

Cladded walls

Rainscreen cladding and curtain wall systems



Rainscreen cladding systems

There are a wide variety of proprietary rainscreen cladding systems available most of which have the insulation installed on the external face of a masonry wall, this helps to keep internal temperatures stable by storing heat in the winter and reducing solar gains in the summer. Rainscreen cladding systems are also lightweight when compared to brick and masonry solutions and they can provide the designer with a wide range of aesthetic options.

Curtain wall systems

Curtain walls usually consist of a proprietary non structural lightweight frame which in some cases is designed to incorporate glass panels which act as the weatherproof facade and also allow daylight to penetrate into the building. There are several other types of curtain walling including factory built unitized systems which are typically comprised of insulation behind a glass, natural stone or metal facing.

Whenever a proprietary rainscreen cladding or curtain wall system is used, the system manufacturer's recommendation should be followed.

Weather protection

Rainscreen cladding systems are designed to keep both the structural frame and the thermal insulation dry, due to the rainscreen cladding itself but also due to the airspace between the cladding and the insulation.

Drained and ventilated rainscreen systems work by allowing air to enter at the base of the system and escape at the top of the system, the ventilated cavity allows water penetrating the panel joints to be partly removed by the 'stack effect' and partly removed by running down the rear face of the panels and out of the base of the system.

Curtain walls usually consist of a glass facade which is both waterproof and thus weather resistant.

Fire

For external wall constructions that include cavities (such as rainscreen cladding), cavity fire barriers are recommended at the junctions between the wall and every compartment floor or wall or other wall or door assembly that forms a fire-resisting barrier as detailed in UAE Civil Defense Regulations.

Fire barriers

The cavity barrier needs to be as per the system performance requirement and ensure compartmentation is established between the façade skin and the primary substrate. The barrier should be installed as per UAE Civil Defense Regulations.

Cladded walls

Behind rainscreen cladding system

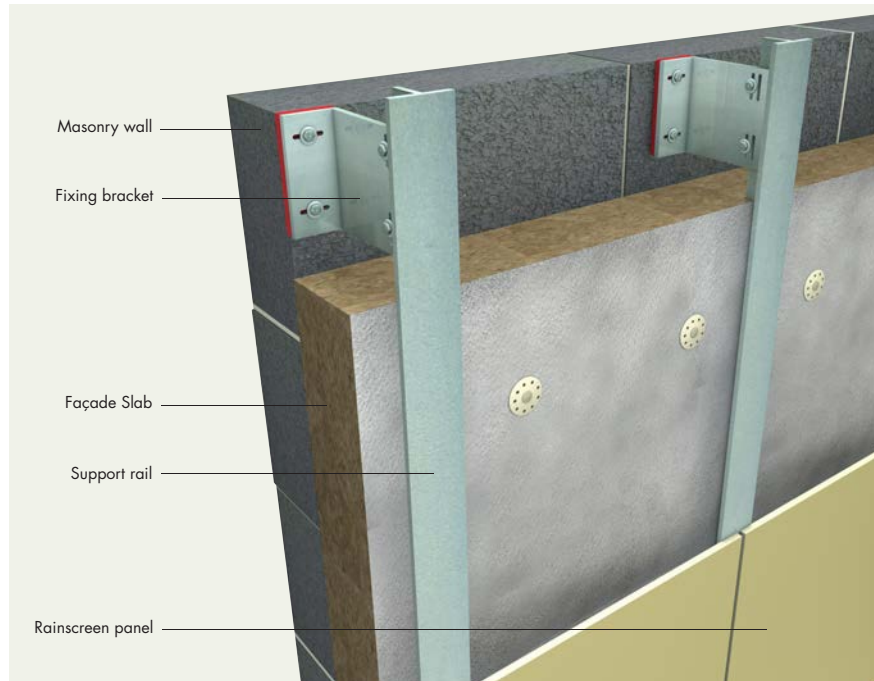
Façade Slab



- Friction fitting behind and between cladding rails prevents air movement and infiltration through or around the insulation
- Lightweight, flexible slab is quick to install and also accommodates imperfections in substrate

Façade Slab

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



Product

Façade Slab is a glass mineral wool slab containing a water repellent additive, specially developed for rainscreen cladding applications. Its manufacture has a very low impact on the environment.

Typical construction

Rainscreen cladding systems comprise outer cladding panels that are bolted to a supporting framework of rails, which are supported by brackets fixed through a thermal break pad back to the building frame.

A layer of insulation is fixed independently against the building substructure using proprietary insulation fasteners.

Façade Slab is recommended for this application, as it is lightweight but rigid enough to resist the compression forces generated when installing the insulation slabs on the masonry substrate.

Installation

Façade Slab is positioned between the support brackets for the rainscreen cladding system and across the whole area to be insulated. Cut the slabs with a sharp knife to fit around the brackets so there are no gaps in the insulation. To minimise thermal bridging, the brackets should be of sufficient depth to allow the panel support rails to be located clear of the face of the insulation.

The insulation should be close butted and fixed independently against the building substructure using proprietary insulation fasteners in accordance with the design specification.

