

Project Information

Reference
Date 14 September 2018

Construction Type

Element	: Suspended ground floor - 0 Spec generator copies					
Internal surface emissivity	: High	External surface emissivity	: High			
		Thickness	Thermal	Thermal	Pitch	Bridge details
		(mm)	Conductivity	Resistance	(°)	Air gaps
			(W/mK)	(m ² K/W)		(Level, Delta U")
Inside surface		-	-	0.170		
Floor deck Particleboard (600 mg/m ³)		22.0	-	0.157		
Ampatex Sinco		-	-	-		
SteicoFlex		150.0	0.036	4.150		9.000% Softwood (150.0mm) L:0 0.000W/m ² K
Ampatex Aero		-	-	-		
Airspace, heat flow downwards, 300 mm thick		300.0	-	0.230		
Deck underside surface resistance				0.170		
Total thickness		472.0mm				

Ground Floor Details

Floor type	: Suspended floor					
Calculation method	: EN ISO 13370:2007					
Perimeter	: 42.00 m	Area				: 104.00 m ²
P/A	: 0.404	Characteristic dimension, B'				: 4.952
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/m ² K
Average wind speed, V:	: 5.000 m/s	Wind shielding factor, fw:				: 0.050
Ventilation opening area, E:	: 0.0015 m ² /m	Subfloor ground resistance, Rs				: 0.170 m ² K/W
Resistance of insulation on ground, Rg	: 0.000 m ² K/W	External surface resistance, Rse				: 0.040 m ² K/W
Deck resistance	: 0.157m ² K/W					
Description	: Particleboard (600 mg/m ³)					
Edge insulation position	: None					

U-value = 0.19W/m²K

U-value, Combined Method : 0.188W/m²K (upper/lower limit 4.265 / 4.091m²K/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 (U_f)

Construction includes 1 bridged layer

Non-bridged layers

Inside surface	0.170 m ² K/W
Floor deck Particleboard (600 mg/m ³)	0.157 m ² K/W
Airspace, heat flow downwards, 300 mm thick	0.230 m ² K/W
Deck underside surface resistance	0.170 m ² K/W
Resistance of non-bridged layers, R _{NB} =	<u>0.727 m²K/W</u>

Bridged layer

SteicoFlex (L1) bridged by Softwood (B1)

Path 1 - SteicoFlex

Path 2 - Softwood

Resistance and fraction of heat flow paths

$$R_{P1} = R_{NB} + R_{L1} = 0.727 + 4.150 = 4.877 \text{ m}^2\text{K/W} \quad F_{P1} = 91.000\%$$

$$R_{P2} = R_{NB} + R_{L2} = 0.727 + 1.154 = 1.881 \text{ m}^2\text{K/W} \quad F_{P2} = 9.000\%$$

Upper resistance limit

$$R_{\text{upper}} = 1 / \left(\frac{F_{P1}}{R_{P1}} + \frac{F_{P2}}{R_{P2}} \right)$$
$$R_{\text{upper}} = 1 / \left(\frac{0.910}{4.877} + \frac{0.090}{1.881} \right) = 4.265 \text{ m}^2\text{K/W}$$

Lower resistance limit

$$R_{\text{lower}} = R_{NB} + 1 / \left(\frac{F_{L1}}{R_{L1}} + \frac{F_{B1}}{R_{B1}} \right)$$
$$R_{\text{lower}} = 0.727 + 1 / \left(\frac{0.910}{4.150} + \frac{0.090}{1.154} \right) = 4.091 \text{ m}^2\text{K/W}$$

Total resistance of suspended ground floor

$$R_F = \left(R_{\text{upper}} + R_{\text{lower}} \right) / 2 = (4.265 + 4.091) / 2 = 4.18 \text{ m}^2\text{K/W}$$
$$U_f = 0.239 \text{ m}^2\text{K/W}$$

Calculation of U-value for ground (U_g)

$$\text{Equivalent thickness of ground, } d_g = 0.300 + 1.500(0.170 + 0.000 + 0.040) = 0.615 \text{ m}$$

$$U_g = \left((2 \times 1.500) / \left((\pi \times 4.952) + 0.615 \right) \right) \times \ln \left((\pi \times 4.952) / 0.615 + 1 \right) = 0.606$$

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

$$U_x = (2 \times (0.225 \times 1.700 / 4.952)) + (1450 \times (0.002 \times 5.000 \times 0.050 / 4.952)) = 0.264$$

Floor U-value, U:

$$1 / U = (1 / 0.239) + (1 / (0.606 + 0.264)) = 5.327$$
$$U = 0.188 \text{ W/m}^2\text{K}$$

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

(Delta U_f + Delta U_g + Delta U_p + Delta U_r) is less than 3% of (1 / R_t) so U = (1 / R_t) + (Delta U_r) + (Delta U_{rc}) = 0.19 W/m²K

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Thermal Mass Details

	Thickness assessed (actual) (mm)	Density (kg/m ³)	Specific heat capacity (J/kgK)	Heat capacity (kJ/m ² K)
Floor deck Particleboard (600 mg/m ³)	22.0 (22.0)	0.0	0.0	0.0
Ampatex Sinco	0.0 (-)	280.0	850.0	0.0
SteicoFlex	0.0 (150.0)	0.0	0.0	0.0
Ampatex Aero	0.0 (-)	300.0	850.0	0.0
Airspace, heat flow downwards, 300 mm thick	0.0 (300.0)	1.2	1008.0	0.0
Total				0.0
kappa value				0.0000
Limiting condition:	insulation			

Admittance : 2.27 W/m²K Decrement : 0.00 factor Decrement delay : 0.00 hours