



UdiINFORMATION
INSTALLATION DETAILS

DAS ORIGINAL
UNGER
DIFFUTHERM®
Innovative Thermal Insulation Systems

INSTALLATION BROCHURE

UdiRECO® FOR FAÇADES + UdiIN RECO® FOR THE INTERNAL INSULATION OF EXTERIOR WALLS



WWW.UNGER-DIFFUTHERM.COM



Inventor and expert assessor for ETICS
Dipl.-Ing. Bernd Unger

Dear reader,

This comprehensive information brochure has been produced primarily for planners and installers. In the following pages the newly-developed wood-fibre external thermal insulation composite system **UdiRECO®** and the technically identical internal system **UdiIN RECO®** will be introduced and explained. The installation, the construction, the individual components and the usual applications will be described for both systems.

External thermal insulation composite systems (ETICS) are designated as constructions in which the whole surface of an exterior wall is insulated and permanently protected from the effects of the weather. ETICS are comprised of an insulating layer, a two-layer reinforcing and weather-proof plaster/render coating, an optimal final paint coat and appropriate fixings to attach the system to the substrate. An ETICS insulated façade is sometimes also known as a thermal insulation composite façade. The first use of ETICS insulation was at the end of the 50's using polystyrene, hard foam boards. Up to the present time a large number of ETICS systems, based on a wide range of insulation materials, have become available in this increasingly confusing market. The first wood-fibre ETICS were developed and marketed at the beginning of the 90's by UNGER-DIFFUTHERM, initially for timber-frame constructions. Seven years later the system was awarded the first official Building Inspectorate Approval for use on both timber and masonry substrates. At the time this was unique and a real breakthrough in the building industry. Unlike other conventional ETICS, due to its inherent rigidity the UNGER-DIFFUTHERM wood-fibre ETICS does not require any external planking/boarding of the timber-frame constructions as a bearer substrate for the insulation layer.

Yours sincerely,

This makes them economical and allows the installation of open-diffusion building elements. Previously, insulation thicknesses greater than 100 mm always had to be laid in two layers e.g. in solid timber or masonry buildings. UNGER-DIFFUTHERM was able to use its 20 years of experience in the development and manufacture of wood-fibre insulation systems in its absolutely revolutionary new product **UdiRECO®**. This special insulating solution can be used in both new buildings and the renovation of the existing stock of buildings.

The system solutions are available in two variants that offer a combination of numerous positive properties:

- ➔ Simple to install
- ➔ Highly insulating due to the optimized apparent densities
- ➔ A large thermal storage capacity for very good summer-time heat-shielding
- ➔ The large thermal storage capacity of the Udi wood-fibre systems reduces the build up of surface condensation – hardly any algae development
- ➔ No mould development in the insulation or the construction
- ➔ The high levels of natural diffusive permeability and capillary activity means it is ideal for use in wall constructions which pose high structural-physics demands
- ➔ Due to its combination of apparent densities, the system exhibits very good acoustic insulation values
- ➔ The high levels of solidity and rigidity provides stability and resistance to mechanical forces
- ➔ Based on renewable raw materials from sustainably managed forests
- ➔ Insulation boards with almost no components derived from oil
- ➔ Enables fire-resistant wall constructions
- ➔ **UdiSYSTEM®** compatible
- ➔ No colour depth limitations
- ➔ Distortion-free and warp-free

Udi is a registered trademark in Europe. **UdiRECO®** is a patented system product.

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➔ *Specially developed system solutions made from natural wood fibres*

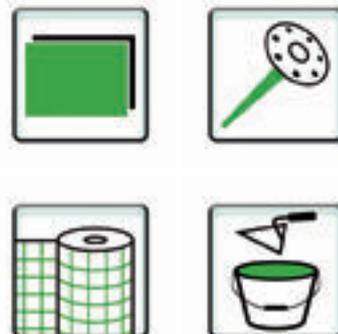
**EXTERNAL THERMAL INSULATION COMPOSITE SYSTEMS
INTERIOR INSULATION SYSTEMS**

UdiASSEMBLY® SDM/ SDH FIXINGS

UdiFOUNDATION COAT® & UdiMULTIGRUND®

UdiREINFORCEMENT® STRENGTHENING MESH

UdiPERL® FINE QUALITY PLASTERS



The *Udi*CONTRIBUTION TO SUSTAINABILITY

Coniferous wood transformed into a high-performance insulation material

The production of the wood-fibre insulation elements for *UdiRECO*®, *UdiSPEED*®, *UdiSTONE*® and *UdiCLIMATE*® takes place in Chemnitz and the surrounding area in our own manufacturing facilities. All of our fine quality renders/plasters, paints and filler products are produced according to our own specifications. These products are all standard system components.

The raw materials for our rigid, renderable and warp-free insulation boards are comprised to 98% from coniferous timber waste and in the dry process for our flexible insulation boards to 94%. As additives, we employ a maximum of 2.0 % PVAC adhesive to bond the layers of the renderable elements and < 6 % textile binder fibres for the flexible elements.

Our systems are always manufactured to comply with CE-conformity standards and the material quality is continually controlled and the systems regularly monitored. Tested and approved constructions can be found in our current planning documentation or in the internet under www.unger-diffutherm.com.

Detailed test reports, expert assessments and official approvals are available upon request.

The task of helping to retain the value of existing and newly-constructed buildings whilst at the same time protecting natural resources remains challenging in these times of continuing energy wastage. *UNGER-DIFFUTHERM* makes a contribution to achieving this difficult goal through our research, production and marketing of environmentally-friendly, wood-fibre insulation systems.

UNGER-DIFFUTHERM

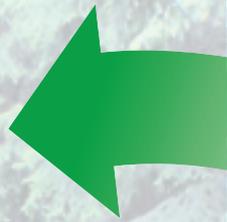
means:

Increased living quality for you and sustainable climate protection for Mother Earth.

Wood fibres grow in natural coniferous trees, accumulate as a waste product in saw mills, store the absorbed CO2 as a refined insulation material within their structure and make a life-long contribution to CO2 storage and energy saving. Afterwards they can be returned to the natural cycle by burning or as compost. **That's what we call sustainability!**



Our wood-fibre insulation board *Udi*UNGER-DIFFUTHERM is natureplus certified



*Insulate naturally.
The Original.*

UdiRECO® SYSTEM

Wood-fibre, interior insulation system
 with integrated levelling compensation



With this unique wood-fibre, sandwich-construction, combination we are breaking new ground in the renovation of older buildings. The system offers improved U-values and in combination with our new **UdiASSEMBLY® SD RECO adjustable fixings** saves time and effort by doing away with the need for extensive work in the levelling of the substrate surface. It adapts itself to uneven surfaces within a range of +/- 20mm providing a wind-tight seal and eliminating problems caused by back-draughts behind the insulation layer - which may lead to the hidden build-up of condensation. Complicated bearer frameworks are unnecessary and the possibility of moisture ingress from basecoat rendering work is avoided. This saves time, money and aggravation.

The special **UdiASSEMBLY® SDM / SDH RECO adjustable fixings** are the product of our many years of experience in the insulation of façades for masonry and timber constructions. Extensive work in the levelling of the substrate surfaces of older buildings e.g. half-timbered constructions, raw bricks or masonry walls with damaged rendered/plastered surfaces is unnecessary.

Hier fehlt noch Text, der nicht übersetzt wurde...



