



April 2012

Section 3.1.4

Cladded Walls



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 Approved Document B - further guidance is given in BR135, published by the Building Research Establishment.

Fire barriers

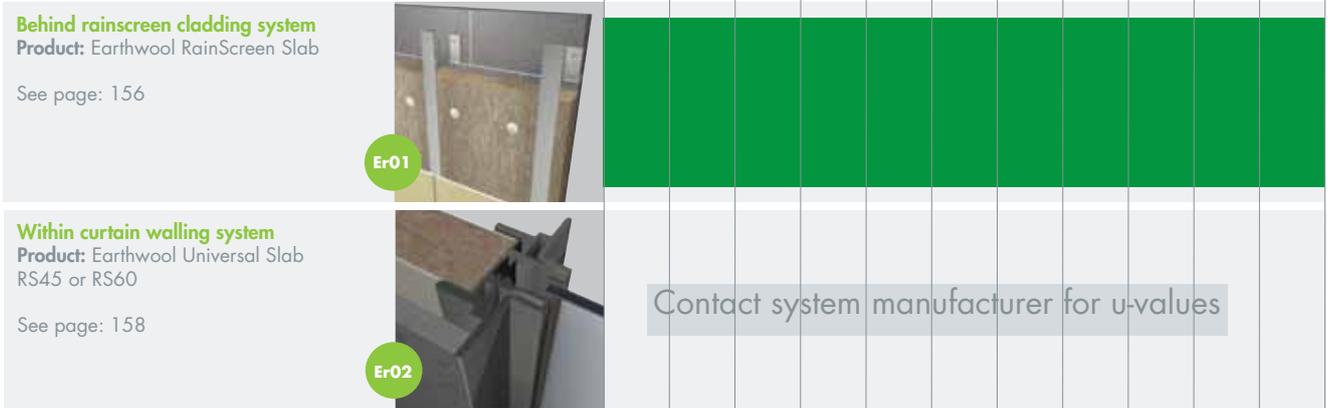
Should be made from non-combustible material, be at least 100mm high and penetrate the full depth of the insulation and form a continuous barrier through the insulation layer.

Solution optimiser and pathfinder

Knauf Insulation solution

U-values

0.34 0.34 0.32 0.31 0.30 0.29 0.28 0.27 0.26 0.25 0.24 0.23



Behind rainscreen cladding system
Product: Earthwool RainScreen Slab

See page: 156

Er01

Within curtain walling system
Product: Earthwool Universal Slab
RS45 or RS60

See page: 158

Er02

Contact system manufacturer for u-values

Key

- Thermal insulation achievable by constructions within this document.
- Find online. Visit knaufinsulation.co.uk and key in construction code to find the most up to date information on your chosen solution.

Cladded walls

Behind rainscreen cladding system

Earthwool RainScreen Slab

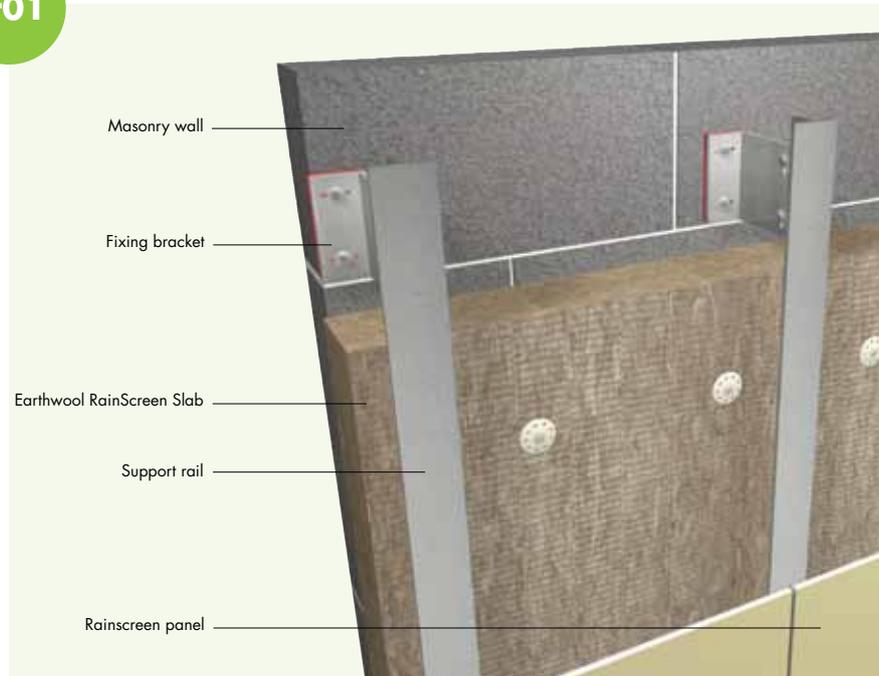


Er01

- 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
- Knauf Insulation 3D modelling calculation service provides optimised thermal performance

Earthwool RainScreen Slab

- Non-combustible with a Euroclass A1 reaction to fire rating
- A+ Generic BRE Green Guide rating
- Zero Ozone Depletion Potential (ODP)
- Zero Global Warming Potential (GWP)



Product

Earthwool RainScreen Slab is a rock 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.

