

U Value Calculation

Software: Stroma U-value Calculator - Version 0.92
 Date Printed: 21/11/2017 08:42
 Construction Type: Floor - Existing Basement Floor
 Calculation Method: BS EN ISO 6946 / BS EN ISO 13370

Floor Construction

No	Description	Main Element			Bridging Element		
		Thickness	λ	R-value	λ	R-value	Fraction
-	Internal Surface Resistance	-	-	0.17	-	-	-
1	Concrete Dense (150 mm)	150	2	0.075	-	-	-
		$\Sigma=150\text{mm}$		$\Sigma=0.245$			

Resistances

Lower Limit	Upper Limit	Average
0.285	0.285	0.285 m ² K/W

Soil Properties

Perimeter	66.572m
Area	131.2m ²
Wall Thickness	250mm
Ground Type - Default $\lambda=$	2W/mK
Height of basement wall below ground (z):	2.5

Floor U-value Corrections

No Correction Values	
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Floor U-value

U-value	0.538
U-value rounded	0.54 W/m ² K

Floor Insulation Payback Calculations

Insulation Properties

Construction	U value (W/m ² k)
No Insulation	0.54
Insulated	0

Installation Costs

Installing Insulation (£/m ²)	15
Insulation Cost (£/m ²)	22.26
Decoration Costs (£/m ²)	85

100 mm Celotex FR5100

Total for Simple Works (£/m ²)	37.26
Total with Redecoration (£/m ²)	122.26

Weather Data

Degree Days	1785
Degree Hours	42840

Energy Savings

Installation	Energy Savings (kWh/m ² /year)	Boiler efficiency
Simple Works	26.3	88%
Redecoration Required	26.3	

Cost Savings

Fuel	Cost Savings (£/m ² /year)	
	Simple Works	Redecoration Required
Gas	1.13	1.13
Electricity	3.69	3.69
LPG	2.19	2.19

Payback

Fuel	Payback (Years)	
	Simple Works	Redecoration Required
Gas	33.04	108.41
Electricity	10.09	33.10
LPG	17.04	55.90

U Value Calculation

Software: Stroma U-value Calculator - Version 0.92
 Date Printed: 21/11/2017 08:42
 Construction Type: Floor - Improved Basement Floor
 Calculation Method: BS EN ISO 6946 / BS EN ISO 13370

Floor Construction

No	Description	Main Element			Bridging Element		
		Thickness	λ	R-value	λ	R-value	Fraction
-	Internal Surface Resistance	-	-	0.17	-	-	-
1	Screed (1200) (75 mm)	75	0.41	0.183	-	-	-
2	FR5000 (100 mm)	100	0.021	4.762	-	-	-
3	Concrete Dense (150 mm)	150	2	0.075	-	-	-
		$\Sigma=325\text{mm}$	$\Sigma=5.19$				

Resistances

Lower Limit	Upper Limit	Average
5.23	5.23	5.23 m ² K/W

Soil Properties

Perimeter	66.572m
Area	131.2m ²
Wall Thickness	250mm
Ground Type - Default $\lambda=$	2W/mK
Height of basement wall below ground (z):	2.5
Floor U-value Corrections	
No Correction Values	
Floor U-value	
U-value	0.145
U-value rounded	0.15 W/m ² K

Floor Insulation Payback Calculations

Insulation Properties

Construction	U value (W/m ² k)
No Insulation	0.54
Insulated	0.15

Installation Costs

Installing Insulation (£/m ²)	15
Insulation Cost (£/m ²)	22.26
Decoration Costs (£/m ²)	85

100 mm Celotex FR5100

Total for Simple Works (£/m ²)	37.26
Total with Redecoration (£/m ²)	122.26

Weather Data

Degree Days	1785
Degree Hours	42840

Energy Savings

Installation	Energy Savings (kWh/m ² /year)	Boiler efficiency
Simple Works	19.0	88%
Redecoration Required	19.0	

Cost Savings

Fuel	Cost Savings (£/m ² /year)	
	Simple Works	Redecoration Required
Gas	0.81	0.81
Electricity	2.67	2.67
LPG	1.58	1.58