Components

Coniferous wood
 Max. 0,5 % Paraffin
 1,5 % PVAc (For bonding the insulation layers)
 < 6 % Binding fibres in the sandwich construction



Technical data

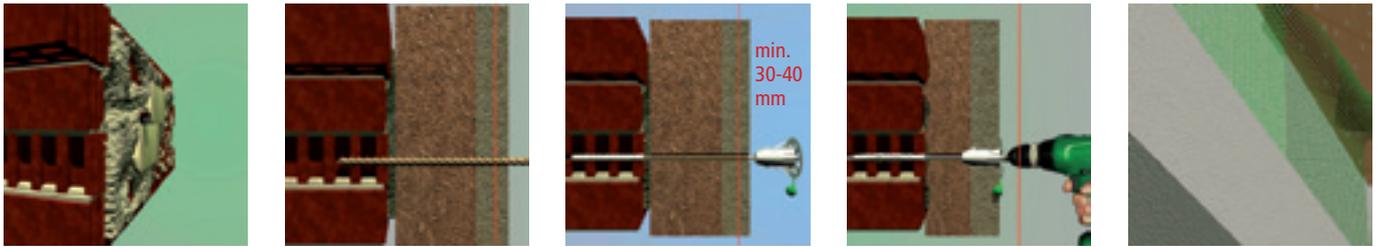
Thermal conductivity	
Declared value λ_D	0,038/ 0,049 W/mK (compressed)
Design value λ	0,041 W/mK (in combination)
Vapour diffusion resistance μ	5
Condensation retention capacity	ca. 20 % of own weight
Specific enthalpy capacity c	2100 J/kg/K
Longitudinal flow-resistance as a complete system	> 5 kNs/m ⁴
Apparent density	ca. 50 / 250 kg/m ³
Fire classification DIN 4102-1	B2
Euro class DIN EN 13501-1	E



Dimensions

Format 1.300 x 790 mm, Coverage (minus tongue & groove): 1.290 x 780 mm
 Tongue and groove around the whole circumference
 Nominal Insulation thicknesses: 80, 100, 120, 140, 160, 180 und 200 mm
 Supplied insulation thicknesses: 100, 120, 140, 160, 180, 200, 220 mm
 (the extra 20 mm insulation thickness serves as levelling compensation)





FIXING AND LEVELLING IN A SINGLE STEP

1. After checking the load bearing capacity and the condition of the substrate, pre-bore an 8 mm drill hole to receive the fixing
2. Insert the screw fixing into the hole so that the head disc is a minimum of 30 - 40 mm from the board surface
3. Screw in the fixing until the extraction seal engages and the fixing head lies level with the insulation surface
4. The **UdiRECO**® insulation board is compressed until the fixing head is level with the insulation surface and then decompressed again
5. Install the other **UdiRECO**® insulation boards
6. Adjust the fixings using a laser (red line) or a spirit level until a level surface has been achieved
7. When all the insulation boards have been installed, the plaster coatings are applied according to the UNGER-DIFFUTHERM manufacturer instructions.

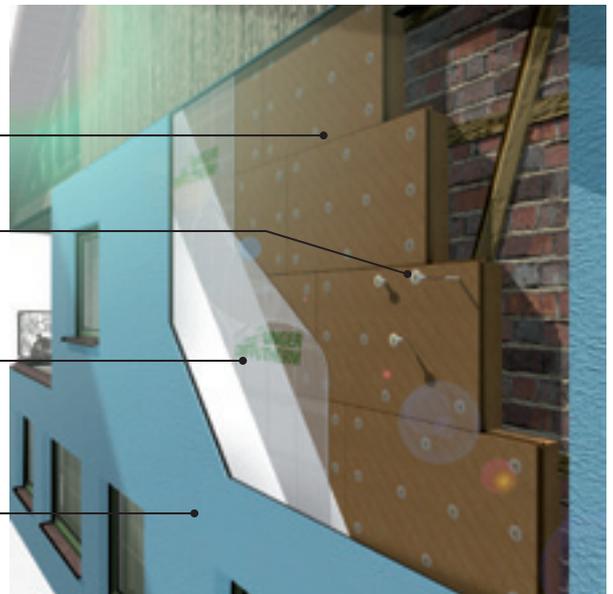
Constructional design

40 mm plaster bearing insulation board in combination with a pliable and flexible, wall facing, wood-fibre, insulation board

Newly-developed insulation fixing with an extraction sealing mechanism for attaching the insulation boards to the substrate

The boards are coated with Unger-Diffutherm's specially developed **UdiFOUNDATION COAT**® and **UdiREINFORCEMENT**® **Strengthening mesh** to hinder the development of surface cracks.

The system is finished with a high performance, fine quality render coating from the **UdiPERL**® range. This rain-proof and air-permeable render is available in a large choice of structured finishes in over 100 shades from the



Our range of building products are carefully co-ordinated and harmonize perfectly with each other. We work in close co-operation with tradesmen and planners to continually improve them.

If components from other manufacturers are used together with the **UdiRECO**® Insulation boards, then the long-term structural stability of the system, which may lead to liability issues, cannot be guaranteed.

Based on our many years of experience, to ensure the longevity and qualitative high standard of the system construction and to avoid building errors which can affect the long-term stability of the system, we recommend that only original system components from the **UNGER-DIFFUTHERM** range be used.



**OUR SYSTEM
STANDS
FOR STABILITY**



**Insulate naturally.
The Original.**

UdiIN RECO® SYSTEM

The active interior insulation is a real alternative to vapour-tight solutions



By exerting a direct influence on the moisture level, the capillary-active insulation system **UdiIN RECO®** inhibits problems with moisture which may lead to building damage. With this system, a simple and effective solution has been developed which meets the requirements for energy saving and contributes to a healthy room climate. It can be used for any application from thin, half-timbered wall constructions to thick castle walls.

The system in detail



Energy-conscious renovations

For all buildings that can not be insulated externally or in rooms which are only used occasionally, the **UdiIN RECO® SYSTEM** enables the speedy and efficient heating of those areas where the heat is needed quickly.

Through the use of the system the heat retention on cold and wintery days and thereby the comfort level in the building can be improved considerably. The thermal insulation value is maintained due our own specially developed water-vapour regulating render **UdiMULTIGRUND®** and it does not come to super-hygroscopic over-wetting of the insulation.

The **UdiIN RECO® SYSTEM** is an active vapour diffusion system with a combined active-capillary effect in which condensation is absorbed by the system and through the natural drying of the wood fibres is transported back into the room air or to the exterior via the capillary effect.

This interior insulation system does away with the need or a vapour barrier! The system can be installed regardless of wind speeds.

Components

Coniferous wood off-cuts and chippings
Max. 0,5 % Paraffin
1,5 % PVAc (For bonding the insulation layers)
< 6 % Binding fibres in the sandwich construction

Technical data

Thermal conductivity
Declared value λ_D 0,038/ 0,049 W/mK (compressed)
Design value λ 0,041 W/mK (in combination)
Vapour diffusion resistance μ 5
Condensation retention capacity ca. 20 % of own weight
Specific enthalpy capacity c 2100 J/kg/K
Longitudinal flow-resistance as a complete system > 5 kNs/m⁴
Apparent density ca. 50 / 250 kg/m³
Fire classification DIN 4102-1 B2
Euro class DIN EN 13501-1 E

Dimensions

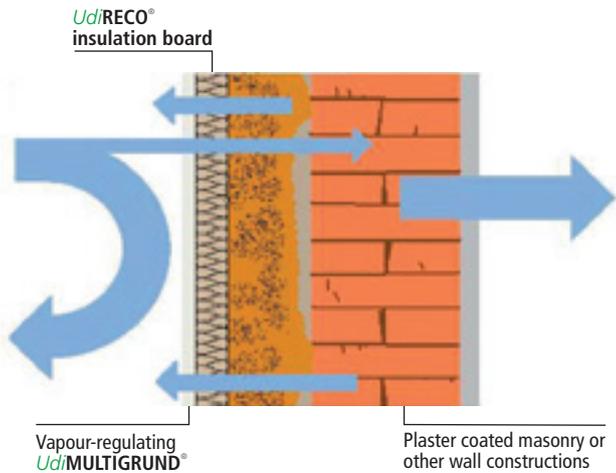
Format: 1.300 x 790 mm
Coverage (minus tongue & groove): 1.290 x 780 mm
Tongue and groove around the whole circumference
Nominal Insulation thicknesses: 80, 100, 120, 140, 160, 180 und 200 mm
Supplied insulation thicknesses: 100, 120, 140, 160, 180, 200, 220 mm (the extra 20 mm insulation thickness serves as levelling compensation)

Technical data

UdiMULTIGRUND® as a vapour-retarder:
A special coating for UNGER-DIFFUTHERM interior insulation systems. It is an effective vapour retarder to restrict the level of condensation and serves as a filler, a reinforcement coat and a base coat for renders/plasters, paint coats, wallpaper etc.

