rockwool / Dritherm 37	100	Block $\lambda$ value of 0.11 or lower e.g. Celcon Solar/ Thermalite Turbo/ Durox Supablock	13	Lightweight plaster
102.5	Brick	100	Dritherm 34	100	Block $\lambda$ value of 0.32 or lower e.g. Plasmor Aglite or Fibolite.	13	Lightweight plaster
102.5	Brick	100	Dritherm 32	100	Block $\lambda$ value of 1.13 or lower, e.g. RMC Readyblock Dense	12.5	Plasterboard on dabs
102.5	Brick	100	Dritherm 37	100	Block $\lambda$ value of 0.51 or lower, e.g. Masterblock GPI	30	Knauf Thermal Laminate
102.5	Brick	100	Dritherm 32	100	Block $\lambda$ value of 0.11 or lower, e.g. Celcon Solar/ Thermalite Turbo/ Durox Supablock	13	Dense or lightweight plaster

**FULL FILL CAVITY WALL – BLOCK INNER LEAF AND BLOCK OUTER LEAF**

U-Value achieved maximum 0.28W/m<sup>2</sup>K

Outer Leaf		Full Fill Cavity*		Inner Leaf		Internal finish	
mm		mm		mm		mm	
100	Rendered Block $\lambda$ value of 0.11 or lower, e.g. Celcon Solar/ Thermalite Turbo/ Durox Supablock	65	Dritherm 32	100	Block $\lambda$ value of 0.11 or lower, e.g. Celcon Solar / Thermalite Turbo / Durox Supablock	13	Lightweight plaster
100	Rendered Block $\lambda$ value of 0.15 or lower e.g. Celcon Standard/ Toplite Standard	75	Dritherm 32	100	Block $\lambda$ value of 0.15 or lower, e.g. Celcon Standard / Toplite Standard	13	Dense or lightweight plaster
100	Rendered Block $\lambda$ value of 0.15 or lower, e.g. Celcon Standard/ Toplite Standard	75	Dritherm 37 / Rockwool	100	Block $\lambda$ value of 0.11 or lower, e.g. Celcon Solar / Thermalite Turbo / Durox Supablock	13	Lightweight plaster
100	Rendered Block $\lambda$ value of 0.15 or lower, e.g. Celcon Standard/ Toplite Standard	75	Isowool Hi-Cav	100	Block $\lambda$ value of 0.15 or lower, e.g. Celcon Standard / Toplite Standard	13	Lightweight plaster
100	Rendered Block $\lambda$ value of 0.15 or lower, e.g. Celcon Standard/ Toplite Standard	80	Rockwool	100	Block $\lambda$ value of 0.15 or lower, e.g. Celcon Standard / Toplite Standard	13	Lightweight plaster
100	Rendered Block $\lambda$ value of 0.15 or lower, e.g. Celcon Standard/ Toplite Standard	85	Dritherm 37	100	Block $\lambda$ value of 0.15 or lower, e.g. Celcon Standard / Toplite Standard	13	Lightweight plaster
100	Rendered Aglite Block 7.3N $\lambda$ value of 0.32	100	Dritherm 34 or Isover C.W.S.	100	Ag-lite Block 7.3N $\lambda$ value of 0.32	13	Lightweight plaster
100	Rendered Block 1500kg/m <sup>3</sup> Dense Block	100	Dritherm 37	100	Block $\lambda$ value of 0.15 or lower, e.g. Celcon Standard / Toplite Standard	13	Lightweight plaster



