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

Project Information
Reference
Date 22 November 2023

Construction Type
Element : Suspended ground floor - Floor-suspended-100mm
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")
Inside surface	-	-	0.170		
Floor deck Oriented strandboard (OSB)	22.0	-	0.169		
Ampatex Sinco	-	-	-		
SteicoFlex	100.0	0.036	2.750		11.000% Softwood (100.0mm) L:0 0.000W/m²K
Airspace, heat flow downwards, 100 mm thick	100.0	-	0.220/0.000		
(Slightly vented cavity - width=5000.0mm, hro=5.100, E1=0.900, E2=0.900, downward heat flow, opening area 500 mm²/m)					
Ampatop Protecta	-	-	-		
Deck underside surface resistance			0.170		
Total thickness	**222.0mm**				

Ground Floor Details

Floor type	: Suspended floor		
Calculation method	: EN ISO 13370:2007		
P/A	: 0.900	Characteristic dimension, B'	: 2.222
Thermal conductivity of ground:	: 1.500 W/mK	Width of walls, w:	: 0.300 m
Height of floor above ground, h:	: 0.225 m	U-value of sub-floor walls, Uw:	: 1.700 W/m²K
Average wind speed, V:	: 5.000 m/s	Wind shielding factor, fw:	: 0.050
Ventilation opening area, E:	: 0.0015 m²/m	Subfloor ground resistance, Rs	: 0.170 m²K/W
Resistance of insulation on ground, Rg	: 0.000 m²K/W	External surface resistance, Rse	: 0.040 m²K/W
Deck resistance	: 0.169m²K/W		
Description	: Oriented strandboard (OSB)		
Edge insulation position	: None		

U-value = 0.28W/m²K

U-value, Combined Method : 0.279W/m²K (upper/lower limit 3.037 / 2.872m²K/W, dUf 0.0000, dUg 0.0000, dUp0.0000, dUr0.0000, dUrc1 0.0000, dUrc2 0.0000)

Correction factors
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

Calculation of U-value for floor deck (Uf)

Construction includes 1 bridged layer

Non-bridged layers

Inside surface	0.170 m²K/W
Floor deck Oriented strandboard (OSB)	0.169 m²K/W
Airspace, heat flow downwards, 100 mm thick	0.220 m²K/W
Deck underside surface resistance	0.170 m²K/W
Resistance of non-bridged layers, R_{NB} =	0.729 m²K/W

Bridged layer

SteicoFlex (L1) bridged by Softwood (B1)

Path 1 - SteicoFlex

Path 2 - Softwood

Resistance and fraction of heat flow paths

$R_{P1} = R_{NB} + R_{L1} = 0.729 + 2.750 = 3.479$ m²K/W $F_{P1} = 89.000\%$

$R_{P2} = R_{NB} + R_{L2} = 0.729 + 0.769 = 1.498$ m²K/W $F_{P2} = 11.000\%$

Upper resistance limit

$R_{upper} = 1 / ((F_{P1}/R_{P1}) + (F_{P2}/R_{P2}))$

$R_{upper} = 1 / ((0.890/3.479) + (0.110/1.498)) = 3.037$m²K/W

Lower resistance limit

$R_{lower} = R_{NB} + 1 / ((F_{L1}/R_{L1}) + (F_{B1}/R_{B1}))$

$R_{lower} = 0.729 + 1 / ((0.890/2.750) + (0.110/0.769)) = 2.872$m²K/W

Total resistance of suspended ground floor

$R_F = (R_{upper} + R_{lower}) / 2 = (3.037 + 2.872) / 2 = 2.95$ m²K/W

$U_f = 0.338$ m²K/W

Calculation of U-value for ground (Ug)

Equivalent thickness of ground, dg = 0.300 + 1.500(0.170 + 0.000 + 0.040) = 0.615m

Ug = ((2 x 1.500) / ((Pi x 2.222) + 0.615)) x ln(((Pi x 2.222) / 0.615) + 1) = 0.993

Calculation of U-value for sub-floor void (Ux)

Ux = (2 x (0.225 x 1.700 / 2.222)) + (1450 x (0.002 x 5.000 x 0.050 / 2.222)) = 0.589

Floor U-value, U:

1 / U = (1 / 0.338) + (1 / (0.993 + 0.589)) = 3.587

U = 0.279 W/m²K

Correction for air gaps, Delta Ug = 0.0000W/m²K

(Delta Uf + Delta Ug + Delta Up + Delta Ur) is less than 3% of (1 / Rt) so U = (1 / Rt) + (Delta Ur) + (Delta Urc) = 0.28 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)
Floor deck Oriented strandboard (OSB)	22.0 (22.0)	0.0	0.0	0.0
Ampatex Sinco	0.0 (-)	280.0	850.0	0.0
SteicoFlex	0.0 (100.0)	60.0	2100.0	0.0
Airspace, heat flow downwards, 100 mm thick	0.0 (100.0)	1.2	1008.0	0.0
Ampatop Protecta	0.0 (-)	300.0	850.0	0.0
Total				0.0
kappa value				0.0000
Limiting condition:	insulation			

Admittance : 0.45 W/m²K Decrement : 0.00 factor Decrement delay : 0.00 hours