Granularity: ca. 0 - 0,4 mm
Compressive strength: ca. 4 - 9 N/mm²
 μ -value: ca. 125
Reinforcement coat thickness: Average of 4 mm (depending upon the required vapour retardation value)

The effective transport of moisture as water vapour and capillary-stored water from the room air.



By coating the interior insulation boards *UdiRECO*® with the mineral based, vapour-retarding *UdiMULTIGRUND*®, the wall is kept dry 'intelligently'. A portion of the water vapour can be stored temporarily due to the effects of the moisture-field shift and then transported into the room air or to the outside of the building.

In addition *UdiMULTIGRUND*® acts as a plaster bearer. A whole range of finishing coatings can be applied or the *UdiMULTIGRUND*® can simply be smoothed with a trowel. Possible finishing coatings are tiles, paint, clay or lime plasters, wallpaper or even natural, wall coverings. There are no limitations.

The insulation boards are **installed** directly to the existing substrate with 30 cm off-set joints **and fixed** with our adjustable screw fixings. Regardless of whether the substrate is raw masonry or old plaster, once adjusted the system automatically compensates for voids or lumps to provide a level surface. Neither mounting adhesives nor mounting constructions are necessary. Pre-bore the fixing holes and screw in the fixings.



After the system has been adjusted, a coat of our special *UdiMULTIGRUND*® vapour-retarding, mineral based coating is applied, into which a reinforcement mesh is embedded. This provides the basis for a permanently dry, crack-free, smooth and ready-to-paint surface. It also serves as a limited vapour retarder. Coverage: 6.5 kg/m².



The finishing touch

Now the final step is to apply the top coat using a material of your choice. It doesn't matter which one you choose: Loam/clay plaster, loam/clay paint, mineral-based fine plaster in a wide range of attractive colours.



➔ The advantages

- ➔ No additional moisture loading during installation
- ➔ Automatic levelling compensation of uneven walls between +/- 20 mm
- ➔ Full-surface contact to the wall
- ➔ Improves the room climate – great energy savings
- ➔ Blocks the radiation of cold from the external wall – uncomplicated installation
- ➔ No mould growth on the surface or in the construction
- ➔ With *UdiMULTIGRUND*® all types of finishing coating are possible, e.g. tiles, paint and wallpaper
- ➔ Additional acoustic insulation - both inside and towards the outside



Insulate naturally.
The Original.

UdiRECO® SYSTEM *in solid timber buildings*

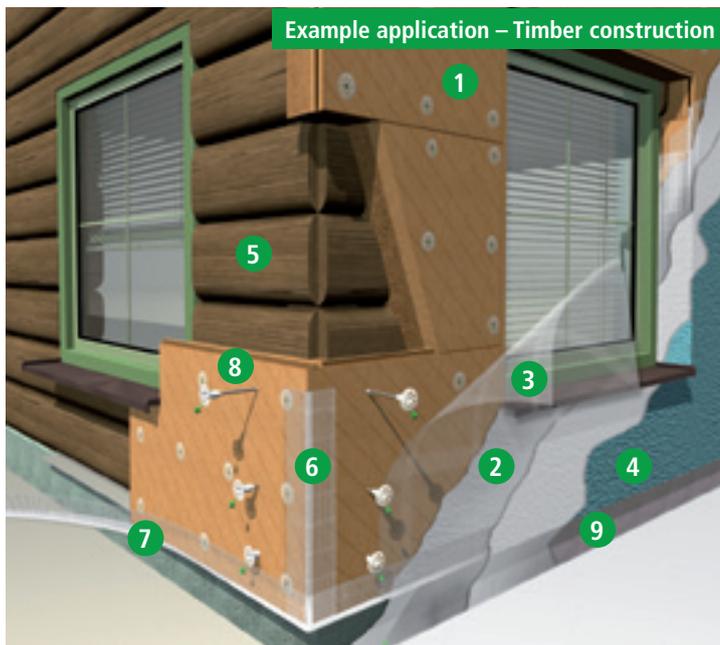
E.g. Composite timber -, HOMOGEN-, Steko- or Block-timber



In solid timber constructions, the **UdiRECO® Wood-fibre insulation elements** promote the stabilisation of the natural moisture balance within the wood. This produces an extraordinarily pleasant room climate. As a rule, vapour barriers on the inside of external walls are unnecessary.

Layer thicknesses up to passive house standards can be installed.

A solid timber construction in detail



- 1 UdiRECO® Wood-fibre insulation board
- 2 UdiFOUNDATION COAT®
- 3 UdiREINFORCEMENT® Strengthening Mesh
- 4 UdiPERL® Structured Fine Render
- 5 Substrate: Composite timber, Block-timber, LIGNOTREND- or STEKO
- 6 UdiREINFORCEMENT® Corner Protection Profile
- 7 UdiBASE® Plinth-End Cap Profile variable
- 8 UdiASSEMBLY® SDH Reco (adjustable fixing – timber constructions)
- 9 Perimeter insulation with plaster coating

➔ *The advantages*

- ➔ Can be screwed in directly
- ➔ Material conformity
- ➔ Diffusion-permeable and air-permeable
- ➔ Stabilises the natural moisture balance within the wood
- ➔ Less thermic movement of the timber construction or the insulation construction
- ➔ Optimization of the thermal storage

UdiRECO® SYSTEM on mineral substrates

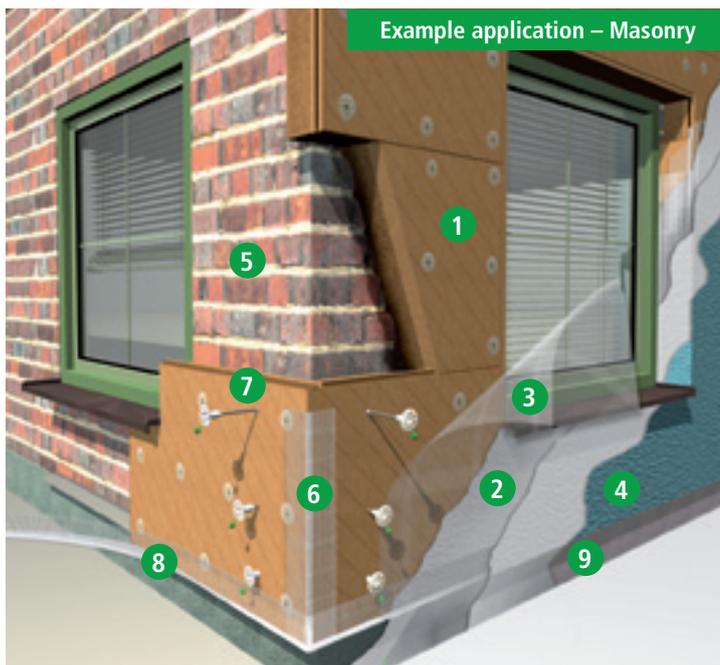


- Active capillary conductivity without the use of vapour barriers
- Additional thermal storage capacity of the natural wood fibres
- Excellent sound-proofing

Special features

This system avoids back-draughts behind the insulation layer with no reduction in the insulation performance. The specially designed adjustable fixing system bears the load on the façade. The boards do not require adhesive bonding and are held mechanically by the fixings.

