Back to Earth SW Ltd
7 Tuns Lane
Silverton
Exeter
EX5 4HY

Project Information
Reference
Date 4 December 2023

Construction Type
Element : Wall - Wall-masonry-solid-internal-plasterboard
Internal surface emissivity : High External surface emissivity : High

	Thickness (mm)	Thermal Conductivity (W/mK)	Thermal Resistance (m²K/W)	Pitch (º)	Bridge details Air gaps (Level, Delta U")
Outside surface resistance	-	-	0.040		
Brick outer leaf	105.0	0.770	0.136		
Brick inner leaf	105.0	0.560	0.188		
Clay Plaster	10.0	0.800	0.013		
UdiTHERM	60.0	0.038	1.550		L:0 0.000W/m²K
Ampatex Variano	-	-	-		
SteicoFlex	38.0	0.036	1.050		11.800% Softwood (38.0mm) L:0 0.000W/m²K
Gyproc Wallboard	12.5	0.190	0.066		
Inside surface resistance	-	-	0.130		
Total thickness	**330.5mm**				

U-value = 0.35W/m²K

U-value, Combined Method : 0.347W/m²K (upper/lower limit 3.059 / 2.926m²K/W, dUf 0.0127, dUg 0.0000, dUp0.0000, dUr0.0000, dUrc1 0.0000, dUrc2 0.0000)

Correction factors
Mechanical fasteners :-
Insulation Fixings
Alpha : 0.80 per m lambda f : 50.0000W/mK nf : 4.000 per m² Af : 20.000mm² Recess : 0.0mm
Delta Uf for UdiTHERM : 0.0127
nf = fasteners per m² Af = fasteners cross-sectional area
Air gaps, Delta Ug = 0.000W/m²K

(Based on the combined method for determining U-values of structures containing repeating thermal bridges)

Detailed U-value Calculation Results

Construction includes 1 bridged layer

Non-bridged layers	
Outside surface resistance	0.040 m²K/W
Brick outer leaf	0.136 m²K/W
Brick inner leaf	0.188 m²K/W
Clay Plaster	0.013 m²K/W
UdiTHERM	1.550 m²K/W
Gyproc Wallboard	0.066 m²K/W
Inside surface resistance	0.130 m²K/W
Resistance of non-bridged layers, R_{NB} =	2.122 m²K/W

Bridged layer
SteicoFlex (L1) bridged by Softwood (B1)

Path 1 - SteicoFlex
Path 2 - Softwood

Resistance and fraction of heat flow paths
$R_{P1} = R_{NB} + R_{L1} = 2.122 + 1.050 = 3.172$ m²K/W $F_{P1} = 88.200\%$
$R_{P2} = R_{NB} + R_{L2} = 2.122 + 0.292 = 2.415$ m²K/W $F_{P2} = 11.800\%$

Upper resistance limit
$R_{upper} = 1 / ((F_{P1}/R_{P1}) + (F_{P2}/R_{P2}))$
$R_{upper} = 1 / ((0.882/3.172) + (0.118/2.415)) = 3.059$m²K/W

Lower resistance limit
$R_{lower} = R_{NB} + 1 / ((F_{L1}/R_{L1}) + (F_{B1}/R_{B1}))$
$R_{lower} = 2.122 + 1 / ((0.882/1.050) + (0.118/0.292)) = 2.926$m²K/W

Total resistance of wall
$R_T = (R_{upper} + R_{lower}) / 2 = (3.059 + 2.926) / 2 = 2.99$ m²K/W

Mechanical fasteners :-
Calculations to BS EN ISO 6946:2007
Insulation Fixings
Alpha : 0.80 per m lambda f : 50.0000W/mK nf : 4.000 per m² Af : 20.000mm² Recess : 0.0mm
Delta Uf for UdiTHERM : 0.0127
Correction for air gaps, Delta Ug = 0.0000W/m²K

U = (1 / Rt) + (Delta Uf + Delta Ug + Delta Up + Delta Urc2 + Delta Urc2) = (1/2.9928) + 0.0127 + 0.0000 + 0.0000 + 0.0000 + 0.0000 = 0.35 W/m²K

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Thermal Mass Details

	Thickness assessed (actual) (mm)	Density (kg/m³)	Specific heat capacity (J/kgK)	Heat capacity (kJ/m²K)
Brick outer leaf	0.0 (105.0)	1700.0	840.0	0.0
Brick inner leaf	0.0 (105.0)	1700.0	840.0	0.0
Clay Plaster	0.0 (10.0)	1700.0	1000.0	0.0
UdiTHERM	0.0 (60.0)	160.0	2100.0	0.0
Ampatex Variano	0.0 (-)	280.0	850.0	0.0
SteicoFlex	0.0 (38.0)	60.0	2100.0	0.0
Gyproc Wallboard	12.5 (12.5)	0.0	0.0	0.0
Total				0.0
kappa value				0.0000
Limiting condition:	insulation			

Admittance : 0.58 W/m²K Decrement : 0.21 factor Decrement delay : -11.49 hours