### PARTIAL FILL CAVITY WALL – BLOCK INNER LEAF AND BRICK OUTER LEAF

U-Value achieved maximum 0.28W/m<sup>2</sup>K

Outer Leaf mm		* mm	Partial Fill Cavity	mm	Inner Leaf	mm	Internal finish
102.5	Brick	90	40mm Kingspan Thermawall TW50, or 40mm Celotex CG4000	100	Block $\lambda$ value of 0.11 or lower, e.g. Durox Supablock/ Celcon Solar/ Thermalite Turbo	13	Lightweight plaster
102.5	Brick	95	45mm Celotex CW4000	100	Block $\lambda$ value of 0.15 or lower, e.g. Celcon standard	13	Lightweight Plaster
102.5	Brick	100	50mm Polyfoam Cavityboard	100	Block $\lambda$ value of 0.16 or lower, e.g. Celcon Standard	13	Lightweight Plaster
102.5	Brick	95	45mm Kingspan Thermawall TW50, or 45mm Kooltherm K8 or 45mm Celotex CW4000	100	Lightweight Block $\lambda$ value of 0.19 or lower, e.g. Durox Supablock 7/ Thermalite Hi Strength/ Topblock Supabloc 7.	15	Plasterboard on dabs
102.5	Brick	100	50mm Kingspan TW50, or Celotex CW5000, or Xtratherm XT/CW	100	Block $\lambda$ value of 0.25 or lower, e.g. Plasmor Fibolite	13	Lightweight plaster
102.5	Brick	100	50mm Kingspan Thermawall TW50, or 50mm Kooltherm K8, or 50mm Celotex CG4000	100	Med dense Block $\lambda$ value of 0.51 or lower, e.g. Masterblock GPI/ Plasmor Stranlite.	15	Plasterboard on dabs

*\*Some products can be used with reduced residual cavity width – a good level of workmanship is essential.*

### PARTIAL FILL CAVITY WALL – BLOCK INNER LEAF AND BLOCK OUTER LEAF

U-Value achieved maximum 0.28W/m<sup>2</sup>K

Outer Leaf Mm		mm	Partial Fill Cavity	mm	Inner Leaf	mm	Internal finish
100	Block (1.13 or lower) + Render	75	40mm Celotex CG4000	100	Block $\lambda$ value of 0.11 e.g. Celcon Solar / Thermalite Turbo	13	Dense or lightweight plaster
100	Rendered Block ( $\lambda$ 0.15 or lower)	60	35mm Kingspan	100	Block $\lambda$ value of 0.15 or lower, e.g. Thermalite Shield.	13	Lightweight plaster
100	Rendered Dense Block (1.13 or lower)	80	55mm Kingspan Thermawall TW50 / K8, or 55mm Celotex CW4000	100	Dense Block $\lambda$ value of 1.13 or lower e.g. Monacrete 100S / Plasmor Plascon	15	Plasterboard on dabs

**HERTS TECHNICAL FORUM TECHNICAL NOTE 10**  
**BLOCK TECHNICAL DATA**  
**Compliance with Approved Document L1B 2010**

Block Manufacturer	Block type	Strength (N)	Density (kg/m <sup>3</sup> )	λ Value (W/mK)
<b>Armstrong</b>	Light weight	3.6	1350	0.42
	Dense	7.3	1950	1.13
<b>Besblock</b>	Insulite Solid	7	1457	0.47
<b>Celcon</b>	Solar	2.9 / 3.5	460	0.11
	Standard	3.6	600	0.15
	Hi Strength 7	3	750	0.19
<b>Durox</b>	Supablock 400	2.8	420	0.10
	Supablock	3.6	460	0.11
	Supablock 4	4.2	630	0.16
	Supablock 7	7.3	680	0.19
<b>Forticrete</b>	Newlight			0.43
<b>Hanson</b>	Ultralite	3.6	850	0.30
	Superlite	3.6 / 7.3	1000	0.36
	Fenlight	3.6 – 15	1500	0.48
	Evalast	3.6 – 22.5	1900	1.31
<b>Interfuse</b>	Optilyte			0.20
	Interyte			0.47
	Intercrete			1.13
<b>Lignacite</b>	SP	3.6 / 7.3 / 10.4	1450	0.79
	Standard	3.6 / 7.3 / 10.4	1570	0.97
<b>Masterblock</b>	Pumalite			0.44
	Lightweight			0.59
	Dense			1.06
	Fibotherm	3.5		0.25
	Monalight 100S			0.5
	Monacrete 100			0.59
	GPI			0.51
	Monacrete 100S			1.13
<b>Plasmor</b>	Fibolite	3.6	850	0.25
		7.3	950	0.28
	Aglite	4.2	1050	0.32
		7.3	1050	0.32
		10.4	1150	0.32
	Stranlite	4.2	1375	0.46
		7.3	1375	0.46
		10.4	1425	0.46
	Plascon	7.3 / 10.4	1950	1.06

**HERTS TECHNICAL FORUM TECHNICAL NOTE 10**  
**BLOCK TECHNICAL DATA CONTINUED**  
**Compliance with Approved Document L1B 2010**