A solid wall in detail



Example application – Masonry

- 1 UdiRECO® Wood-fibre insulation board
- 2 UdiFOUNDATION COAT®
- 3 UdiREINFORCEMENT® Strengthening Mesh
- 4 UdiPERL® Structured Fine Render
- 5 Substrate: Masonry – rendered/unrendered
- 6 UdiREINFORCEMENT® Corner Protection Profile
- 7 UdiASSEMBLY® SDM (adjustable fixing – masonry)
- 8 UdiBASE® Plinth-End Cap Profile variable
- 9 Perimeter insulation with UdiPlinth sealing slurry® and plaster coating

→ The advantages

- The soft insulation layer compensates for uneven surfaces
- Façades are better insulated than the current German energy regulations require
- Façades are less likely to develop algae or moss growth due to the “hot water bottle effect” (high thermal storage)
- Façades can be adjusted to an accuracy of a few millimetres
- No back-draughts
- No mould growth in living areas or in the construction
- Improved sound proofing



Insulate naturally.
The Original.

UdiIN RECO® SYSTEM for the room-side insulation of external walls



Thermal storage, the intermediate storage of moisture, capillary-active and vapour-permeability. These are the benefits of the UdiIN RECO® interior insulation system. Contrary to foam or mineral-fibre insulation boards, the condensation which develops within system is absorbed, stored temporarily and through the natural drying of the wood fibres is transported back into the room air or to the exterior via the capillary effect.

Special features

The interior insulation of external walls using UdiRECO® wood-fibre insulation boards does not require a structurally questionable vapour barrier. Instead the functional, mineral render coating UdiMULTIGRUND® is applied to the whole surface. This fulfils the functions of a finishing coat, a plaster bearer and provides a targeted regulation of the moisture transport by means of its intelligent vapour-retarding capability.

The room-side insulation in detail



- 1 UdiRECO® Wood-fibre insulation board with substrate levelling compensation
- 2 UdiREINFORCEMENT® Strengthening Mesh
- 3 UdiMULTIGRUND® mineral, vapour-retarding render
- 4 UdiASSEMBLY® SDM Reco (adjustable fixing – masonry)
- 5 UdiLOAM® Loam-clay plaster (with coloured, loam-clay, interior paint)
- 6 Substrate: Masonry – rendered/unrendered

→ The advantages

- No additional moisture loading due to rendering work to level the substrate
- An up to 200 mm thick insulation layer can be installed
- Direct installation and fixing in a single step and easy adjustment and finishing
- Additional benefits through acoustic decoupling and sound-proofing
- Air-permeable and heat-retaining for a positive room climate
- There is no additional installation-related moisture
- Secure contact to adjoining elements such as ceilings, floors or partition walls
- No mould growth

GENERAL INFORMATION – PLEASE TAKE NOTE



In addition to this brochure **UNGER-DIFFUTHERM** also offers a whole range of training courses, which take place regularly, to help you achieve a competent level of installation quality. Take advantage of this service and ask your local **UNGER-DIFFUTHERM** contact partner.

We offer various seminars for architects and planners as well as training courses on the correct application and installation of the **UdiRECO**® insulation system and the master class:

The two day course to become a licensed **UdiSPECIALIST INSTALLER**® with a licence certificate. This course includes both theory and practice.

At the time of print the following technical information in this brochure complies with recognised technical standards. Older versions are no longer valid.

Further details and current installation information are available in the internet under **www.unger-diffutherm.com** or per telephone under the **Hotline +49 (0) 371 81 56 40**.

Guarantees, warranties or constructional and structural physics properties can only be guaranteed through the exclusive use of original Building Inspectorate approved Unger-Diffutherm System components.

➔ CRITICAL AREAS

Connection to bargeboard / eave area ①

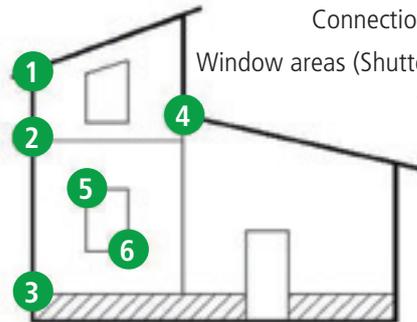
Transition to ceiling ②

Transition to Foundation slab cellar ③

Connection to roof covering ④

Window areas (Shutters / corner areas) ⑤

Window sill areas ⑥



BECOME A LICENSED PARTNER



UNGER-DIFFUTHERM places great emphasis on the highest levels of quality and state of the art technology which we communicate to all installation companies. Profit from our know-how and get yourself and your employees trained as licensed and qualified **UdiSPECIALIST INSTALLER**® with a registered licence. We would like to pass on our over 20 years of experience in practical building and product development in order to reach new goals together.

It is not the individual products which are decisive but their interaction in a complete system solution and their permanent functionality. We place great importance on the correct installation by a licensed company and the use of our tried and long-term tested system products.

This is what we stand for with our good name.



**Insulate naturally.
The Original.**

CORRECT INSTALLATION of UdiRECO® and UdiIN RECO®

➔ 1. Take the right measure

Cut-outs must be cut into the boards for rafters and joists. Their widths and heights must be measured exactly and an approximately 3mm excess should be added when cutting the board.

When installing large insulation thicknesses pay attention to roof overhangs which may be too short. These should be extended before or during the installation.

Protruding elements such as water taps, window sills, electrical fixtures, awning/canopy holders etc should be extended before installing the insulation. Heavy loads should be anchored in the substrate. **Udi/HEAVY DUTY FIXINGS** or special, thermally decoupled mounting blocks should be used.



Take measurements. Cut-outs must be made for visible rafters.



Check roof overhang. This will be reduced according to the respective insulation thickness.



Correctly measure the required window sill length beforehand.



Select the water tap extension according to the insulation thickness.



Ready installed insulation layer. The water tap can be reused.



Mark out the rafter dimensions.



Using an electric 'alligator' saw only cut away the plaster-bearing layer.

➔ 2. Cutting / trimming

The quickest and easiest cutting method is to use an electric saw e.g. an electric crosscut saw, hand-operated circular saw, mini chain saw, alligator or jig saw. Suction devices are recommended to collect the fine saw dust and waste material. We recommend using an alligator saw with a blade for cellular concrete.

TIP: When making the cut-outs leave an excess of the flexible layer of about 2 cm. This guarantees a wind-tight connection without the need for additional foam compression tapes.



Removing the upper, plaster-bearing layer.



Cutting the lower, flexible layer allowing an excess (projection above the plaster-bearing layer).



Now cut approximately 1-2 cm from the plaster-bearing layer to provide a snug fit to adjacent building elements e.g. floors, soffits, joists etc



The picture shows the protruding flexible layer e.g. for connections to walls, roof areas. This ensures a good contact to the insulation layer.





An electric mini chain saw is a convenient and recommended device for cutting.



It can also be used for precise cutting by using the cutting stop.

➔ **TIPS**

- To ensure easy installation and perfect connections, the cut-outs should be executed with millimetre precision.
- Depending on how uneven the connecting area is, the upper, plaster-bearing layer (4 cm) can be trimmed by approx. 1-2 cm so that the flexible layer can form a wind-tight fit to the adjacent building elements.
- Cut a flat lower edge for connection to the plinth-end cap profile – variable.



Then precisely position the insulation board



Alligator



Hand-operated circular saw with hard metal blade



UdiRECO® insulation board 200 mm thick.



Electric mini chain saw with cutting stop

→ 3. Variable plinth end-cap profile for *UdiRECO*®

The *UdiBASE*® Plinth end-cap profile - variable, has proven itself to be a simple and efficient solution for finishing the lower edge of the insulation layer in the plinth area. It is comprised of two parts – the wall connection profile and the slot-in profile. *UdiBASE*® wall connection profile - variable, is fixed to the bearer substrate using *UdiBASE*® FIXINGS (Art. - No. 0910). *UdiBASE*® Distance Piece (Art.-No. 0930) can be inserted behind each fixing to achieve a flush connection to uneven substrates. The system is cut using a suitable, fine electric saw or with a fine-toothed hand saw. The wall connection profile must always be fixed securely to the substrate and mounted flush and level. Right angles for internal or external corners must be mitred precisely. In joint areas a play of 3-5 mm should be allowed.

