



21 Stone Street, Gravesend, Kent, DA11 0NP
 www.dacarchitects.com
 leslie.may@dacarchitects.co.uk 01474 566996

DESIGN DATA SHEET 003

5424 – St KATHERINE'S HOUSE

0.15 W/m²K U VALUE – FLOOR



U-Value Calculation and Condensation Risk Assessment

Project Information St Catherine's House, Shorne, Gravesend
 Construction: Suspended Floor- Beam and Block
 Construction Type: Suspended Floor
 File reference: 1-JS-241125-153047-809
 Calculated U-value = 0.15 W/m²K

Selected Build-Up

Description	Thickness (mm)	Thermal Conductivity (W/mK)	Thermal Resistance (m ² K/W)	Thermal Bridging	Vapour Resistivity (MNs/gm)	Vapour Resistance (MNs/g)	
Inside Surface			0.170				
SAND CEMENT SCREED	75.0	1.400	0.054		100.000	7.500	
POLYTHENE SEPARATION LAYER	0.5		0.001			500.000	
KOOLTHERM K103	100.0	0.019	5.263		370.000	37.000	
DAMP PROOF MEMBRANE	0.9		0.001			800.000	
CONCRETE BEAM & BLOCK DECK (block k-value = 1.13 W/mK)	150.0	1.130	0.130	12.0% Concrete beams, 500.0 centres	100.000	15.000	
Ground			0.187				

Key Bridged and fastened Bridged Fastened

Supporting Information

Detailed U-value

The calculation method is in accordance with BS EN ISO 6946:2017 / I.S. EN ISO 6946:2017. A simplified summary of the steps involved are shown below

$$R_{total}(R_{tot}) = R_{si} + R_1 + R_2 + \dots + R_n + R_{se}$$

For a construction containing inhomogeneous layers the upper and lower resistances of the construction must be used

$$R_{tot;upper} = 1 / ((f_a / R_{tot;a}) + (f_b / R_{tot;b}) + \dots + (f_q / R_{tot;q}))$$

$$R_j = 1 / ((f_a / R_{aj}) + (f_b / R_{bj}) + \dots + (f_q / R_{qj}))$$

$$R_{tot;lower} = R_{si} + R_1 + R_2 + R_j + \dots + R_n + R_{se}$$

$$\begin{aligned} R_{tot} &= (R_{tot;upper} + R_{tot;lower}) / 2 \\ &= (5.806 + 5.805) / 2 \end{aligned}$$

$$\begin{aligned} U &= 1 / R_{tot} \\ &= 6.588 \end{aligned}$$

$$\Delta U = \Delta U_g + \Delta U_f + \Delta U_r$$

ΔU_g correction for air voids - 0.0000

ΔU_f correction for fasteners by approximate procedure - 0.0000

ΔU_f correction for fasteners by detailed calculation method (rainscreen cladding) - 0.0000
(point thermal transmittance 0.000 W/K | fasteners per m² 0.000)

ΔU_r correction for inverted roofs - 0.0000
(precipitation 0.000 mm/day | $f \bullet \times 0.0000$)

Total U-value (U_c) = $U + \Delta U$

If ΔU is less than 3% of U then the corrections need not be applied.

Calculations including a steel frame construction are calculated in accordance with BRE Digest 465.

Calculations for floor and basement constructions are calculated in accordance with BS EN ISO 13370:2017 / I.S. EN ISO 13370:2017.

Characteristics	Value	Characteristics	Value
Perimeter	13.573m	Area	20.200m ²
P/A	0.672	Soil type	Clay or Silt
Earth conductivity	1.500W/mK	Floor height above ground	0.225m
Underfloor wall u-value	1.700W/m ² K	Ventilation openings	1500.000mm ² /m
Average wind speed	5.000m/s	Wind shielding factor	0.050

Condensation

Condensation calculations have been performed in accordance with BS EN ISO 13788:2012 and BS 5250:2021 and the risk assessed within environmental conditions with the following characteristics

Humidity class 2 - Offices, shops and dwellings with low occupancy

Location: 5a England SE & Central South

Condensation risk has been assessed up to and including Level 2 Humidity Class (2 - Offices, shops and dwellings with low occupancy) within worst case environment conditions. The risk level is 1 in 20 years

Condensation has been calculated to accumulate at the followings interfaces:

Interface1: KOOLTHERM K103 / DAMP PROOF MEMBRANE

Condensation Analysis

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Internal Temperature (°C)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Internal Relative Humidity (%)	51.9	51.0	51.7	52.8	57.2	62.3	67.5	67.9	64.4	59.7	54.3	52.8
External Temperature (°C)	1.5	1.8	3.7	6.0	9.3	12.4	14.5	14.1	11.8	8.7	4.4	2.5
External Relative Humidity (%)	90.0	86.5	84.0	81.0	81.0	80.0	80.5	82.5	85.5	88.0	89.5	90.5
Interface1 (Gc (kg/m²))	0.001	0.001	0.001	0.000	-0.001	-0.002	-0.002	0.000	0.000	0.000	0.001	0.001
Interface1 (Ma (kg/m²))	0.003	0.004	0.005	0.004	0.004	0.002	0.000	0.000	0.000	0.000	0.001	0.002

Gc = Monthly moisture accumulation per area at an Interface
Ma = Accumulated moisture content per area at an Interface
Peak accumulated moisture content per area at Interface1 (Ma) = 0.005m Kg/m²
Annual moisture accumulation (Ma) = 0.000 Kg/m²
Peak moisture build-up month: March