Block Manufacturer	Block type	Strength (N)	Density (kg/m <sup>3</sup> )	λ Value (W/mK)
<b>RMC</b>	Readybock 1100			0.34
	Readyblock 1400			0.59
	Readyblock Dense			1.13
<b>Stock Blocks</b>	Ultralite			0.25
	Insulite			0.40
	Lyta			0.56
	Dense Concrete			0.99 – 1.25
<b>Thermalite</b>	Turbo	2.9	470	0.11
	Shield	3.6	600	0.15
	Hi Strength	7.3	730	0.19
<b>Topblock</b>	Supabloc			0.11
	Supabloc 4			0.16
	Supabloc 7			0.19
	Hemelite	3.6	1360	0.45
		7.3	1450	0.47
		10.4	1480	0.49
	Toplite GTI	2.9	460	0.11
Toplite Standard	3.6	630	0.15	
Toplite 7	7.3	720	0.19	
Topcrete Fair Face			0.99	
Topcrete Dense			1.28	

**HERTS TECHNICAL FORUM TECHNICAL NOTE 10**  
**EXAMPLES OF PITCHED ROOF INSULATION**

**Compliance Approved Document L1B 2010**

**VENTED COLD DECK PITCHED ROOF - INSULATION BETWEEN RAFTERS**

U-Value achieved maximum 0.18W/m<sup>2</sup>K

Product	λ-Value	Solution/mm
Kingspan Kooltherm K7 with K18 Insulated Dry-lining Board comprising 12.5 mm plasterboard and 25 mm of insulation	0.021 – 0.024	125 K7 between rafters & K18 under rafters*
Celotex GA4000 between or between and under rafters	0.022	165 between rafters * or 100 between rafters & 35 under rafters* or 50 between rafters & 70 under rafters, with plasterboard attached to 25mm deep counter battens to create air space
Rockwool Flexi	0.038	240mm between rafters
Web Dynamics TLX Silver FB and Insulation with K value of 0.022 or better	(R-value 1.69) 0.022	One layer under rafters with plasterboard attached to 25mm deep counter battens to create air space <u>and</u> 75mm foiled rigid insulation such as Kingspan or Celotex between rafters*
YBS SuperQuilt and Insulation with K value of 0.023 or better	(R value of 2.71 including both airspaces) 0.023	One layer under rafters with plasterboard attached to 25mm deep battens to create air space <u>and</u> 65mm foil face rigid insulation such as Kingspan or Celotex between rafters with a 25mm cavity between the multifoil and the rigid insulation.

\* All unvented roofs using vapour permeable underlay.

All specifications assume rafters at 400mm c/c and plaster skimmed 12.5 plasterboard ceiling

**VENTED COLD DECK PITCHED ROOF - INSULATION BETWEEN & OVER CEILING JOISTS**

U-Value achieved maximum 0.16W/m<sup>2</sup>K

Product	λ-Value	Solution/mm
Earthwool	0.044	100mm between & 170mm over
Rockwool Roll	0.044	100mm between & 170mm over
Earthwool & Polyfoam Supadeck	0.044 0.029	100mm Earthwool between & 130mm Supadeck over

**WARM DECK PITCHED ROOF – INSULATION ABOVE THE RAFTERS**

U-Value achieved 0.18W/m<sup>2</sup>K

Product	λ-Value	Solution/mm
Kingspan Thermapitch TP10	0.022	100 over rafters *
Kingspan Thermapitch TP10	0.022	60 between and 60over rafters *
Celotex GA4000	0.022	100 over rafters *
Celotex GA4000	0.022	60 between and 60over rafters *

\* All unvented roofs using vapour permeable underlay.

All specifications assume rafters at 400mm c/c and plaster skimmed 12.5 plasterboard ceiling