An additional option is to seal these areas using *UdiSTEAM*® Butyl Standard. The adjustable wood-fibre boards are then installed and adjusted using a rotating laser or a spirit level. The next step is to insert the slot-in profile into the previously installed wall connection profile so that it is flush with the level of the insulation boards.



Firstly, the *UdiBASE*® wall connection profile is fixed flush and level on to the substrate.



After successfully adjusting the *UdiRECO*® insulation boards, the *UdiBASE*® Slot-in profile is inserted and bonded flush using render to fill the gaps.



This forms a neat and thermally efficient plinth/lower edge finish with a drip edge to protect against the ingress of moisture, rain and snow.

→ TIP

- Large unevenness's or protrusions can be compensated for by cutting away a section of the flexible insulation layer.
- In order to ensure that the head of the fixing lies flush with the surface of the board when screwing in it is possible to cut a recess into the board using a suitable countersink bit.



Large unevenness's or protrusions can be compensated for by cutting away a section of the flexible insulation layer.



Cut-outs for large protrusions should be performed before installing.



Insulate naturally.
The Original.

→ 4. Fixing

As a rule each insulation board should be affixed using 8 **UdiRECO**® SDM or **SDH adjustable fixings**. The fixing diagram, see page 29, should be followed. The clearance distance to the board edge is 10cm and the spacing between the fixings should be a minimum of 40 cm. For poor quality substrates or when the condition of the masonry substrate is unknown, the load-bearing capacity of the substrate should be checked before installation and using the substrate analysis form (page 32) have the correct fixing length determined by **UNGER-DIFFUTHERM**. The fixing hole can be pre-bored in the correct position. It is advisable to drill the hole without using the hammer-drill function to avoid creating too large a hole.



By using a template it is easier to exactly mark the position of the hole(s) required. For a perfect result the surface can also be countersunk to receive the fixing head disc.



Countersinking provides a neater result but is not absolutely necessary.
 Recess depth: max. 3 mm.



The picture shows an exact, countersunk fixing hole layout. 8 adjustable fixings are required per square metre/insulation board.



Take care that the fibres in the drill hole have been removed properly. To achieve this simply repeat the drilling procedure in the upper layer of the board.



The **UdiASSEMBLY**® SDM (adjustable fixing - Masonry) is supplied in two parts. The screw should initially be screwed into the plug with approximately two turns.



The fixing should then be skilfully inserted into the hole and carefully hammered home until the fixing head is a minimum of 30 mm from the board surface.



Ensure a clearance of approx. 30 mm to the board surface.



Hold the fixing head securely when screwing in to avoid it rotating with the screw. The fixing head sits perfectly when it is flush with the surface. To ensure that the fixing is thermally decoupled, always insert the green sealing cap into the aperture provided



Once all the fixings are correctly installed these can then be adjusted one after the other. We recommend that you use a rotating laser or alternatively use a long spirit level. It is only possible to work wall-for-wall i.e. once a whole wall is correctly adjusted, the installation of the boards on the next wall can begin.

→ TIP

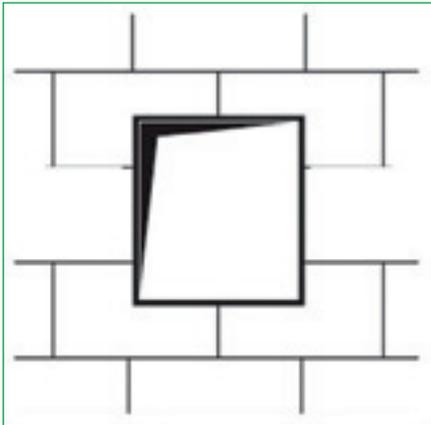
For very large façades it is recommended that the insulation boards are pre-mounted in turn using two fixings. The remaining fixings can be installed afterwards. Unevenness's are compensated for automatically. Old plaster/render, tiles or other surfacing materials can remain on the surface. It is also possible to integrate water pipes or electric cables behind the insulation layer.



*Insulate naturally.
The Original.*

→ 5. Fixing diagram – Installation layout

The **UdiRECO**® Wood-fibre insulation boards should preferably be installed so that the horizontal and vertical joints do not coincide with wall apertures such as windows and doors or with protrusions/penetrations such as rafters, beams etc. It may be necessary to prepare an installation plan to help avoid this or else to bond all the edges of the respective boards with adhesive. The boards should always be cut so that the joint and the wall aperture are offset to one another. Care should be taken to ensure that the offset is 30 cm. If this mounting layout is not possible, then in the area of the wall aperture or the protrusion the tongue and groove connection around the whole circumference of the board must be bonded using **UdiSPECIAL ADHESIVE**®.



OPTIMAL installation layout

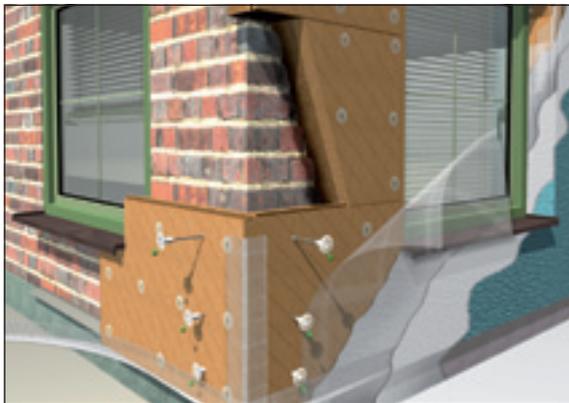
Board offset ≥ 30 cm



ALTERNATIVE

Bond the tongue and groove connection around the whole circumference of the board using **UdiSPECIAL ADHESIVE**®
 Board offset ≥ 30 cm

Mounting options in window and door areas



8 fixings are used per board. This corresponds to an application rate of 8 pcs/m².



Uneven joint edges should be smoothed using a grid plane/trowel (picture) or an electric disc-type sander. This helps to ensure a uniform coating thickness when applying the reinforcement render.

➔ 6. Window and door reveals



The **UdiUNGER-DIFFUTHERM® L** Reveal insulation board is stuck to the **UdiRECO®** Insulation board using our solvent-free **UdiSPECIAL ADHESIVE®**.



Beforehand, the **UdiJOINTING TAPE®** should be installed and the reveal insulation board disengaged.



Finished installation of the reveal insulation board



Mount the **UdiREINFORCEMENT®** Render Edging Strip LATE



Trim excess strengthening mesh



Apply sufficient **UdiFOUNDATION COAT®**



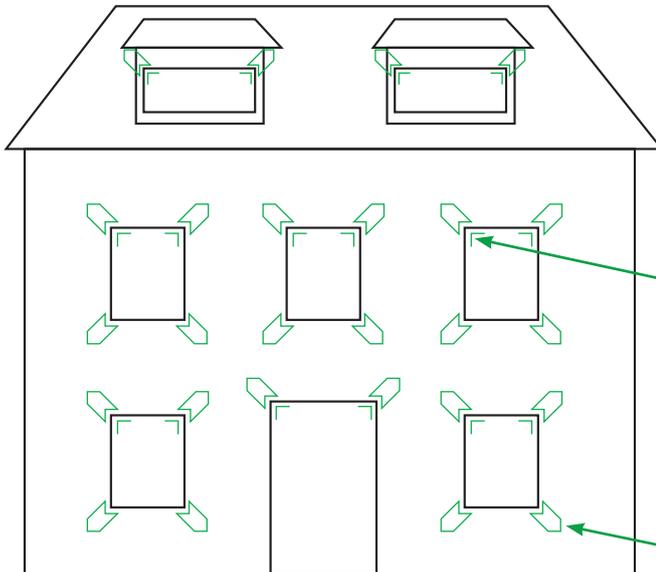
Then embed the **UdiREINFORCEMENT®** Corner Protection Profile. Ensure it is plumb.