Earthwool RainScreen 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

Earthwool RainScreen 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

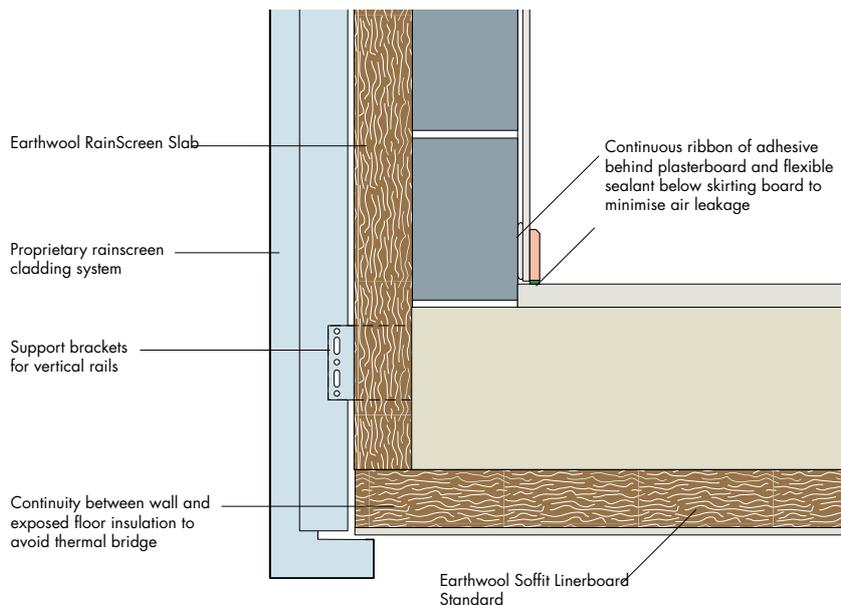
Earthwool RainScreen Slab has a thermal conductivity of 0.035 W/mK.

The U-value of a proprietary rainscreen cladding system is dependent on the degree of thermal bridging in the system. Typically 120mm of Earthwool RainScreen Slab will achieve a U-value of 0.35 W/m²K or better, but Knauf Insulation advise consulting proprietary rainscreen cladding manufacturers for U-values appropriate for their system.

Fire performance

Earthwool RainScreen Slab is classified as Euroclass A1 to BS EN ISO 13501-1.

Typical junction detail with exposed floor



Typical specification

Earthwool RainScreen Slabmm thick to be fixed independently against the building substructure using proprietary insulation fasteners in accordance with the design specification.

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.



Alternatively, consult the National Building Specifications, Standard version clause/clauses... H92/776.....

Knauf Insulation specification clauses can be downloaded from knaufinsulation.co.uk/nbs

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, namely BS 6946: 2007.

Accurate U-value calculations for rainscreen cladding systems can be generated by numerical modelling programs such as HEAT 3 which employ the methodologies detailed in BS EN ISO 10211.

Approved Documents ADL1A and ADL2A require BR443 - 'Conventions for U-value Calculations' to be consulted when U-values for rainscreen cladding systems are being compiled.

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.

Table 14 - Typical U-values of external walls with rainscreen cladding

U-values (W/m ² K) for 215mm solid masonry wall of:			
Insulation thickness (mm)	Dense block (λ=1.13)	Medium block (λ= 0.51)	Cast concrete aggregate (λ=0.13)
200	0.24	0.23	0.24
190	0.25	0.24	0.25
180	0.26	0.25	0.26
170	0.27	0.26	0.27
160	0.28	0.27	0.28
150	0.29	0.28	0.29
140	0.31	0.29	0.31
130	0.32	0.32	0.32
120	0.34	0.33	0.34

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 Advice and Support Centre on 01744 766666.

Our Technical Advice and Support 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.

Further information can be obtained from our Technical Advice and Support Centre on 01744 766666.