**HERTS TECHNICAL FORUM TECHNICAL NOTE 10 -  
EXAMPLES OF FLAT ROOF INSULATION**

**Compliance with Approved Document L1B – 2010 Edition**

**COLD DECK FLAT ROOF – INSULATION BETWEEN AND BETWEEN / UNDER JOISTS**

U-Value achieved minimum 0.18W/m<sup>2</sup>K

Product	λ-Value	Notes	Solution - o/all thickness in mm
Jablite Premium Board	0.030	Based on timber roof with 50mm wide joists at 400mm centres	220 between joists or 150 between joists and 50 under
Knauf Polyfoam Roofboard Batt & Polyfoam Linerboard	0.031 & 0.029	Ditto	175 batt between joists & 55 / 9.5 Linerboard under
Xtratherm Thin - R	0.025	Ditto	190 between joists or 150 between joists and 25mm under
Ecotherm	0.023	Ditto	160 between joists or 125 between and 30mm under
Quintherm	0.025	Ditto	190 between joists or 150mm between and 25mm under
Kingspan Thermapitch TP10	0.022 – 0.024	Ditto	160 between joists or 125 between joists and 25 under
Celotex XR 4000	0.023	Ditto	165 between joists
Celotex XR4120 and PL4040 Under-layer	0.023	Ditto	120 XR4120 between joists and 40 PL4040 under joists.

**WARM DECK FLAT ROOF – INSULATION ABOVE JOISTS OR ABOVE AND BETWEEN JOISTS**

U-Value achieved maximum 0.18W/m<sup>2</sup>K

**NB** – Where composite deck insulation is to be used with a Single Ply Membrane – ensure the conditions of use of the membrane are met. It may be necessary to use an additional layer of 12mm Ply above the insulation to meet the conditions of use.

Product	λ-Value	Notes	Solution
Celotex Tempcheck Deck (composite deck)	0.022	Mechanical Fix <b>Single Ply Membrane or Built up felt. (12mm additional ply required for single ply membrane)</b>	126mm Celotex TD4000
Celotex	0.022	Mechanical Fix Single Ply or Built up Roofing	125mm Celotex TA4000
Celotex	0.022	Balconies – Weatherproof layer on 19mm ply, on Celotex, on 1000g polythene on 19mm Ply on Joists.	120mm Celotex XR4000
Kingspan Therमारooft TR31 (composite deck)	0.022	For use with 3 layer Built up felt. 2 Layer felt or heat bonded mastic asphalt to be used with 13mm fibre board.	126mm Kingspan TR31 or 96 plus 30mm of TP10 between joists and directly under.
Kingspan Therमारooft TR27	.026	Use with bonded fixing over a plywood deck – finish with 3 layer built up felt, mastic asphalt or single ply membrane	120mm
Polyfoam Roofboard Standard	0.029	<b>(Single Ply membranes only)</b> Timber deck, Joists at 400c/c with a 12.5mm plasterboard ceiling.	140mm
Knauf Krimpack rock fibre slab		Ditto	180mm <i>175mm where available</i>
Jablite Jabdec	0.035	Ditto	183mm (with mech fixing) 163mm (without)

**HERTS TECHNICAL FORUM TECHNICAL NOTE 10**  
**INSULATION TECHNICAL DATA**  
**Compliance with Approved Document L1B 2010**

Company	Product	$\lambda$ -Value W/mK	Available Thickness (mm)	Use
Knauf	Dritherm Cavity Slab 37	0.035 0.037	50 65, 75, 85, 100	Cavity wall
	Dritherm Cavity Slab 34	0.034	65, 75, 85, 100	Cavity wall
	Dritherm Cavity Slab 32	0.032	65, 75, 85, 100	Cavity wall
	Frametherm 32	0.032	50 (roll) 50, 90 (slab)	Timber frame, Inter rafter
	Frametherm 35	0.035	90, 140	Timber frame, Inter rafter
	Frametherm 38	0.038	90, 140	Timber frame, Inter rafter
	Frametherm 43	0.043	90, 140	Timber frame, Inter rafter
	Rocksilk	0.035	40, 50, 60, 70, 100	Walls, roof, floors
	Loft Roll 40	0.040	100, 150, 170, 200	Walls
	Loft Roll 44	0.044	100, 150, 170, 200	Walls
	Rafter Roll 32	0.032	50, 65, 75, 80, 100	Rafter
Knauf Polyfoam	Cavityboard	0.029	25,30,35,40,50,60,75	Cavity wall
	Roofboard	0.029 0.034	35, 50, 60, 75 35, 50, 60, 75	Warm deck roof
	Roofboard Extra	0.029 0.031	50, 60, 75, 110, 120 130, 140	Warm deck roof
	Floorboard	0.029	25, 35, 50, 65, 70	Floor
	Floorboard Extra	0.029 0.034	25,35,50,60,75 100	Floor
	Space Board	0.029	52.5 overlaid with 18	Loft decking
	Raftersqueeze	0.030	50, 75	Inter rafter
Celotex	TB4000	0.023	12,20,25,30,35,40,45	Floors, walls, Roof
	GA4000	0.023	50,60,70,80,90,100	Floors, walls, Roof
	XR4000	0.023	110,120,130,140,150,200	Floors, walls, Roof
	CW4000	0.023	25,40,50,60,70,80,90,100	Cavity walls
	FR4000	0.022	25,50,60,70,80,90,100,150	Walls & pitched roof
	CG4000	0.022	40,50,60,70,74,80	Cavity walls
	PL4000	0.023	25,40,55,65	Thermal plasterboard
	FF4000	0.023	50,70,90,100,125,150	Underfloor heating
	TD4000	0.023	70,80,90,100,120,150	Flat roof
	EL3000	0.027 0.026 0.025	50 80, 90, 100, 110 120,140,150,165,200	Flat roof
	TA4000	0.023	50,75,90,100,125,150,200	Flat roof
	LG3000	0.002	25,30,40,50	Lining
Rockwool	Flexi	0.035–0.037	50,60,70,90,100,140	
	Timber batt/roll	0.037	60,80,90,100,150	Timber frame/floor
	Cavity wall batt	0.036	50,75,100,125,150	Cavity wall
	Rockfloor	0.036	30,40,50,60,70	Concrete floor
	Roll batts	0.037	80,100,150	Pitched roof, floor

