

St Michael & All Angels Church, East Coker Section

08.07.2025

Floor
created on 22.8.2025

Thermal protection

$U = 0,26 \text{ W}/(\text{m}^2\text{K})$

GEG 2020/24 Bestand*: $U < 0,3 \text{ W}/(\text{m}^2\text{K})$

 excellent

 insufficient

Moisture proofing

No condensate

 excellent

Heat protection

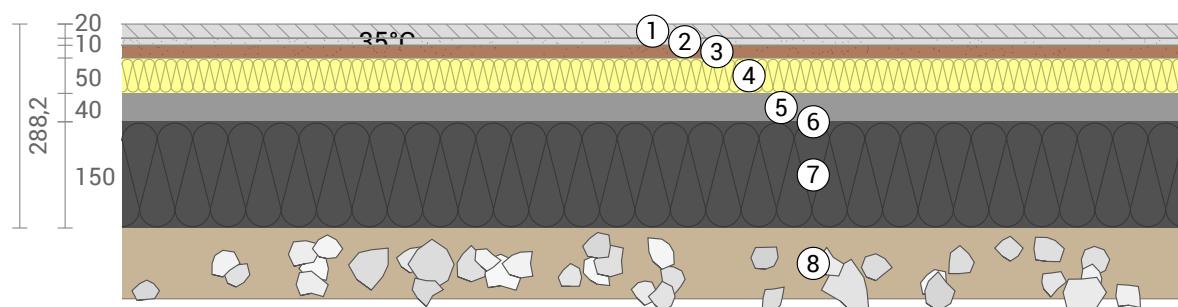
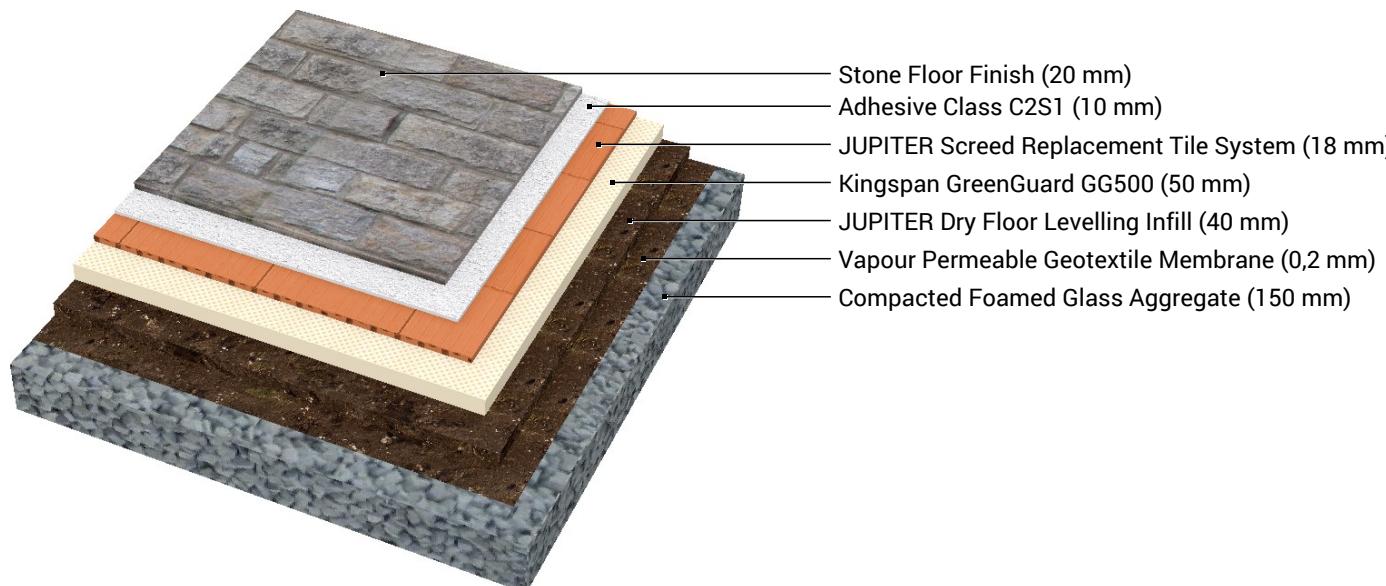
Component is adjacent to earth:

TAV and phase non relevant

Thermal capacity inside: $177 \text{ kJ}/(\text{m}^2\text{K})$

 excellent

 insufficient



- ① Stone Floor Finish (20 mm)
- ② Adhesive Class C2S1 (10 mm)
- ③ JUPITER Screed Replacement Tile System (18 mm)
- ④ Kingspan GreenGuard GG500 (50 mm)

- ⑤ JUPITER Dry Floor Levelling Infill (40 mm)
- ⑥ Vapour Permeable Geotextile Membrane (0,2 mm)
- ⑦ Compacted Foamed Glass Aggregate (150 mm)
- ⑧ Soil

Inside air : $20,0^\circ\text{C} / 50\%$

Ground: $0,0^\circ\text{C} / 100\%$

Surface temperature.: $33,1^\circ\text{C} / 0,4^\circ\text{C}$

Thickness: 28,8 cm

Weight: $139 \text{ kg}/\text{m}^2$

Heat capacity: $126 \text{ kJ}/(\text{m}^2\text{K})$

GEG 2020/24 Bestand

BEG Einzelmaßn.

GEG 2023/24 Neubau

DIN 4108

St Michael & All Angels Church, East Coker Section 08.07.2025, U=0,26 W/(m²K)

U-value calculation

#	Material	Dicke [cm]	λ [W/mK]	R [m ² K/W]
Thermal contact resistance inside (Rsi)				
1	Stone Floor Finish	2,00	1,400	0,014
2	Adhesive Class C2S1 (BS12004)	1,00	1,000	0,010
3	JUPITER Screed Replacement Tile System	1,80	1,030	0,017
4	Kingspan GreenGuard GG500	5,00	0,033	1,515
5	JUPITER Dry Floor Levelling Infill	4,00	0,160	0,250
6	Vapour Permeable Geotextile Membrane	0,02	0,500	0,000
7	Compacted Foamed Glass Aggregate	15,00	0,078	1,923
Thermal contact resistance outside (Rse)				
				0,000

Thermal contact resistances have been taken from DIN 6946 Table 7.

Rsi: heat flow direction upwards

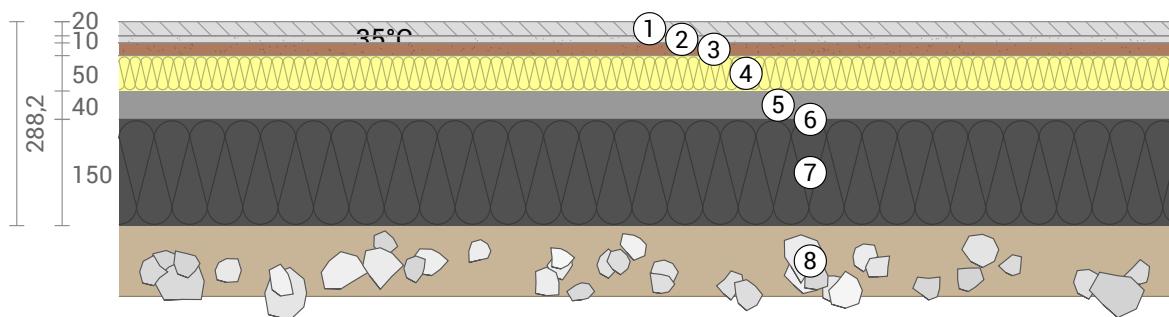
Rse: heat flow direction downward, outside: Ground

