

Exposed soffit

Exposed soffit design

Many clients perceive that rooms above exposed upper floors will be hot. However, it is possible to achieve very high levels of thermal insulation in exposed upper floors. The designer has a choice of where to position the insulation: for concrete floors, either above or below the floor.

If insulating below the structural floor, the insulation can be laminated to a variety of materials thus the floor can be insulated and finished in one process.

Insulating above the structural floor reduces the thermal mass of the floor allowing for fast warm up. However, if only part of the floor on that storey is exposed it may cause problems with steps between finished floor levels.

Shelter factors

Where an exposed floor is over an enclosed but un-conditioned space, such as a podium car parks, the shelter factor of the garage improves the U-value of the exposed floor. Conventions for U-value calculations, sets out the shelter factors to be applied to separating floors in these locations.

There are specific additional requirements that need to be taken into consideration when calculating the U-values for elements that are adjacent to un-conditioned spaces. The U-value of an exposed floor (soffit) which separates a conditioned area from an un-conditioned area, can be calculated by including an additional amount of thermal resistance (R_U) due to the sheltering effect of the un-conditioned area.

Standard default values of R_U can be taken from Dubai Municipality Al Sa'fat Green Building Rating System and Estidama Pearl Rating System. For situations not covered by default values, or where additional guidance is required contact our Technical Support Team Centre on +971 2 551 2453.

Concrete upper floors

Insulation can be positioned above or below the concrete floor. When above the floor, the insulation is usually located below a floating screed. If only part of a concrete slab is insulated, careful detailing may be needed to avoid steps in the floor level.

Insulation located below the floor should be covered, usually with plasterboard or other fire resistant boards.

Weather resistance

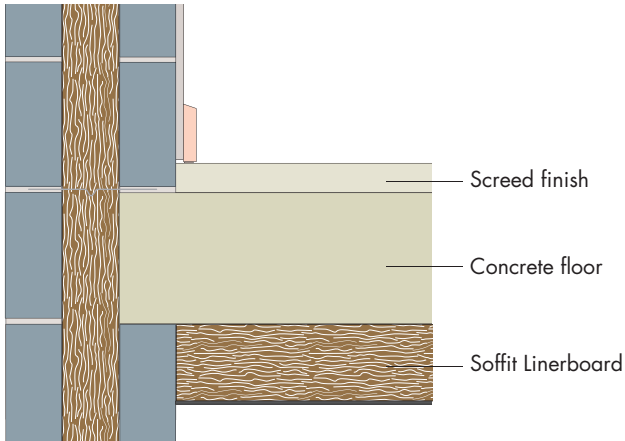
The soffits of exposed floors may need to be finished with a weather resistant finish. Although not exposed to direct driving rain, wind turbulence can result in wind-driven rain being blown up onto soffits. Another consideration is that soffits, being sheltered from the washing effect of wind driven rain, tend to collect dirt and grime over time.

Fire resistance

The fire resistance of the exposed floor should comply with UAE Civil Defense Regulation requirements. This will be between 1 to 4 hours, depending on the purpose of group of the building and its height above ground.

Positions for floor insulation

Insulation below concrete floor



Solution optimiser and pathfinder

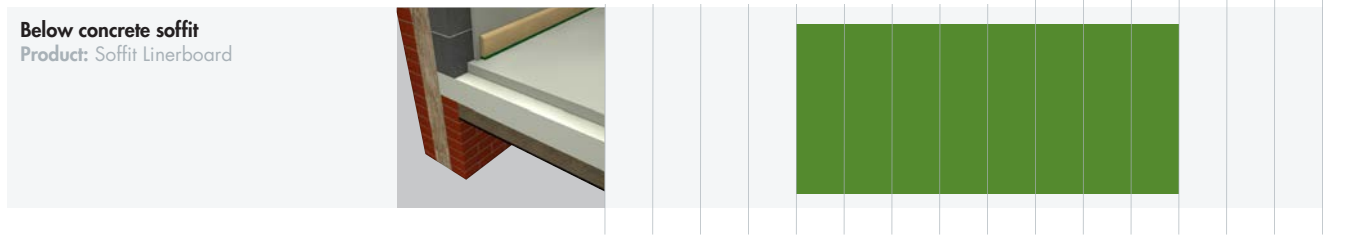
Key

■ Thermal insulation achievable by constructions within this document.