Payback

Fuel	Payback (Years)	
	Simple Works	Redecoration Required
Gas	45.75	150.11
Electricity	13.97	45.83
LPG	23.59	77.40

Wall Insulation Payback Calculations

Insulation Properties

Construction	U value (W/m ² k)
No Insulation	2.07
Insulated	0.78

Installation Costs

Installing Insulation (£/m ²)	16
Insulation Cost (£/m ²)	13.93
Decoration Costs (£/m ²)	85

Celotex PL4015

Total for Simple Works (£/m ²)	29.93
Total with Redecoration (£/m ²)	114.93

Weather Data

Degree Days	1785
Degree Hours	42840

Energy Savings

Installation	Energy Savings (kWh/m ² /year)	Boiler efficiency
Simple Works	62.8	88%
Redecoration Required	62.8	

Cost Savings

Fuel	Cost Savings (£/m ² /year)	
	Simple Works	decoration Required
Gas	2.69	2.69
Electricity	8.82	8.82
LPG	5.22	5.22

Payback

Fuel	Payback (Years)	
	Simple Works	decoration Required
Gas	11.11	42.66
Electricity	3.39	13.03
LPG	5.73	22.00

Wall Insulation Payback Calculations

Insulation Properties

Construction	U value (W/m ² k)
No Insulation	2.07
Insulated	0.3

Installation Costs

Installing Insulation (£/m ²)	16
Insulation Cost (£/m ²)	42.24
Decoration Costs (£/m ²)	37

PL4060

Total for Simple Works (£/m ²)	58.24
Total with Redecoration (£/m ²)	95.24

Weather Data

Degree Days	1785
Degree Hours	42840

Energy Savings

Installation	Energy Savings (kWh/m ² /year)	Boiler efficiency
Simple Works	86.2	88%
Redecoration Required	86.2	

Cost Savings

Fuel	Cost Savings (£/m ² /year)	
	Simple Works	decoration Required
Gas	3.70	3.70
Electricity	12.11	12.11
LPG	7.17	7.17

Payback

Fuel	Payback (Years)	
	Simple Works	decoration Required
Gas	15.76	25.76
Electricity	4.81	7.87
LPG	8.12	13.28

U Value Calculation

Software: Stroma U-value Calculator - Version 0.92
 Date Printed: 20/11/2017 10:34
 Construction Type: Wall - Improved Wall
 Calculation Method: BS EN ISO 6946

Wall Construction

No	Description	Main Element			Bridging Element		
		Thickness	λ	R-value	λ	R-value	Fraction
-	Internal Surface Resistance	-	-	0.13	-	-	-
1	PL4000 (Insulation) (60 mm)	60	0.022	2.727	-	-	-
2	Plaster Dabs Cavity (15 mm)	15	-	0.17	0.43	0.035	0.2001
3	Brickwork Outer Leaf - BRE (250 mm)	250	0.77	0.325	0.94	0.266	0.1712
-	External Surface Resistance	-	-	0.04	-	-	-
		$\Sigma=325\text{mm}$		$\Sigma=3.392$			

Resistances

Lower Limit	Upper Limit	Average
3.306	3.354	3.33 m ² K/W

Wall U-value Corrections

No Correction Values

Wall U-value

U-value	0.3
U-value rounded	0.30 W/m ² K

U Value Calculation

Software: Stroma U-value Calculator - Version 0.92
 Date Printed: 20/11/2017 08:59
 Construction Type: Wall - External Brick Wall
 Calculation Method: BS EN ISO 6946

Wall Construction

No	Description	Main Element			Bridging Element		
		Thickness	λ	R-value	λ	R-value	Fraction
-	Internal Surface Resistance	-	-	0.13	-	-	-
1	Brickwork Outer Leaf - BRE (250 mm)	250	0.77	0.325	0.94	0.266	0.1712
-	External Surface Resistance	-	-	0.04	-	-	-