Thermal resistance $R_{tot} = 3,831 \text{ m}^2\text{K/W}$

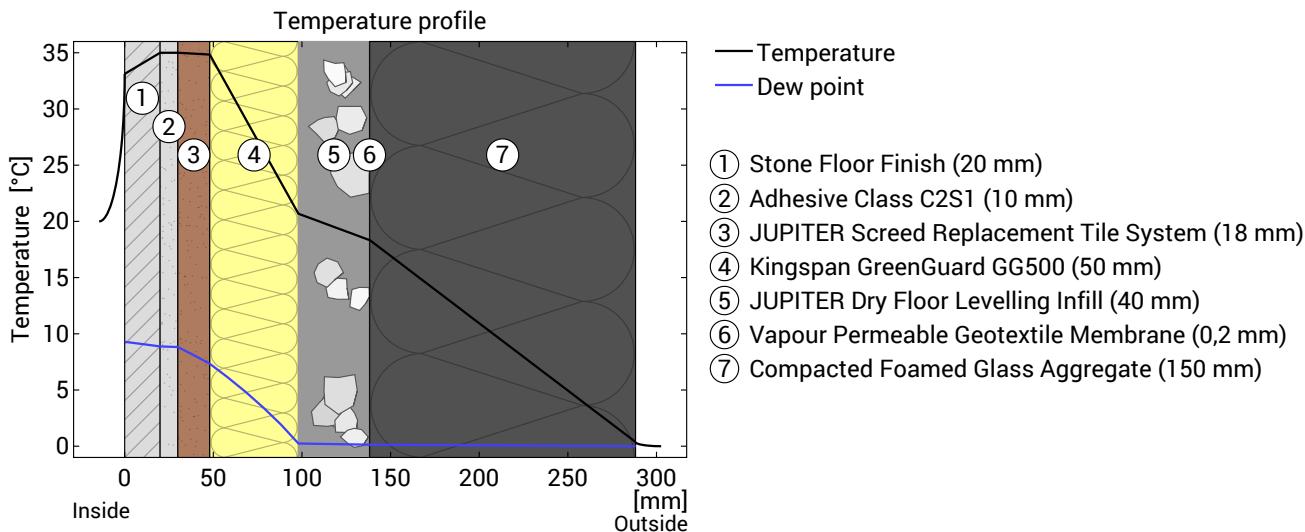
DIN 6946 may not be used for earth-contacting components. However, for the alternative method from DIN V 4108-6 Annex E, the required data on the size and position of this component are missing.

Heat transfer coefficient $U = 1/R_{tot} = 0,26 \text{ W/(m}^2\text{K)}$

The constructive U-value was calculated. Heat losses across the ground or basement were not considered because the necessary data are missing.



Temperature profile



Temperature and dew-point temperature in the component. The dew-point indicates the temperature, at which water vapour condenses. As long as the temperature of the component is everywhere above the dew-point temperature, no condensation occurs. If the curves have contact, condensation occurs at the corresponding position.

Layers (from inside to outside)

#	Material	λ [W/mK]	R [m ² K/W]	Temperatur [°C] min	Temperatur [°C] max	Weight [kg/m ²]
Thermal contact resistance*						
1	2 cm Stone Floor Finish	1,400	0,014	20,0	33,1	40,0
2	1 cm Adhesive Class C2S1 (BS12004)	1,000	0,010	35,0	35,0	15,0
3	1,8 cm JUPITER Screed Replacement Tile System	1,030	0,017	34,8	35,0	35,3
4	5 cm Kingspan GreenGuard GG500	0,033	1,515	20,7	34,8	1,8
5	4 cm JUPITER Dry Floor Levelling Infill	0,160	0,250	18,3	20,7	22,8
6	0,02 cm Vapour Permeable Geotextile Membrane	0,500	0,000	18,3	18,3	0,2
7	15 cm Compacted Foamed Glass Aggregate	0,078	1,923	0,4	18,3	24,0
Thermal contact resistance*						
8	Soil		0,040	0,0	0,4	
28,82 cm Whole component						
			3,831			139,0

*Assuming free circulating air at the inside surface.

Surface temperature inside (min / average / max): 33,1°C 33,1°C 33,1°C

Surface temperature outside (min / average / max): 0,4°C 0,4°C 0,4°C

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Moisture proofing

For the calculation of the amount of condensation water, the component was exposed to the following constant climate for 90 days: inside: 20°C und 50% Humidity; outside: 0°C und 100% Humidity (Climate according to user input).

