CERTIFICATE

Certified Passive House Component

ID: 1451bc03 valid until 31. December 2025

Passive House Institute
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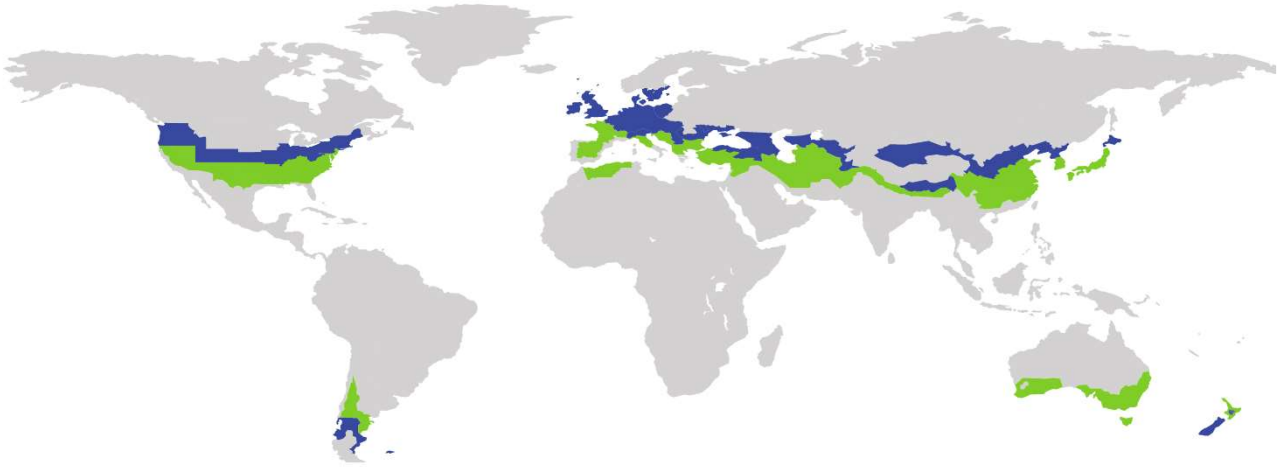
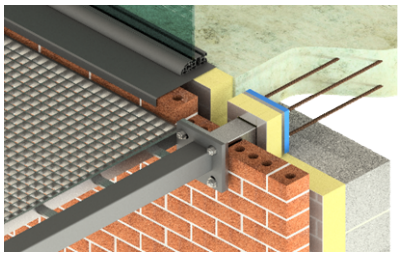


Category	**Balcony connection**
Type	**Cantilevered**
Manufacturer	**Farrat Isolevel Limited** **WA15 8HJ Altrincham** **United Kingdom**
Product name	**FARRAT TBK & TBF**



This certificate was awarded based on the following criteria for the climate zone

Hygiene and comfort criterion

The minimum temperature factor of the internal surfaces is $f_{Rsi=0.25m^2K/W} \geq$ **0.86**

Energy criterion

The linear thermal bridge loss coefficient is $\Psi \leq$ **0.25** W/(mK)

Efficiency criterion

The heat losses depending on the possible load bearing do not exceed **Eff.t. ≤** **10.00** W/(kNmK)

cool temperate climate

CERTIFIED COMPONENT

Passive House Institute

Farrat Isolevel Limited
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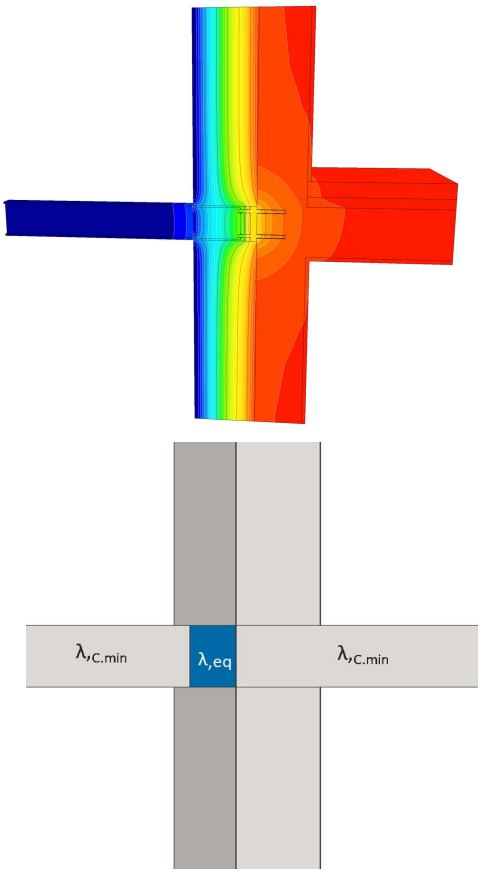
Determined values

Product	h [mm]	d [mm]	$\lambda_{,C.min}$ [W/(mK)]	$\lambda_{,eq}$ [W/(mK)]	$\Psi_{,WB}$ [W/(mK)]	$m_{Rd,y}$ [kNm/m]	f_{Rsi} [-]	Eff.t. [W/(kNmK)]	Efficiency - class
TBK with IPE 140 - Distance 2 m	140	25	-	-	0.0650	-35.00	0.96	1.9	phA+
TBK with IPE 140 - Distance 1.5 m	140	25	-	-	0.0867	-35.00	0.96	2.5	phA
TBK with IPE 140 - Distance 1 m	140	25	-	-	0.1300	-35.00	0.96	3.7	phB
TBF with IPE 140 - Distance 2 m	140	25	-	-	0.0651	-35.00	0.95	1.9	phA+
TBF with IPE 140 - Distance 1.5 m	140	25	-	-	0.0868	-35.00	0.95	2.5	phA
TBF with IPE 140 - Distance 1 m	140	25	-	-	0.1301	-35.00	0.95	3.7	phB

All thermal properties have been determined through a 3D-FEM Simulation. The simulation model consists of an IPE 140 beam, with a head-plate, the TBF/TBK thermal separation element (25 mm) and a 25 mm stainless steel plate. The determination of linear thermal bridges is dependent on the distance between the connectors. The punctiform thermal bridge X accounts to 0.1300 W/K for the TBK and 0.1301 W/K for the TBF. These values can be used to determine a linear surcharge, dependent on the distance. A methodology using an equivalent conductivity as a linear element as for linear thermal seperations is not recommended here.

$\lambda_{,C.min}$ = Min. conductivity reinf. Concrete
$\lambda_{,eq}$ = Equivalent conductivity balcony connection
$\Psi_{,WB}$ = Linear thermal bridge coefficient
f_{Rsi} = Temperature-factor
Eff.t. = Efficiency-value
$m_{Rd,y}$ = Design resistance



Using the equivalent thermal conductivity λ_{eq}, linear thermal bridge loss coefficients can be determined for other connection situations using 2D FEM simulations. The minimum thermal conductivity of the reinforced concrete $\lambda_{C.min}$ of the balcony is to be used for the cantilever slab and the false ceiling. The rectangular replacement geometry of the balcony connection element has the dimensions of height h and width d, as well as the thermal conductivity λ_{eq}.

Notice

The thermal bridge loss coefficients can be interpolated approximately linearly. Calculations and boundary conditions according to the criteria and algorithms “Certified Passive House Component – Balcony Connection, Version 2.1"