$\Sigma=250\text{mm}$

$\Sigma=0.495$

Resistances

Lower Limit	Upper Limit	Average
0.483	0.484	0.483 m²K/W

Wall U-value Corrections

No Correction Values

Wall U-value

U-value	2.07
U-value rounded	2.07 W/m²K

U Value Calculation

Software: Stroma U-value Calculator - Version 0.92
 Date Printed: 21/11/2017 10:30
 Construction Type: Wall - Existing Wall- 15 years pay back
 Calculation Method: BS EN ISO 6946

Wall Construction

No	Description	Main Element			Bridging Element		
		Thickness	λ	R-value	λ	R-value	Fraction
-	Internal Surface Resistance	-	-	0.13	-	-	-
1	Brickwork Outer Leaf - BRE (250 mm)	250	0.77	0.325	0.94	0.266	0.1712
3	Plaster Dabs Cavity (15 mm)	15	-	0.17	0.43	0.035	0.2001
3	PL4000 (Insulation) (15 mm)	15	0.022	0.682	-	-	-
-	External Surface Resistance	-	-	0.04	-	-	-
		$\Sigma=280\text{mm}$		$\Sigma=1.346$			

Resistances

Lower Limit	Upper Limit	Average
1.26	1.307	1.284 m ² K/W

Wall U-value Corrections

No Correction Values

Wall U-value

U-value	0.779
U-value rounded	0.78 W/m ² K

U Value Calculation

Software: Stroma U-value Calculator - Version 0.92
 Date Printed: 21/11/2017 08:43
 Construction Type: Roof - Existing Flat roof
 Calculation Method: BS EN ISO 6946

Roof Construction

No	Description	Main Element			Bridging Element		
		Thickness	λ	R-value	λ	R-value	Fraction
-	Internal Surface Resistance	-	-	0.1	-	-	-
1	Plasterboard Standard (12.5 mm)	12.5	0.21	0.06	-	-	-
2	Unventilated Cavity - (High Emissivity) (100 mm)	100	-	0.18	0.13	0.769	0.125
3	Soft Wood/Plywood/Chipboard (Hardwood) (0 mm)	12	0.18	0.067	-	-	-
-	External Surface Resistance	-	-	0.04	-	-	-
		$\Sigma=124.5\text{mm}$		$\Sigma=0.446$			

Resistances

Lower Limit	Upper Limit	Average
0.465	0.48	0.473 m ² K/W

Roof U-value Corrections

No Correction Values

Roof U-value

U-value	2.115
U-value rounded	2.12 W/m ² K

Flat Roof Payback Calculations

Insulation Properties

Construction	U value (W/m ² k)
No Insulation	2.12
Insulated	1.15

Installation Costs

Installing Insulation (£/m ²)	26.8
Insulation Cost (£/m ²)	5.5
Decoration Costs (£/m ²)	116.85

TB4012

Total for Simple Works (£/m ²)	32.3
Total with Redecoration (£/m ²)	149.15

Weather Data

Degree Days	1785
Degree Hours	42840

Energy Savings

Installation	Energy Savings (kWh/m ² /year)	Boiler efficiency
Simple Works	47.2	88%
Redecoration Required	47.2	

Cost Savings

Fuel	Cost Savings (£/m ² /year)	
	Simple Works	Redecoration Required
Gas	2.03	2.03
Electricity	6.63	6.63
LPG	3.93	3.93

Payback

Fuel	Payback (Years)	
	Simple Works	decoration Required
Gas	15.94	73.63
Electricity	4.87	22.48
LPG	8.22	37.96

Flat Roof Payback Calculations

Insulation Properties

Construction	U value (W/m ² k)
No Insulation	2.12
Insulated	0.15

Installation Costs

Installing Insulation (£/m ²)	26.8
Insulation Cost (£/m ²)	29.8
Decoration Costs (£/m ²)	116.85

140mm Celotex Crownbond

Total for Simple Works (£/m ²)	56.6
Total with Redecoration (£/m ²)	173.45

Weather Data

Degree Days	1785
Degree Hours	42840

Energy Savings

Installation	Energy Savings (kWh/m ² /year)	Boiler efficiency
Simple Works	95.9	88%
Redecoration Required	95.9	