Insulate naturally.
The Original.

→ 7. Window and door installation areas

In order permanently prevent the development of cracks around window and door areas and especially in the window reveals, all corners must be reinforced using **UdiREINFORCEMENT**[®] 3D Corner Strengthening Mesh (window – 2 pieces, door - 2 pieces) and **UdiREINFORCEMENT**[®] Corner Strengthening Mesh (window – 4 pieces, door - 2 pieces).



UdiREINFORCEMENT[®] 3D Corner Strengthening Mesh

2 pieces should be installed in the upper inside corners of all windows and doors.



UdiREINFORCEMENT[®] Corner Strengthening Mesh

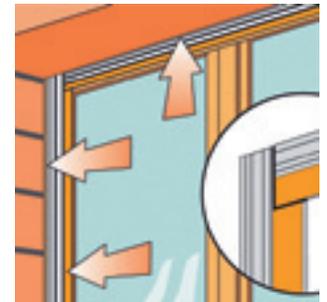
4 pieces should be installed in all windows in the upper and lower inside corners and 2 pieces in the upper corners of all doors



Installation of the **UdiREINFORCEMENT**[®] Render Edging Strip LATE

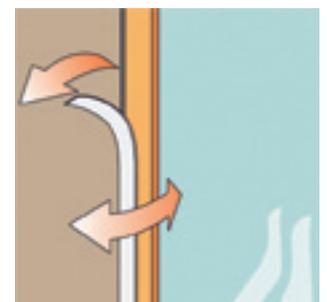
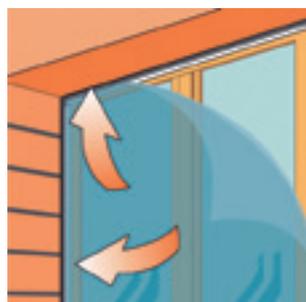
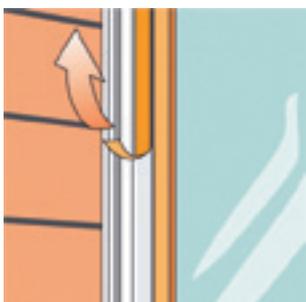
The frame must be cleaned so that it is sound.

Remove edge of strip along the length of the break-joint



The **UdiREINFORCEMENT**[®] Render Edging Strip LATE (slim telescopic strip for the absorption of surface movements) has proven its worth as a thermally decoupled connector to windows and doors.

This is installed horizontally on to the cleaned and dust-free window or door frame and, in combination with a plastic sheet overlay, protects the sensitive window and door areas during the rendering/plastering work. The render edging strips are installed flush to one another. Please use complete strips and not off-cuts placed together. The excess mesh must always be trimmed back to the level of the board surface. After completion of the rendering/plastering work the edging strip should be broken along the break-joint and this section removed. This frees up the movable section of the strip. This creates a neat and permanently flexible connection between the render/plaster layer and the window/door area. It also makes it rain-proof.



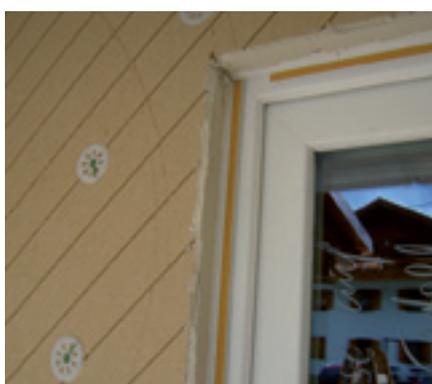


→ 8. Render / plaster reinforcement

This provides the system external stability and permanent protection against weathering. The specially developed, mineral **UdiFOUNDATION COAT®** is applied together with a crack-bridging layer of **UdiREINFORCEMENT® Strengthening Mesh**. This provides the base for a long-lasting and crack-free finishing coating. All mesh overlaps must overlap by a minimum of 10 cm. **UdiREINFORCEMENT® 3D Corner Strengthening Mesh** is applied in the lintel area. The next step is to pre-render/plaster the reveal area so that enough room is left for the finishing coat layer. Before rendering/plastering, **UdiJOINTING TAPE®** should be applied between the window sill and the insulation board. The **Render Edging Strip LATE** must be installed flush with the edge of the window-sill profile. Then the **UdiREINFORCEMENT® Corner Protection Profile** is applied on top of the mesh of the **UdiREINFORCEMENT® Render Edging Strip LATE** in the reveal area. The mesh must be bedded-in to the upper third i.e. the third closest to the surface, of the render coating layer. When covering adjacent areas it is important, in order to avoid cracks and unsightly joints, that the edges should not be allowed to dry out i.e. the material must always be applied whilst the render coat is still fresh (wet-on-wet).



The **UdiREINFORCEMENT® Corner Strengthening Mesh**, for all the corners of the window/door in the lintel area, must be pressed onto the main mesh layer and then smoothed out. Please take care that when installing the **UdiREINFORCEMENT® Corner Protection Profile** in window or plinth areas, external corners, roof connection areas etc that it does not bulge outward. This is usually caused by the application of a coat of **UdiFOUNDATION COAT®** that is too thick. This leads to a high material consumption rate. The minimum thickness of the whole strengthening layer is 5 mm including the strengthening mesh. This corresponds to a coverage rate of approx. 6.5 to 7.0 kg/m². The coating should be applied uniformly across all surfaces. After the strengthening layer has been correctly applied and the **UdiFOUNDATION COAT®** has dried it is recommended that the quality of the layer be checked. This is performed by pressing a thumb into the coating at various points on the façade. If the surface 'gives' under the pressure of your thumb then this is a sign that the **UdiFOUNDATION COAT®** is too thin or has not bonded properly with the surface of the boards because it has not penetrated the strengthening mesh sufficiently. Appropriate steps must be undertaken to rectify the situation.



A 12 mm toothed trowel should be used to apply the **UdiFOUNDATION COAT®** in order to fill the strengthening mesh. Experience has shown that this trowel, when held at the correct angle, exactly produces the minimum coating thickness of 5 mm. **IMPORTANT:** You must ensure that the **UdiREINFORCEMENT®** is forced uniformly through the gaps in the mesh and makes a secure contact with the surface of the insulation boards and that the strengthening mesh is in the upper third i.e. the third closest to the surface of the **UdiREINFORCEMENT®**. The surface is then smoothed with a stainless steel trowel. It can also be applied in two coats but you must ensure that the mesh always remains in the upper third of the layer. If this is not the case there is a danger of cracks developing later. The next step is to press the **UdiREINFORCEMENT® Corner Strengthening Mesh**, for the corners of the window/door in the lintel area, onto the main mesh layer and then smooth it out.



*Insulate naturally.
The Original.*

→ 9. Surface finishing

Finally, after the foundation coat has dried, the installation is completed with the application of your specially selected structured render in the colour of your choice. The render/plaster surface is then artistically finished by the installer. The first layer applied is the ready-to-use **UdiPERL**® Render Primer (or another **UdiFINE RENDER/PLASTER SYSTEM**®). After drying, as a rule after 2 days (20°C 65 % rel. humidity), the fine render/plaster is stirred and applied with a stainless steel trowel at a thickness of approximately 1.5 times the granularity size. Then the next coat is applied to a thickness of the size of the granularity and immediately structured using a plastic trowel. Based on the granularity group and the type of structure chosen it is particularly important to take into account how the surface is rubbed. The finishing plaster should always be applied in the same direction and also only rubbed in one direction. The float should be rubbed with a slight pressure in a uniform manner over the surface to achieve a uniform surface structure. Don't apply too much pressure; let the float slide over the surface. Do not apply in windy conditions or in direct sunlight. In such cases the scaffold can be veiled to provide shade.