Knauf Insulation solution

U-values

0.35 0.34 0.33 0.32 0.31 0.30 0.29 0.28 0.27 0.26 0.25 0.24 0.23 0.22 0.21 0.20



Exposed soffit

Below concrete soffit

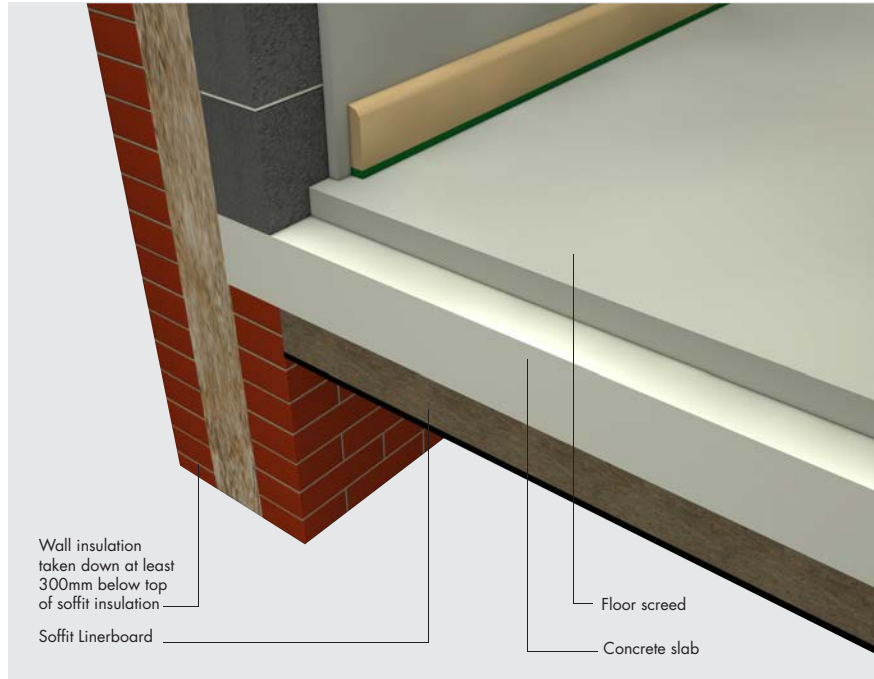
Soffit Linerboard



- Installed without the need to access areas above the floor
- Provides a solution to upgrade thermal performance of existing floors without reducing floor height

Soffit Linerboard

- Glass mineral wool is non-combustible
- Zero Ozone Depletion Potential (ODP)
- Zero Global Warming Potential (GWP)



Products

Soffit Linerboard is a non-combustible glass mineral wool slab with a black tissue facing.

Typical construction

A concrete upper floor slab or beam and block floor insulated on the underside with Soffit Linerboard. The linerboard can either be screw fixed directly to the slab, or to timber battens either fixed directly to the soffit or nailed to ceiling clips held within the joints of prestressed concrete units.

Installation

Fixing directly to soffit

Ensure the structure is stable and suitable to support the extra load of the lining boards. If in doubt, seek specialist advice.

Soffit Linerboard is screwed to the structure using suitable fixings, set in at least 50mm from any board edge. All boards to be butt jointed.

There are a wide range of fixings available from suppliers such as Rawlplug, Hilti, Ejot and Fisher. Typically 4 fixings per board are required for Soffit Linerboard. However, due to variations in the specification of concrete, Knauf Insulation advise you to seek specialist advice from the fixing manufacturer.