Cost Savings

Fuel	Cost Savings (£/m ² /year)	
	Simple Works	Redecoration Required
Gas	4.11	4.11
Electricity	13.47	13.47
LPG	7.98	7.98

Payback

Fuel	Payback (Years)	
	Simple Works	decoration Required
Gas	13.76	42.16
Electricity	4.20	12.87
LPG	7.09	21.74

U Value Calculation

Software: Stroma U-value Calculator - Version 0.92
 Date Printed: 21/11/2017 08:44
 Construction Type: Roof - Improved Flat Roof
 Calculation Method: BS EN ISO 6946

Roof Construction

No	Description	Main Element			Bridging Element		
		Thickness	λ	R-value	λ	R-value	Fraction
-	Internal Surface Resistance	-	-	0.1	-	-	-
1	Plasterboard Standard (12.5 mm)	12.5	0.21	0.06	-	-	-
2	Unventilated Cavity - (High Emissivity) (0 mm)	150	-	0.18	0.13	1.154	0.125
3	Soft Wood/Plywood/Chipboard (Hardwood) (0 mm)	12	0.18	0.067	-	-	-
4	Celotex Crown Board	140	-	6.35	-	-	-
-	External Surface Resistance	-	-	0.04	-	-	-
		$\Sigma=314.5\text{mm}$		$\Sigma=6.796$			

Resistances

Lower Limit	Upper Limit	Average
6.817	6.904	6.861 m ² K/W

Roof U-value Corrections

No Correction Values

Roof U-value

U-value	0.146
U-value rounded	0.15 W/m ² K

U Value Calculation

Software: Stroma U-value Calculator - Version 0.92
 Date Printed: 21/11/2017 10:35
 Construction Type: Roof - Flat roof 15 years payback
 Calculation Method: BS EN ISO 6946

Roof Construction

No	Description	Main Element			Bridging Element		
		Thickness	λ	R-value	λ	R-value	Fraction
-	Internal Surface Resistance	-	-	0.1	-	-	-
1	Plasterboard Standard (12.5 mm)	12.5	0.21	0.06	-	-	-
2	Unventilated Cavity - (High Emissivity) (100 mm)	88	-	0.18	0.13	0.677	0.125
3	TB4000 (12 mm)	12	0.022	0.545	0.13	0.092	0.125
4	Soft Wood/Plywood/Chipboard (Hardwood) (0 mm)	12	0.18	0.067	-	-	-
-	External Surface Resistance	-	-	0.04	-	-	-
		$\Sigma=124.5\text{mm}$		$\Sigma=0.992$			

Resistances

Lower Limit	Upper Limit	Average
0.802	0.94	0.871 m ² K/W

Roof U-value Corrections

No Correction Values

Roof U-value

U-value	1.148
U-value rounded	1.15 W/m ² K

U Value Calculation

Software: Stroma U-value Calculator - Version 0.92
 Date Printed: 21/11/2017 10:13
 Construction Type: Roof - Existing Pitched Roof
 Calculation Method: BS EN ISO 6946

Roof Construction

No	Description	Main Element			Bridging Element		
		Thickness	λ	R-value	λ	R-value	Fraction
-	Internal Surface Resistance	-	-	0.1	-	-	-
1	Plasterboard Standard (12.5 mm)	12.5	0.21	0.06	-	-	-
2	Ventilated Cavity (100 mm)	100	-	0.16	0.13	0.769	0.125
3	Tiles (Clay) (10 mm)	10	1	0.01	-	-	-
-	External Surface Resistance	-	-	0.04	-	-	-
		$\Sigma=122.5\text{mm}$		$\Sigma=0.37$			

Resistances

Lower Limit	Upper Limit	Average
0.387	0.401	0.394 m²K/W

Roof U-value Corrections

No Correction Values

Roof U-value

U-value	2.539
U-value rounded	2.54 W/m²K

Pitched Roof Payback Calculations

Insulation Properties

Construction	U value (W/m ² k)
No Insulation	2.54
Insulated	1.04

Installation Costs

Installing Insulation (£/m ²)	40.8
Insulation Cost (£/m ²)	6.81
Decoration Costs (£/m ²)	105