Roll on the ready-to-use render primer in accordance with the particular colour shade and system requirements



or preferably apply with crosswise brush strokes



The surface is then structured by hand or else using a plastering machine with an adjustable flow rate. The finished structure must have a uniform appearance but can vary slightly due to the craftsmanship individual workers.

→ 10. Plinth area

The plinth area or the perimeter insulation should always be executed using a non-moisture-absorbing insulation material. The wood-fibre insulation boards are not permissible in this area. The lower edge of the Udi Insulation system should be at least 30 mm above the final level of the ground/soil. If the insulation layer forms an overhang to the perimeter insulation it is recommended that a strip of **UdiJOINTING TAPE**® is installed between the **UdiBASE**® Plinth end-cap profile – variable, and the perimeter insulation to ensure a wind-tight connection. Alternatively, the same insulation thickness as the perimeter insulation can be chosen to give a level rendered surface. In this case an extra strip of strengthening mesh, which overlaps both insulation layers by 10 cm, must be used.



→ 11. Colour variants

Due to differences in the characteristics of the structure, the roughness (shadow effect), through the differences in the type of substrate and absorbency and the printing process used to produce the **UdiCOLOR® Colour selection cards**, it is possible that these factors can lead to a slightly modified colour impression compared to the colour card. In order to avoid complaints after completion of the project, we recommend that a small sample of the chosen colour is tested before commencing the work. If subsequent orders are placed for the same project we require the colour and batch number of the original delivery. Very slight variations in the colour depth may occur due to differences in the raw materials and production conditions. There are no restrictions in relation to the colour luminosity.



WE SUPPLY THE FOLLOWING EXTERNAL RENDERS:

UdiMIRALO® Mineral render/plaster system

The classic mineral plaster system should also be treated with two coats of equalisation paint. This paint coating provides the colour decoration of the façade.

UdiSILANO® Silicone render/plaster system

The ready-mixed silicone render system is resistant to weathering and provides longevity combined with harmonious colours.

UdiORGATO® Organic render/plaster system

The organic render system is delivered in buckets and allows an almost unlimited choice of colours.

UdiSIKATO® Silicate render/plaster system

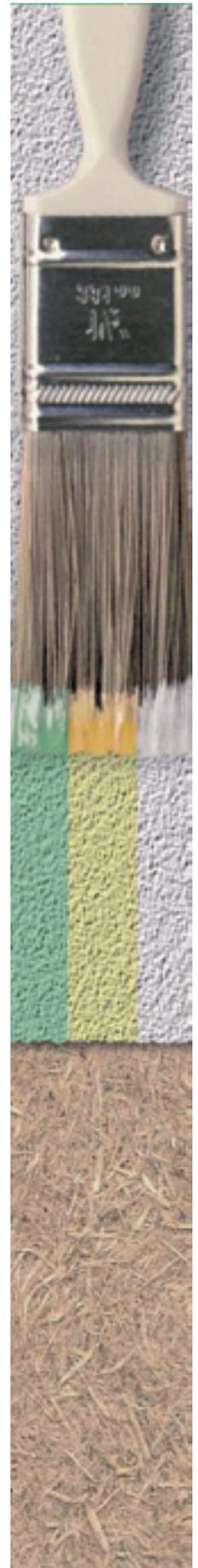
The silicate system is similar to the mineral render. This high-quality finishing coat is bound using sodium silicate and therefore good weather conditions are necessary for an optimal application. Not all colouring options are suitable.

UdiPERL®

This modern and high-performance render system is the product of many years of development work. This innovative, silicate based recipe has been polymerized to offer an optimum level of wear resistance.

In order to create an optically attractive surface the plaster/render structure should be uniform and each application of the paint should be executed wet-on-wet. This requires good organisation i.e. a sufficient number of workers and good preparations e.g. measures to ensure a uniform application along the whole length of the scaffold. Two different structures are available: Scratch-finish and rubbed-finish.

Fine or smooth surfaces can also be achieved using our mineral plasters/renders. These surfaces are however more delicate and require a higher level of application skill than coarser plasters/render with a granularity of 1.5 mm or above. The finer the structure of the surface, the more noticeable the unavoidable irregularities in glancing light. A further drawback is the rapid formation of hair-line cracks due to a lack of elasticity. This effect is only increased by an intensive dyeing of the plaster/render.



**Insulate naturally.
The Original.**

➔ 12. Installation instructions for *Udi*IN RECO® System interior insulation

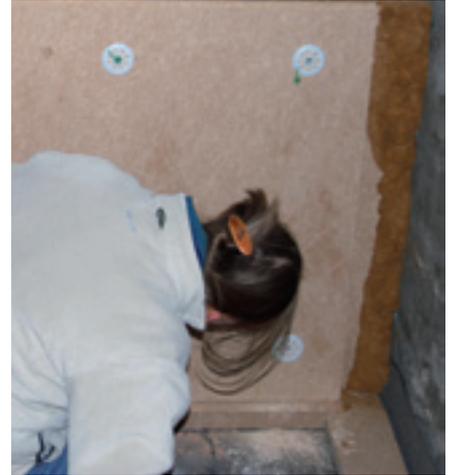
There is no need to use insulation wedges as the rapid moisture transport capacity of the insulation boards means that they can absorb condensation, store it and then disperse it again. The installation must be executed so that all adjoining areas such as floors or suspended ceilings and corners are free from thermal bridges.



A minimum of 8 adjustable fixings should be used per *Udi*RECO® wood-fibre insulation board.



Joints should be filled with wood-fibre, waste material so that there are no gaps.



The wood-fibre insulation board should be cut in such a way that the flexible region fits snugly to adjoining areas such as intruding walls or ceiling/roof areas. This method ensures a good contact to the insulation layer.



All apertures, such as windows and doors, must then be cladded with reveal insulation boards.



The self-adhesive *Udi*REINFORCEMENT® Render Edging Strip **INSIDE** is stuck to the frame and coated with *Udi*MULTIGRUND® to provide a neat, finished plastered edge.



Horizontal or vertical grooves can be cut into the boards for electrical cables. Alternatively, the cable can be affixed to the substrate underneath the insulation layer.

It is important to ensure that the capillary-conductivity of the **UdiRECO**® wood-fibre insulation boards is carried over to the wall that is being insulated. The insulation boards fit snugly, across their whole surface, against the substrate to exclude air pockets. The fixing of the boards is executed exclusively using **UdiASSEMBLY**® **SDM RECO** screw fixings. For half-timbered constructions we recommend that **UdiASSEMBLY**® **SDH RECO** fixings are used for the timbers and **UdiASSEMBLY**® **SDM RECO** for the bays. Thereafter, a coating of the special water-vapour-regulating **UdiMULTIGRUND**®, with a bedded-in layer of **UdiREINFORCEMENT**® strengthening mesh, with a minimum coat thickness of 4 mm, is applied. This mineral coating combines the functions of material-bearer and vapour retarder in one. It can be used for rendering and reinforcement, as a material-bearer for fine plasters, paint coats, wallpapers etc and can subsequently be smoothed out or sponged.

Our EXTRA-SERVICE – FREE OF CHARGE for you:

If you are not sure, a structural analysis for the interior wall insulation can be calculated by us.

UdiIN RECO® is universally applicable, regardless of the thickness of the wall or of the insulation layer that is to be used.



UdiMULTIGRUND® can be rubbed smooth



If the **UdiMULTIGRUND**® is combed with a toothed trowel, a **UdiLOAM**® Loam plaster or mortar can also be applied.



Wall heating systems can also be installed onto the plaster-finished surface. These should be fixed securely to the substrate.

