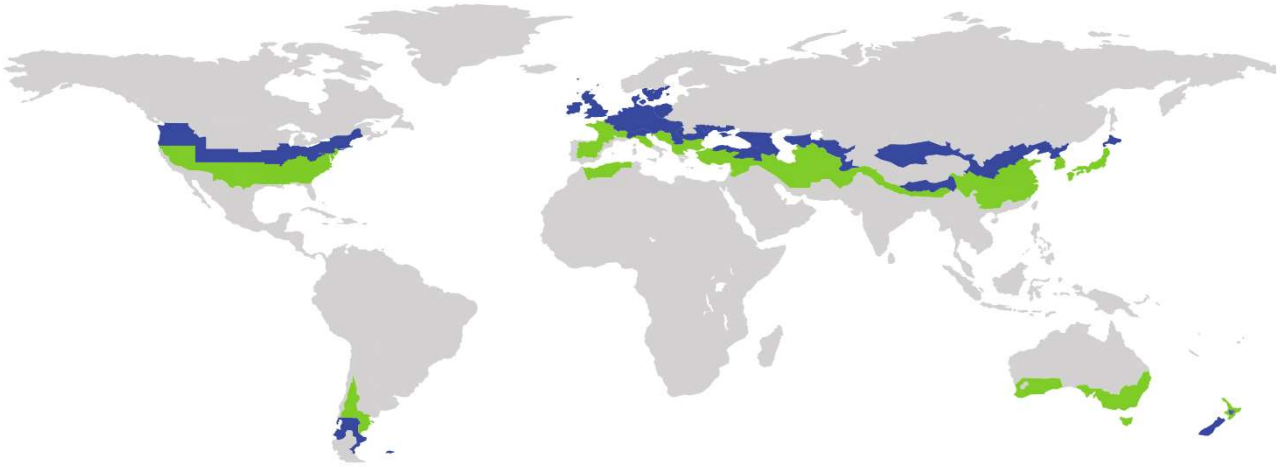
CERTIFICATE

Certified Passive House Component

ID: 2451bc03 valid until 31. December 2026

Passive House Institute
Dr. Wolfgang Feist
64342 Darmstadt
GERMANY



Category	**Balcony connection**
Type	**Cantilevered**
Manufacturer	**Thermal Breaks Ltd** **CM23 4TR Bishops Stortford** **UNITED KINGDOM**
Product name	**TekTherm™ AK-FR**

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

cool, temperate climate

Hygiene and comfort criterion

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

Energy criterion

The linear thermal bridge loss coefficient is **Ψ ≤** **0.25** W/(mK)

Efficiency criterion

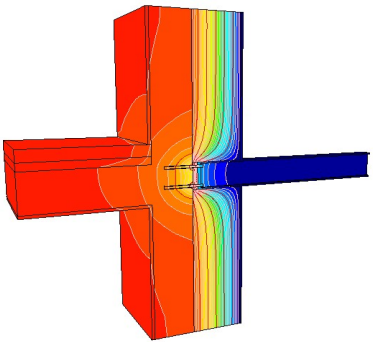
The heat losses depending on the possible load bearing do not exceed **Eff.t. ≤** **10.00** W/(kNmK)

ZERTIFIZIERTE KOMPONENTE
Passive House Institute

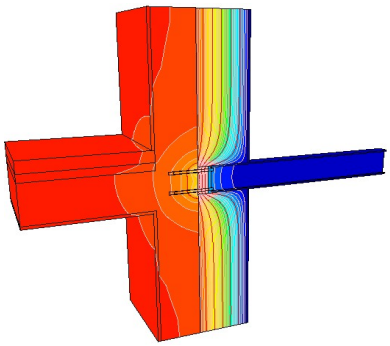
Thermal Breaks Ltd
11 Thorley Fields Business Park CM23 4TR Bishops Stortford UNITED KINGDOM
0800 6444 949 | www.thermal-breaks.group

Determined values

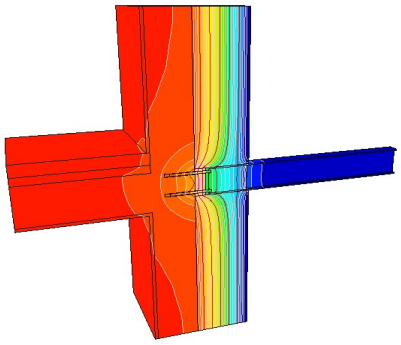
Product	h [mm]	d [mm]	$\lambda_{,C.min}$ [W/(mK)]	$\lambda_{,eq}$ [W/(mK)]	$\psi_{,WB}$ [W/(mK)]	$m_{Rd,y}$ [kNm/m]	f_{Rsi} [-]	Eff.t. [W/(kNmK)]	Efficiency class
AK-FR 25 mm - 1 / m	140	25	3.0	0.05	0.219	-34.8	0.92	6.30	phC
AK-FR 2 x 25mm - 1 / m	140	50	3.0	0.066	0.162	-34.8	0.94	4.70	phB
AK-FR 2 x 25mm - 1 / m + Ins. 035	140	50	3.0	0.037	0.112	-34.8	0.95	3.20	phB



AK-FR 25 mm



AK-FR 50 mm

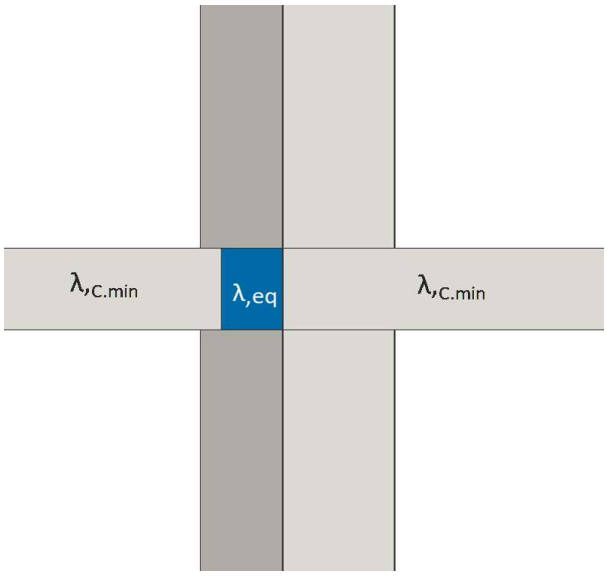


AK-FR 50 mm + Insulation

$\lambda_{,C.min}$ = 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

The simulations have been conducted with an HEA140 steel beam, with a distance of 1 m. Larger distances reduce the equivalent linear thermal bridges. The stated values assume the installation of 1 anchor per meter. The thermal seperation element has a thermal conductivity of 0.22 W/(mK).

Using the equivalent thermal conductivity λ_{eq}, linear thermal bridge loss coefficients for other connection situations can be determined with 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 equivalent rectangular 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 approximately linearly interpolated. Calculations and boundary conditions according to the criteria and algorithms "Certified Passive House Components - Balcony Connection, Version 2.1"