**HERTS TECHNICAL FORUM TECHNICAL NOTE 10**  
**INSULATION TECHNICAL DATA CONTINUED**  
**Compliance with Approved Document L1B 2010**

Company	Product	$\lambda$ -Value W/mK	Available Thickness (mm)	Use
<b>Jablite</b>	Jabfloor Premium	0.030	25,40,50,75,100,150,200	Floor
	Jabfloor 70	0.038	25,40,50,75,100,150,200	Floor
	Jabwall & Jablok	0.038	40,50,60,75	Cavity wall
	Jabwall Premium	0.030	40,50,60,75	Cavity wall
	Jabfill Premium	0.030	75,100	Cavity wall
	Jablite Board	0.038	25,40,50,75,100,150,200	Wall lining, roof
	Jabroof Slim fix	0.037	79	Pitched roof
		0.031	97	
		0.027	113	
		0.024	131	
		0.020	157	
		0.016	195	
	Jabsqueeze	0.038		
	Jabdec	0.036	33 -100 in 5mm increments	Flat roof
0.035		100 + in 5mm increments		
Jabtherm	0.036	20 -100 in 5mm increments	Flat roof	
	0.035	100 + in 5mm increments		
Jabroll	0.036	50,65,95	Flat roof	
	0.035	135		
<b>Kingspan</b>	Kooltherm K7	0.02 – 0.022	20 – 150 in 5mm increments	Roof
	Kooltherm K18	0.02 – 0.022	32.5 – 82.5 in 5mm increments	Dry lining board
	Kooltherm K11	0.02 – 0.023	60 – 90 in 5mm increments	Flat roof
	Kooltherm K8	0.02 – 0.022	20 – 65 in 5mm increments	Cavity wall
	Kooltherm K5	0.02 – 0.022	20 – 80 in 5mm increments	Flat roof
	Kooltherm K12	0.02 – 0.022	20 – 100 in 5mm increments	Timber frame
	Kooltherm K3	0.02 – 0.022	20 – 100 in 5mm increments	Floor
	Thermapitch TP10	0.022	20 – 200 in 5mm increments	Roof
	TherमारooF TR26	0.022	45 -130 in 5mm increments	Flat roof
	TherमारooITW51	0.025	25 – 50 in 5mm increments	Cavity Wall
	TherमारooITW50	0.022	20 – 65 in 5mm increments	Cavity Wall
	TherमारooITF70	0.022	20 – 120 in 5mm increments	Floor
	TherमारooITR20	0.026	45,50,60,70,75	Flat roof
		0.025	80 – 110 in 5mm increments	
0.024		120 – 140 in 5mm increments		
<b>Dow Styrofoam</b>	Floormate 200-X	0.029	25,35,50,60,70,80,100,120	Floors
	Roofmate SL-X	0.029	25,35,50,70,80,100,120	Flat roof
		0.031	130,140,150	
	Roofmate RL-X	0.029	25,35,50,60,70,80,90,100,120	Flat roof
	Styrofoam IB-X	0.029	25,35,50,60,70,80,100,120	Wall lining
Wallmate CW-X	0.029	25,35,50,60,70,80,100,120	Cavity wall	
<b>Web Dynamics</b>	Thinsulex (multifoil)	0.53	30	Pitched roof