Once the insulation is firmly in place, the application of the cladding can proceed. Ensure that a ventilated cavity remains between the insulation and the external cladding. The dimensions of the ventilated cavity should not exceed the limits in the Building Regulations.

Performance

Thermal performance

Façade Slab 35 has a thermal conductivity of 0.035 W/mK.

Façade Slab 33 Super has a thermal conductivity of 0.033 W/mK.

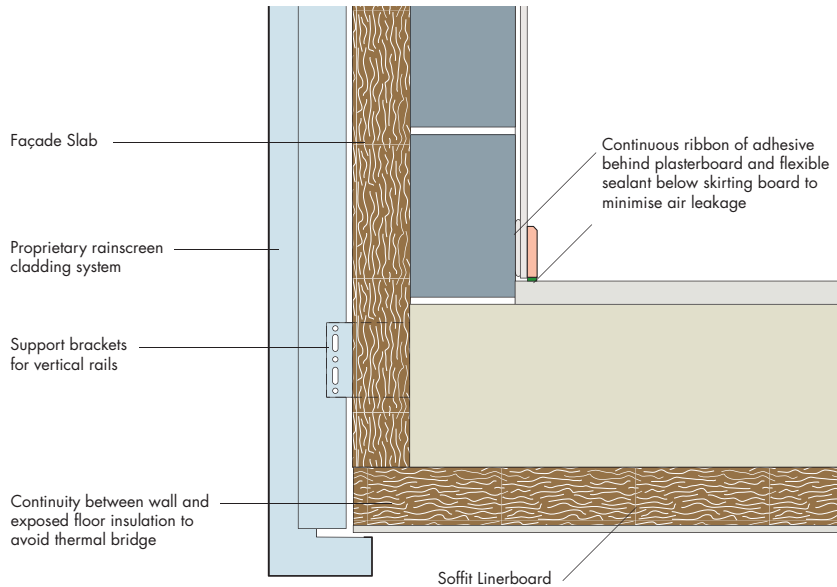
Façade Slab 32 Ultimate has a thermal conductivity of 0.032 W/mK.

The U-value of a proprietary rainscreen cladding system is dependent on the degree of thermal bridging in the system. Typically 50mm of Façade Slab will achieve a U-value of 0.57 W/m²K or better, but Knauf Insulation advise consulting proprietary rainscreen cladding manufacturers for U-values appropriate for their system.

Fire performance

FS Faced Façade Slab insulation is A2 non-combustible.

Typical junction detail with exposed floor



Typical specification

Façade Slab 35*/33*/32*mm thick to be fixed independently against the building substructure using proprietary insulation fasteners in accordance with the design specification. (*Delete as appropriate).

The insulation should be close butted and fitted around all adjacent parts of the rainscreen support brackets to minimise thermal bridging. Once the insulation is firmly in place the application of the rainscreen cladding can proceed.

U-values (W/m ² K) Outer ACP-MCM /Airspace/Insulation/150mm block inner leaf, plasterboard					
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)
50	Façade Slab 35	0.56	0.57	0.36	0.39
	Façade Slab 33 Super	0.53	0.55	0.35	0.37
	Façade Slab 32 Ultimate	0.52	0.53	0.34	0.37

Note: Fixings assumed to be plastic insulation holders with 5mm dia. steel expansion pin. The U-values have been calculated to BS EN ISO 10211 and BR 443. For project specific calculations contact our Technical Support Team Centre on +971 2 551 2453.

U-value calculations and rainscreen cladding systems

Rainscreen cladding systems can be very complex constructions due to the fact that they are made up of a variety of steel or aluminium components which are fastened together by various means.

It therefore, is no surprise that the heat flow paths through rainscreen cladding systems are also complex and cannot be accurately quantified by the normal calculation methods

used to establish the U-value of a construction element.

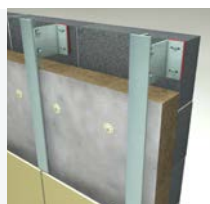
Therefore, if the U-value for a rainscreen cladding system is calculated without employing numerical modelling, the U-value should be calculated without taking the rainscreen brackets consideration and then increased by 0.30W/m²K.

Our Technical Support Team Centre can supply numerically modelled U-value calculations for rainscreen systems installed on existing walls, new build walls or walls incorporating light steel frame systems, providing all relevant construction information is made available to us.

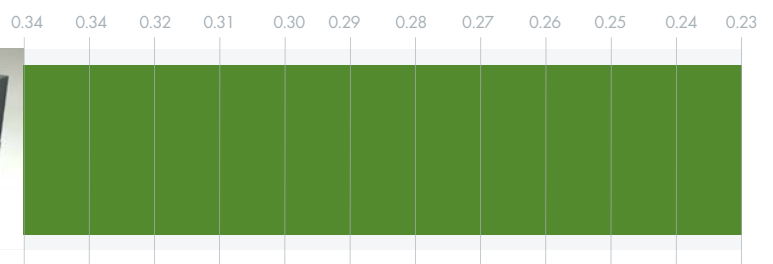
Solution optimiser and pathfinder

Knauf Insulation solution

Behind rainscreen cladding system
Product: Façade Slab



U-values



Key

Thermal insulation achievable by constructions within this document.