Interior heat transfer resistance Rsi (user input deviating from DIN 4108-3):0,1 m²K/W

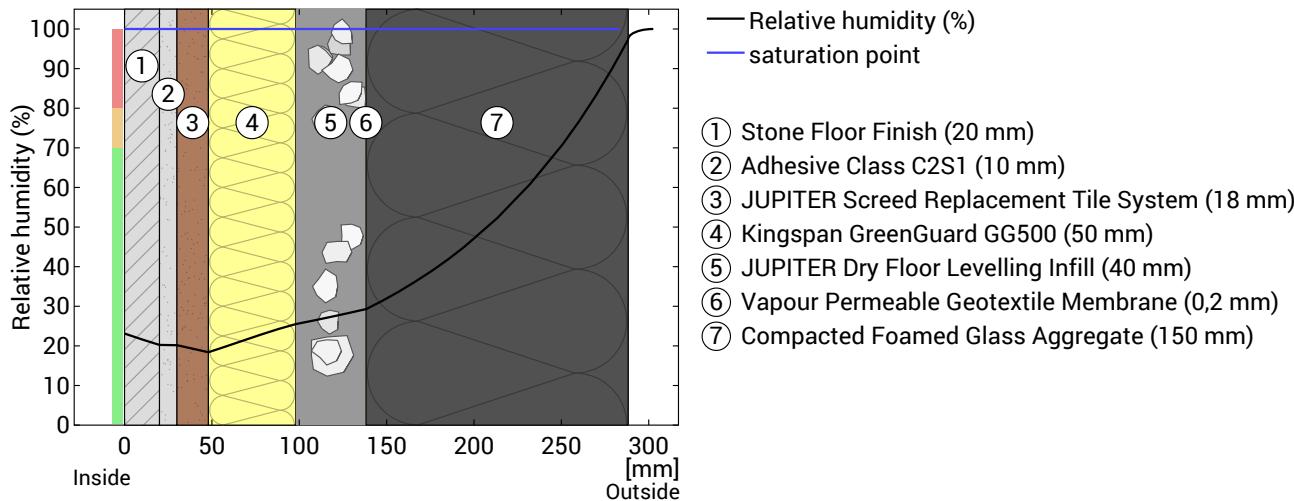
This component is free of condensate under the given climate conditions.

#	Material	sd-value [m]	Condensate [kg/m ²]	Weight [kg/m ²]
1	2 cm Stone Floor Finish	0,80	-	40,0
2	1 cm Adhesive Class C2S1 (BS12004)	0,10	-	15,0
3	1,8 cm JUPITER Screed Replacement Tile System	2,70	-	35,3
4	5 cm Kingspan GreenGuard GG500	10,00	-	1,8
5	4 cm JUPITER Dry Floor Levelling Infill	0,12	-	22,8
6	0,02 cm Vapour Permeable Geotextile Membrane	0,00	-	0,2
7	15 cm Compacted Foamed Glass Aggregate	0,15	-	24,0
	28,82 cm Whole component	13,87	0	139,0

Humidity

The temperature of the inside surface is 20,0 °C leading to a relative humidity on the surface of 23%. Mould formation is not expected under these conditions.

The following figure shows the relative humidity inside the component.



Notes: Calculation using the Ubakus 2D-FE method. Convection and the capillarity of the building materials were not considered. The drying time may take longer under unfavorable conditions (shading, damp / cool summers) than calculated here.

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Moisture protection in accordance with DIN 4108-3:2018 Appendix A

DIN 4108-3 can not be used with components which are in contact with ground.

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heating level

Heat output into the interior (heating output): approx. 131 W/m².

The heating plane leads to increased heat losses to the outside and can be taken into account with an effective U-value (U_{eff}):

Effective u-value: 0,47 W/m²K (Energy loss of the heated component)

U-value: 0,261 W/m²K (Energy loss of the un-heated component)

Thermal transmission to the outside: 9,34 W/m² (At an outside temperature of 0°C)

At the assumed temperatures of room air, outside air and heating plane, the heat loss to the outside corresponds to an identical but unheated component with an U-value of U_{eff} = 0,47 W/m²K.

Temperature of inside surface: 33,1 °C

The surface temperature of the floor should not exceed 29°C in living areas. Maximum 33°C in the bath room and 35°C for the border zones.

These values are based on a room temperature of 20°C, an outside temperature of 0°C and the following tempered layer:
Adhesive Class C2S1 (BS12004) [35°C]