**HERTS TECHNICAL FORUM TECHNICAL NOTE 10**  
**INSULATION FROM RECYCLABLE OR NATURAL SOURCES**  
**Compliance with Approved Document L1B 2010**

**VENTED COLD DECK PITCHED ROOF – insulation between and over joists**

U- Value achieved maximum 0.16 W/m<sup>2</sup>K

Product	Source	λ-Value (w/mK)	Solution
Warmcel 300	Recycled Newspaper	0.040	250mm
Thermafleece	80% Sheepswool blend	0.038	240mm (100mm between, 140mm over joists)
Thermafleece PB20	60% Sheepswool blend	0.039	240mm (100mm between, 140mm over joists)
YBS Non-Itch	85% Recycled plastic bottles	0.0425	270mm (100mm between + 170 over)

**VENTED COLD DECK PITCHED ROOF – insulation between and under rafters**

U- Value achieved maximum 0.18 W/m<sup>2</sup>K

Product	Source	λ-Value	Solution
Thermafleece	80% Sheepswool	0.038	100mm between rafters + 165mm under. (50mm Ventilated space required with F1 felts)
Thermafleece PB20	60% Sheepswool	0.039	100mm between rafters + 165mm under. (50mm Ventilated space required with F1 felts)

**TIMBER FRAME WALL (Non-breathing structure)**

U- Value achieved maximum 0.28 W/m<sup>2</sup>K

External Finish	Insulation between studs	Internal Finish
102mm Brick, 50mm vented cavity, breather membrane, 9mm OSB or 12.5mm Ply.	150mm of Warmcel 500 <b>dry-injection.</b> (Assumes 12.5% Timber Fraction)	9mm OSB, 500 gauge vapour check, 25mm <u>service cavity</u> , 12.5mm plasterboard
102mm Brick, 50mm vented cavity, breather membrane, 9mm OSB or 12.5mm Ply.	150mm Warmcel - <b>damp spray.</b> (Assumes 12.5% Timber Fraction.)	500 gauge vapour check, 12.5mm plasterboard.
Brick / Tile / or Timber Clad Finish, 50mm vented cavity, breather membrane, 9mm OSB	150mm Thermafleece or Thermafleece PB20.	Accredited low emissivity membrane, 25mm service void, 12.5mm plasterboard.
Brick / Tile / or Timber Clad Finish, 50mm vented cavity, breather membrane, 9mm OSB	160mm Thermafleece or 170mm Thermafleece PB20.	500 gauge vapour check, 12.5mm plasterboard.
Brick / Tile / or Timber Clad Finish, 50mm vented cavity, breather membrane, 9mm OSB	140mm YBS Non-Itch <b>0.039W/mK</b> grade.*	500 gauge vapour check and 12.5mm plasterboard.

\*Non-Itch is available in two grades of thermal conductivity. 0.0425 W/mK and 0.039W/mK.



**HERTS TECHNICAL FORUM TECHNICAL NOTE 10**  
**INDICATIVE U VALUES FOR WINDOWS & DOORS**  
**Compliance with revised Approved Document L1B 2010**

**Introduction:**

- Any PVC-U or timber framed window (installed vertically) or fully glazed door should have a Window Energy Rating (WER) of band C or better.
- Alternatively, the window should have a U-value of 1.6W/m<sup>2</sup>k or better.
- All doors should have a U-Value of 1.8W/m<sup>2</sup>k or better.
- Doors with > 50% of their internal face area glazed should have an overall U-value of 1.8W/m<sup>2</sup>k. (see below).