TB4025

Total for Simple Works (£/m ²)	47.61
Total with Redecoration (£/m ²)	152.61

Weather Data

Degree Days	1785
Degree Hours	42840

Energy Savings

Installation	Energy Savings (kWh/m ² /year)	Boiler efficiency
Simple Works	73.0	88%
Redecoration Required	73.0	

Cost Savings

Fuel	Cost Savings (£/m ² /year)	
	Simple Works	Redecoration Required
Gas	3.13	3.13
Electricity	10.26	10.26
LPG	6.08	6.08

Payback

Fuel	Payback (Years)	
	Simple Works	Redecoration Required
Gas	15.20	48.72
Electricity	4.64	14.87
LPG	7.84	25.12

Pitched Roof Payback Calculations

Insulation Properties

Construction	U value (W/m ² k)
No Insulation	2.54
Insulated	0.16

Installation Costs

Installing Insulation (£/m ²)	40.8
Insulation Cost (£/m ²)	42.48
Decoration Costs (£/m ²)	105

PL4060 + FR5100

Total for Simple Works (£/m ²)	83.28
Total with Redecoration (£/m ²)	188.28

Weather Data

Degree Days	1785
Degree Hours	42840

Energy Savings

Installation	Energy Savings (kWh/m ² /year)	Boiler efficiency
Simple Works	115.9	88%
Redecoration Required	115.9	

Cost Savings

Fuel	Cost Savings (£/m ² /year)	
	Simple Works	Redecoration Required
Gas	4.97	4.97
Electricity	16.28	16.28
LPG	9.64	9.64

Payback

Fuel	Payback (Years)	
	Simple Works	Redecoration Required
Gas	16.75	37.88
Electricity	5.12	11.57
LPG	8.64	19.53

U Value Calculation

Software: Stroma U-value Calculator - Version 0.92
 Date Printed: 20/11/2017 10:51
 Construction Type: Roof - Improved Pitched Roof
 Calculation Method: BS EN ISO 6946

Roof Construction

No	Description	Main Element			Bridging Element		
		Thickness	λ	R-value	λ	R-value	Fraction
-	Internal Surface Resistance	-	-	0.1	-	-	-
1	PL4000 (Insulation) (60 mm)	60	0.022	2.727	-	-	-
2	FR5000 (100 mm)	100	0.021	4.762	0.13	0.769	0.125
3	Soft Wood/Plywood/Chipboard (Softwood) (mm)	12	0.13	0.092	-	-	-
-	External Surface Resistance	-	-	0.04	-	-	-

$\Sigma=172\text{mm}$

$\Sigma=7.721$

Resistances

Lower Limit	Upper Limit	Average
5.848	6.81	6.329 m ² K/W

Roof U-value Corrections

No Correction Values

Roof U-value

U-value	0.158
U-value rounded	0.16 W/m ² K

U Value Calculation

Software: Stroma U-value Calculator - Version 0.92
 Date Printed: 21/11/2017 10:36
 Construction Type: Roof - Pitched Roof 15 years payback
 Calculation Method: BS EN ISO 6946

Roof Construction

No	Description	Main Element			Bridging Element		
		Thickness	λ	R-value	λ	R-value	Fraction
-	Internal Surface Resistance	-	-	0.1	-	-	-
1	Plasterboard Standard (12.5 mm)	12.5	0.21	0.06	-	-	-
2	TB4000 (25 mm)	25	0.022	1.136	0.13	0.192	0.125
-	External Surface Resistance	-	-	0.04	-	-	-
		$\Sigma=37.5\text{mm}$		$\Sigma=1.336$			

Resistances

Lower Limit	Upper Limit	Average
0.904	1.027	0.965 m ² K/W

Roof U-value Corrections

No Correction Values

Roof U-value

U-value	1.036
U-value rounded	1.04 W/m ² K