Cladded walls

Within curtain walling system

Earthwool Universal Slab RS45 and RS60

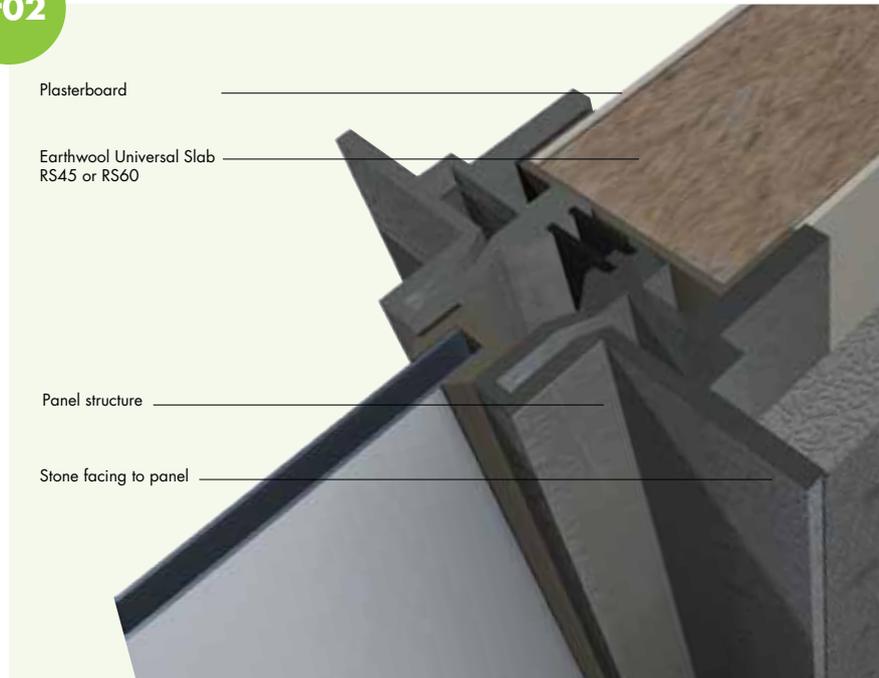


Er02

- Friction fits in panels for maximum thermal and acoustic performance
- Suitable for unitised and traditional build curtain walling systems

Earthwool Universal Slab RS45 and RS60

- Non-combustible with a Euroclass A1 reaction to fire rating
- A+ Generic BRE Green Guide rating
- Zero Ozone Depletion Potential (ODP)
- Zero Global Warming Potential (GWP)



Products

Earthwool Universal Slab RS45 and **RS60** are semi-rigid rock mineral wool slabs, their manufacture has a very low impact on the environment.

Typical construction

Curtain walling systems come in several forms. The illustration above shows a unitised curtain wall system.

Unitised curtain wall facades are suitable for various facing materials such as aluminium, steel, natural stone or glass. They are assembled in a factory as large integral units, and taken to site for fast track fixing.

Earthwool Universal Slab RS45 and RS60 are recommended for insulating curtain walling systems.

Installation

Earthwool Universal Slab RS45 and RS60 are cut to size and installed in the factory as the middle layer of a pre-assembled curtain wall unit.

The panels are typically hung onto and/or mechanically fixed to the building's superstructure

Performance

Thermal performance

Earthwool Universal Slab RS45 and RS60 have a thermal conductivity of 0.035 W/mK.

The U-values for proprietary curtain walling systems are dependent on the degree of thermal bridging in the system, Knauf Insulation advise consulting individual curtain walling manufacturers for U-values appropriate for their system.

Fire performance

Earthwool Universal Slab RS45 and RS60 are classified as Euroclass A1 to BS EN ISO 13501-1.



Unitised curtain walling corner panels being assembled in a factory.

Typical specification

Earthwool Universal Slab RS45*/RS60*
mm thick to be housed within the opaque
modular panels as part of the proprietary
curtain wall system specified in clause
of the specification. (*Delete as appropriate.)

nbsPlus

Alternatively, consult the National
Building Specifications, Standard
version clause/clauses...
H11/780.....

Knauf Insulation specification clauses can be
downloaded from knaufinsulation.co.uk/nbs

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Knauf Insulation Ltd
PO Box 10 Stafford Road
St Helens
Merseyside
WA10 3NS

Tel: 01744 766 600

Email: info.uk@knaufinsulation.com

www.knaufinsulation.co.uk

Ref: GB044012

thinkinsulation.com

Knauf Insulation Ltd

PO Box 10
Stafford Road
St Helens
Merseyside
WA10 3NS

Customer Service (Sales)

Tel: 0844 800 0135
Fax: 01744 612007
Email: sales.uk@knaufinsulation.com
www.knaufinsulation.co.uk

Technical Advice and Support Centre

Tel: 01744 766 666
Fax: 01744 766 667
Email: technical.uk@knaufinsulation.com

Literature

Tel: 08700 668 660
Fax: 0870 400 5797
Email: info.uk@knaufinsulation.com