Fabric Heat Loss with Linear and Point Thermal Bridges

Envelope heat transfer coefficient from U × A plus linear (ψ × length) and point (χ) thermal bridges, with the bridges' share and heat loss.

Method: H = ΣUA + ΣψI + Σχ (ISO 14683 / ISO 13789 method)

Input parameters

Unit system: SI

Parameter	Value	Unit
Plane element U-value	0.30000	W/(m²·K)
Plane element area	200.00	m²
Linear bridge 1, ψ-value (per metre of junction)	0.10000	W/(m·K)
Length of bridge 1	60.000	m
Linear bridge 2, ψ-value (per metre of junction)	0.050000	W/(m·K)
Length of bridge 2	40.000	m
Point bridge (each)	1.0000e-04	kW/K
Number of point bridges	20.000	
Inside–outside temperature difference	25.000	K

Calculated results

Parameter	Value	Unit
Plane element coefficient	0.060000	kW/K
Thermal bridge coefficient	0.010000	kW/K
Share of thermal bridges	14.286	%
Heat loss	1,750.0	W

Notes for this case

- ψ-values from numerical calculation (ISO 10211) or catalogues of details; in well-insulated buildings bridges often add 10–30 % to fabric loss.

Formula and method

$$H = UA + \sum \psi_j l_j + \sum \chi_k, \quad Q = H\Delta T$$

Variables

U	Plane element U-value	W/(m²·K)
A	Plane element area	m²
ψ_1	Linear bridge 1, ψ-value (per metre of junction)	W/(m·K)
l_1	Length of bridge 1	m
ψ_2	Linear bridge 2, ψ-value (per metre of junction)	W/(m·K)
l_2	Length of bridge 2	m
χ	Point bridge (each)	W/K
n_χ	Number of point bridges	-
ΔT	Inside–outside temperature difference	K
H_U	Plane element coefficient	W/K
H_{TB}	Thermal bridge coefficient	W/K
H_{TB}/H	Share of thermal bridges	-
Q	Heat loss	W

Method and standards

ISO 13789 transmission coefficient.

Assumptions and limits

- A ψ-value has the units of thermal conductivity, W/(m·K) (Btu/(h·ft·°F) in FPS), but means heat flow per metre of junction per kelvin; the page converts it as such.
- Steady state.

References

- H = ΣUA + ΣψI + ΣχI (ISO 14683 / ISO 13789 method)

Report details

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Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/hvac/loads/thermal-bridge-heat-loss

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.