**When available, manufacturers' certified U-values should be used in preference to the data in these tables. Further information can be obtained from CERTass, FENSA or the Glass & Glazing Federation.**

**DOUBLE GLAZING**

**U-Value required minimum 1.6 W/m<sup>2</sup>K (Windows)**  
**1.8 W/m<sup>2</sup>K (Doors)**

<b>Pilkington Glass</b>	<b>Outer Pane</b>	<b>Cavity / Spacer / Gas</b>	<b>Inner Pane</b>	<b>U-value</b>
Typical IGU	4mm Optifloat	16mm air	4mm K-Glass	1.7
energiKare Classic	4mm Optiwhite	16mm argon with Aluminium spacer bar	4mm K-Glass	1.5
	4mm Optiwhite		4mm K-Glass OW	1.5
energiKare Plus	4mm Optiwhite	16mm argon plus warm edge spacer bar	4mm K-Glass	1.5
	4mm Optiwhite		4mm K-Glass OW	1.5
<b>Saint-Gobain Glass</b>	<b>Outer Pane</b>	<b>Cavity / Spacer / Gas</b>	<b>Inner Pane</b>	<b>U-Value</b>
SGG Planitherm	4mm Float Glass	16mm air plus warm edge spacer bar	4mm Total +	1.4
SGG Planitherm	4mm Float Glass	16mm argon plus warm edge spacer bar	4mm Total +	1.1
SGG Planitherm	4mm Float Glass	20mm air plus warm edge spacer bar	4mm Total +	1.4
SGG Planitherm	4mm Float Glass	20mm argon plus warm edge spacer bar	4mm Total +	1.1

**Rooflights and Roof Windows:**

- Where windows and rooflights are installed within a sloping roof, the standard U-values will need to be adjusted as per table below

<b>Inclination Of Roof</b>	<b>U-value Adjustment (W/m<sup>2</sup>K)</b>	
	<b>Twin skin or double glazed</b>	<b>Triple skin or triple glazed</b>
70° or more (treated as vertical)	= 0.0	= 0.0
<70° and >60°	+ 0.2	+ 0.1
≤60° and >40°	+ 0.3	+ 0.2
≤40° and >20°	+ 0.4	+ 0.2
≤20° (treated as horizontal)	+ 0.5	+ 0.3

## INDICATIVE U VALUES FOR GLAZED/PARTIALLY GLAZED DOORS

Where doors are fully glazed, the above table for U-values for windows and roof lights should be used. Where doors have more than 50% glazed area (approximately) the u-value of the door is the average of the appropriate window u-value and that of the non glazed part.

*Further information can be obtained from Certass, FENSA or the Glass & Glazing Federation.*

## TRIPLE GLAZING

### Pilkington 'energiKare' Glazing:

Outer Pane	Cavity	Middle Pane	Cavity	Inner Pane	U-value
Optiwhite	12mm argon	K Glass T	12mm argon	K Glass	1.0
Optiwhite	16mm argon	K Glass T	16mm argon	K Glass	0.8
Optiwhite	12mm argon	K Glass OW T	12mm argon	K Glass OW	1.0
Optiwhite	16mm argon	K Glass OW T	16mm argon	K Glass OW	0.8
Optiwhite	12mm krypton	K Glass OW T	12mm krypton	K Glass OW	0.7

## DEFAULT U-VALUES GIVEN IN SAP 2009 VERSION 9.90 (MARCH 2010)

(TABLE 6e FOR TRIPLE GLAZED PVC-U AND WOODEN WINDOW FRAMES FOR GLASS MANUFACTURED BY COMPANIES OTHER THAN PILKINGTON)

Triple Glazing	Wood / PVC-U Frame	
	12mm gap	16mm gap or more
Triple glazing (low-E, $\epsilon^n = 0.2$ , Air filled, hard coat)	1.7	1.6
Triple glazing (low-E, $\epsilon^n = 0.15$ , Air filled, hard coat)	1.7	1.6
Triple glazing (low-E, $\epsilon^n = 0.1$ , Air filled, soft coat)	1.6	1.5
Triple glazing (low-E, $\epsilon^n = 0.05$ , Air filled, soft coat)	1.5	1.4
Triple glazing (low-E, $\epsilon^n = 0.2$ , Argon filled, hard coat)	1.6	1.5
Triple glazing (low-E, $\epsilon^n = 0.15$ , Argon filled, hard coat)	1.5	1.4
Triple glazing (low-E, $\epsilon^n = 0.1$ , Argon filled, soft coat)	1.5	1.4
Triple glazing (low-E, $\epsilon^n = 0.05$ , Argon filled, soft coat)	1.4	1.3