Where board edges are exposed, ensure insulation is covered with either a cement board or a suitable flashing.

Use a flexible and fire resistant sealant to seal any imperfection of fit at junctions between boards and walls.

Performance

Thermal performance

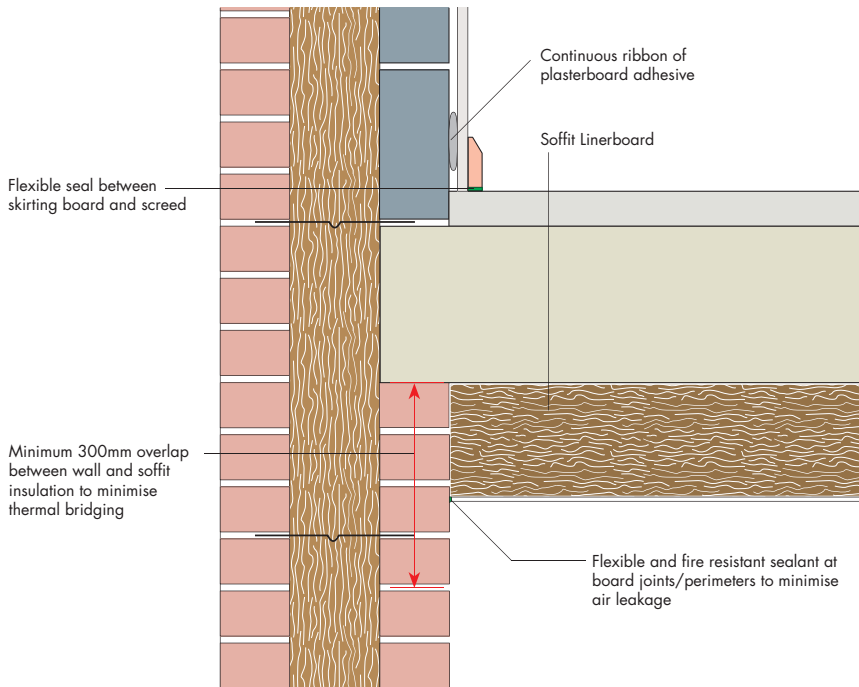
Soffit Linerboard has a thermal conductivity of 0.037 W/mK.

Fire performance

Soffit Liner is tested and listed UL 723, ASTM E84

Classification (UL723)	FSK	WMP-10
Flame spread	not over 25	not over 25
Smoke developed	not over 50	not over 50

Typical wall/floor junction Soffit Linerboard



Typical specification

Soffit Linerboard thickness.....mm to be screwed to the structural soffit using fixings manufactured by Fixings to be set in at least 50mm from any board edge. Boards to be butt jointed.

Weight of Soffit Linerboard

Product	Thickness (mm)	Weight kg/m ²
Soffit Linerboard	100	9.5

Typical U-values of upper concrete floor with 50mm screed finish

U-values (W/m ² K) 200 mm Slab/Insulation					
Insulation thickness (mm)	Product	Masonry Hollow Normal Weight Block (λ=1.13)	Masonry Solid Normal Weight Block (λ=1.69)	Lightweight Autoclave Aerated Concrete (AAC) Block (λ= 0.13)	High strength Autoclave Aerated Concrete (AAC) Block (λ=0.16)
100	Soffit Liner Board	0.31	0.32	0.22	0.23
	Soffit Liner Extra	0.31	0.31	0.22	0.23

Note: There are specific additional requirements that need to be taken into consideration when calculating the U-values for elements that are adjacent to unheated spaces. The U-value of an exposed floor (soffit) which separates a heated area from an unheated area can be calculated by including an additional amount of thermal resistance (R_g) due to the sheltering effect of the unheated area. Standard default values of R_g can be taken from BR 443 (Conventions for U-value calculations) or SAP 2009. For situations not covered by default values, or where additional guidance is required contact our Technical Support Team Centre on +971 2 551 2453.