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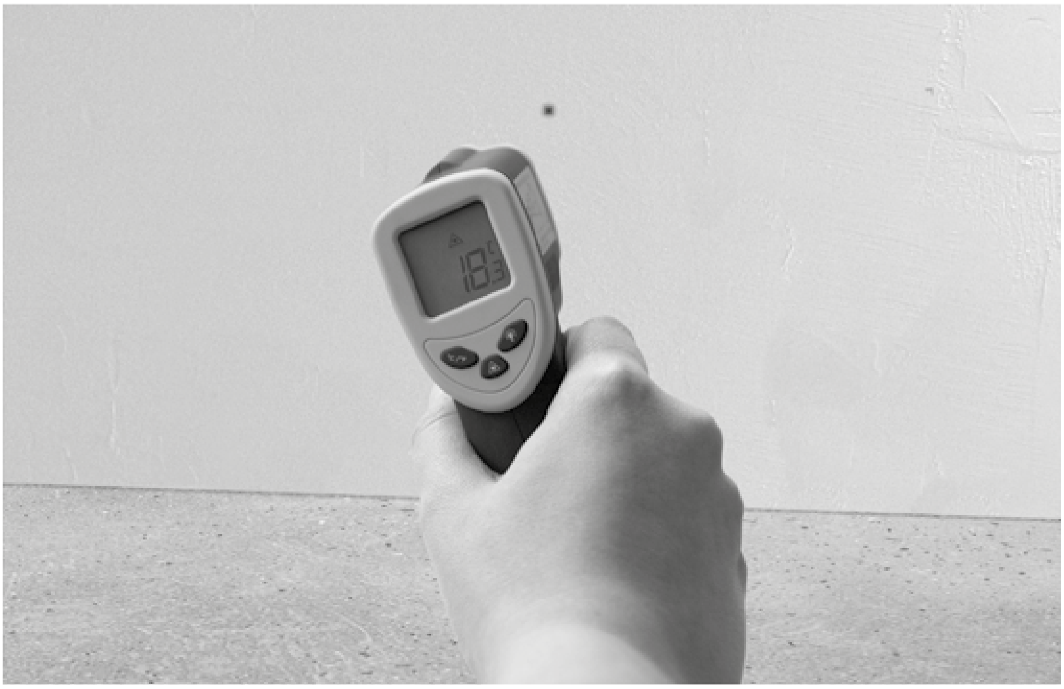
Building physics

Reinforced concrete/reinforced concrete

Thermal protection



Thermal protection | Characteristic building-physical values

The Part L 2010 and its new requirements relating to thermal bridges

Prior to the Building Regulations Part L 2010 , it was possible to to assess the impact of non-repeating thermal bridges very simply by simply stating that Accredited Construction Details had been adopted - and assigning a 'y' value of 0.08 W/(m^2•K) per °C to the entire dwelling, rather than calculating for each individual junction or thermal bridge. However, that has now changed and it is necessary to assess the heat loss through every individual thermal bridge.
This makes it even more critical that an effective thermal barrier is installed wherever a cantilever balcony and/or other similar construction connectivity point breaks the insulation layer creating the risk of a thermal bridge.

Linear thermal transmission coefficient ψ

The heat flow via a linear contact thermal bridge (e.g. balcony connection) is described by a thermal transmission coefficient ψ. The better the heat insulation element employed in the area of the connection of the balcony (or of another thermal bridge) is, the greater the thermal resistance R of the element, the smaller is the heat flow via the thermal bridge and the smaller is the heat coefficient ψ.
The heat transmission coefficient ψ, along with the insulation performance of the Schöck Isokorb® XT, depends on the structural configuration in the area of the balcony connection and therefore changes with each design. The calculation (acc. to EN ISO 10211) takes place via the input of the design (wall or floor structure), on the installation of the Schöck Isokorb® XT and on the assignment of the appropriate material properties (e.g. thermal conductivity) in a thermal bridge program (FEM-Software), which calculates the 2- and/or 3-dimensional heat flow.
If the heat flows through the undisturbed construction is subtracted from this total heat flow, then the linear thermal transmission coefficient ψ is obtained.

Equivalent Thermal Conductivity λ_{eq}

The equivalent thermal conductivity λ_{eq} is the overall thermal conductivity of all components of the Schöck Isokorb® and is - at the same insulting element thickness - a measure for the thermal insulating effect of the connection. The smaller λ_{eq}, the higher the thermal insulation of the balcony connection. λ_{eq} values are determined through detailed thermal bridge calculations. Since each product has an individual geometry and placement specification, each Schöck Isokorb® has an individual number.

For the purpose of comparison of load bearing thermally insulating elements of varying element thickness, the equivalent resistance to heat transmission R_{eq} is used instead of λ_{eq} since it considers the insulating element's thickness in addition to the equivalent thermal conductivity λ_{eq}. The larger R_{eq}, the better thermal insulation effect. R_{eq} is calculated from the equivalent thermal conductivity λ_{eq} and the insulating element thickness as following:

$$R_{eq} = \frac{d}{\lambda_{eq}}$$

Product characteristic value λ_{eq} and structure-dependent thermal transmission coefficient ψ

While the thermal transmission coefficient ψ describes the heat loss across the complete connection structure, the equivalent thermal conductivity λ_{eq} is a measure for the heat insulation of the Schöck Isokorb® alone and thus a structure-independent product characteristic value. Therefore, the related λ_{eq}-values given in this Technical Information are for all Isokorb®types. Along with the thermal transmission coefficients ψ precalculated below for simple wall constructions (configured in layers), λ_{eq} can thus also be employed for detailed thermal bridge calculations in an FEM-Tool as material characteristic value of the Schöck Isokorb®.

Passive house

Passive house standard with Schöck Isokorb® XT

Due to the very high thermal insulation performance of the Schöck Isokorb® XT the balcony from the Passive House Institute in Darmstadt (PHI) connected with the Schöck Isokorb® KXT is certified as “Low thermal bridge design”. For supported balconies (Schöck Isokorb® types QXT) numerous bearing levels are certified as “Non-thermal bridge connection”.
With the Schöck Isokorb® type AXT Schöck offers a non-thermal bridge connection acc. to PHI certification is also available for parapets and balustrades. Depending on the design, with the Schöck Isokorb® type AXT, negative heat transmission coefficients are also possible.

Impact-sound protection

Impact sound protection

The rated difference in impact sound level $\Delta L_{n,v,w}$

This describes the reduction in the transmission of impact sound from the balcony to the building when using the Schöck Isokorb® XT structural thermal break connection, compared with an uninterrupted balcony to concrete connection. The larger the value, the more the impact sound is reduced. The rated difference in impact sound level $\Delta L_{n,v,w}$ for the Schöck Isokorb® XT was measured and specified by the University of Applied Sciences in Stuttgart.

Schöck Isokorb® type	Evaluated impact sound level difference $\Delta L_{n,v,w}$ in dB	
	Fire resistance class R0	Fire resistance class REI120
KXT15-H180	18.1	-
KXT30-H180	17.8	17.6
KXT30-V8-H180	14.9	-
KXT50-H180	14.6	12.7
KXT50-V8-H180	14.0	-
KXT65-V8-H180	12.6	9.3
KXT90-V8-H180	11.8	-
QXT10-H180	18.9	15.8
QXT30-H180	17.3	13.3
QXT60-H180	16.7	13.8
QXT70-H180	15.0	14.0

Table 4: Evaluated impact sound level differences $\Delta L_{n,v,w}$ Schöck Isokorb® XT