

U-value calculations for the alterations to the extension

Floor

Material	Thickness (mm)	Fraction of area (%)	Conductivity (W/mK)	Resistance (m2K/W)
Cement	65	100	0.6	0.11
Kingspan TF70	140	100	0.022	6.36
Concrete	65	100	0.6	0.11
Total Resistance				6.58
U-value (W/m2K)				0.15

Front Wall

Material	Thickness (mm)	Fraction of area (%)	Conductivity (W/mK)	Resistance (m2K/W)
Brick	102.5	100	0.6	0.17
Clear cavity	50	100	-	0.18
Kingspan K108	100	100	0.019	5.26
Brick	102.5	100	0.6	0.17
Plasterboard	12.5	100	0.19	0.07
Total Resistance				5.85
U-value (W/m2K)				0.17

Extension-garage wall

Material	Thickness (mm)	Fraction of area (%)	Conductivity (W/mK)	Resistance (m2K/W)
Brick	102.5	100	0.6	0.17
Knauff DriTherm	85	100	0.032	2.66
Brick	102.5	100	0.6	0.17
Plasterboard	12.5	100	0.19	0.07
Total Resistance				3.06
U-value (W/m2K)				0.33

Roof

Material	Thickness (mm)	Fraction of area (%)	Conductivity (W/mK)	Resistance (m2K/W)
Plywood	18	100	0.13	0.14
Kingspan T27	150	100	0.024	6.25
Plywood	12	100	0.13	0.09
Plasterboard	12.5	100	0.19	0.07
Total Resistance				6.55
U-value (W/m2K)				0.15

U-value calculations for the rear room**Floor**

Material	Thickness (mm)	Fraction (%)	Conductivity (W/mK)	Resistance (m2K/W)
Underlay		2	100	0.08
Plywood		18	100	0.15
Kingspan K103		100	100	0.019
Total Resistance				5.41
U-value (W/m2K)				0.18

Back wall

Material	Thickness (mm)	Fraction (%)	Conductivity (W/mK)	Resistance (m2K/W)
Brick		102.5	100	0.6
Clear cavity		50	100	-
Kingspan K108		100	100	0.019
Brick		102.5	100	0.6
Plasterboard		12.5	100	0.19
Total Resistance				5.85
U-value (W/m2K)				0.17

Side wall

Material	Thickness (mm)	Fraction (%)	Conductivity (W/mK)	Resistance (m2K/W)	Parallel resistance (m2K/W)
Brick		102.5	100	0.6	0.17
Kingspan K112		100	85	0.019	5.26
Studwork		100	15	0.14	0.71
Plasterboard		12.5	100	0.19	0.07
Total Resistance					2.93
U-value					0.34

Wall to garage

Material	Thickness (mm)	Fraction (%)	Conductivity (W/mK)	Resistance (m2K/W)	Parallel resistance (m2K/W)
Ins. plasterboard		53	100	0.022	2.41
Kingspan K106		125	85	0.019	6.58
Studwork		125	15	0.14	0.89
Plasterboard		12.5		0.19	0.07
Total Resistance					5.84
U-value (W/m2K)					0.17

Roof

Material	Thickness (mm)	Fraction (%)	Conductivity (W/mK)	Resistance (m2K/W)
Plywood		18	100	0.13
Kingspan T27		150	100	0.024
Plywood		12	100	0.13
Plasterboard		12.5	100	0.19
Total Resistance				6.55
U-value (W/m2K)				0.15