WE OFFER THE FOLLOWING INTERIOR PLASTER COATINGS:

UdiMIRALO® Mineral plaster system

The classic mineral plaster system creates a comfortable homely atmosphere in your rooms. When used for interior applications it doesn't need to be painted.

UdiSIKATO® Silicate plaster system

The silicate system is similar to the mineral plaster and can also be used for interior applications. The advantage is that the plaster is ready to use. The plasters can also be dyed.

UdiLEHM® Plaster system made from loam-clay

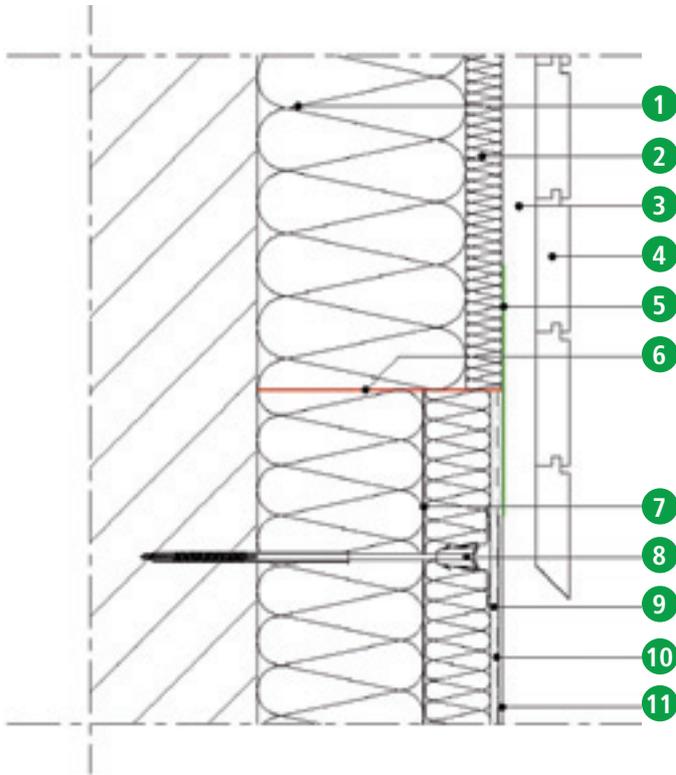
The wide range includes base renders and finishing plasters made from natural and highly diffusion-permeable loam-clay in its natural brown colour. We also offer ready-to-use loam-based paint mixtures in a wide range of colours. These paints are dyed according to our **UdiCOLOR**® SYSTEM and are offered in around 40 colour shades.

- Selection – natural: without additional binders
- Selection – wipe-proof: with surface treatment

In addition we offer natural-based and fully declared loam paints.

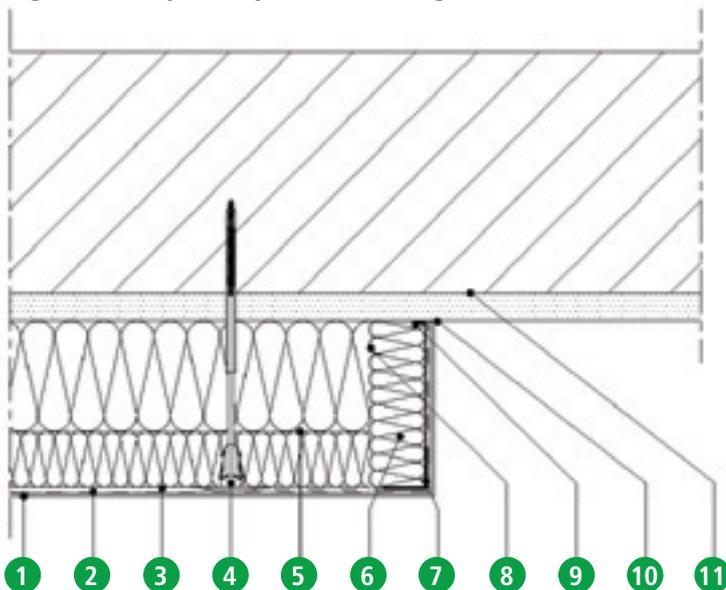
➔ 13. Detailed installation variants

Transition area – Render coat to timber cladding



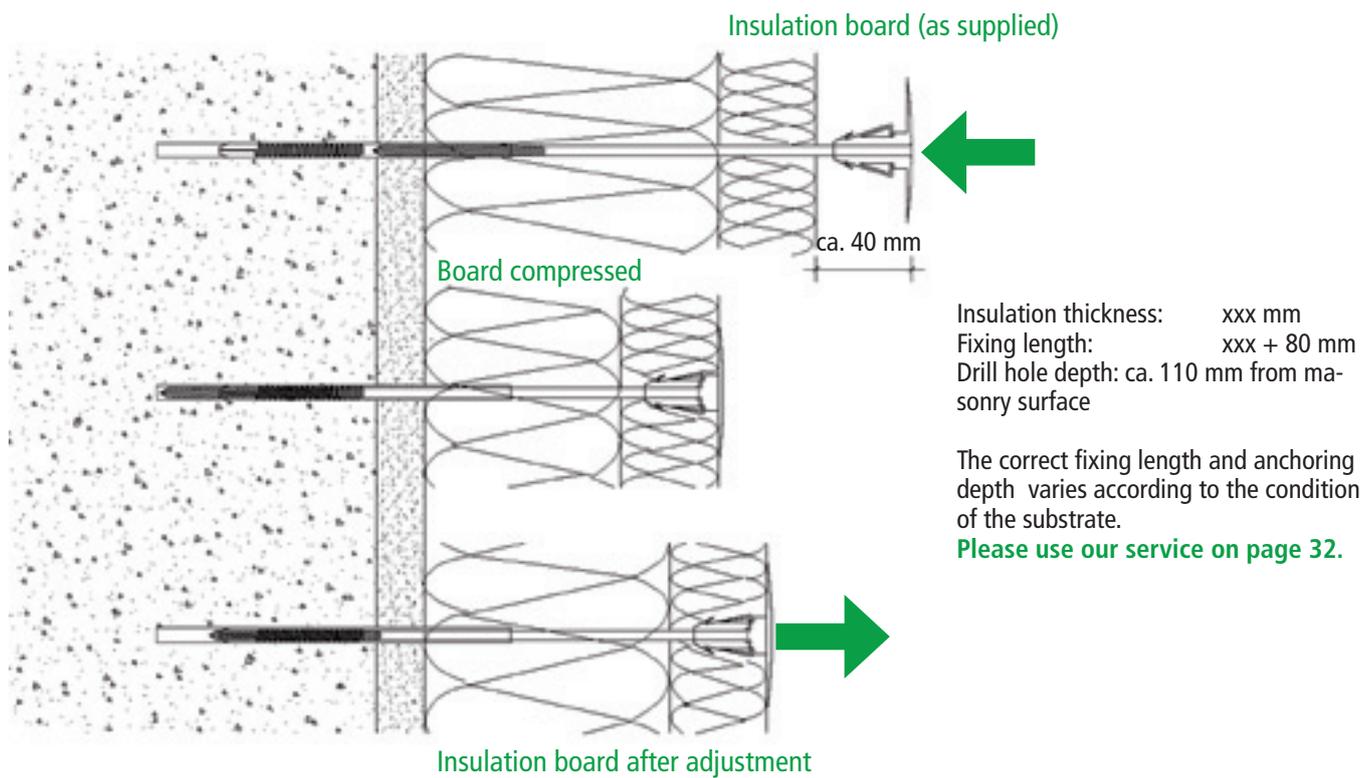
- 1 UdiFLEX® flexible insulation / timber studs
- 2 UdiTOP® Sark Board
- 3 Battens
- 4 Timber cladding
- 5 UdiSTEAM® Alubutyl (primed with UdiSTEAM® Primer)
- 6 Bonded with UdiSPECIAL ADHESIVE®
- 7 UdiRECO® Insulation element with levelling compensation
- 8 UdiASSEMBLY® SDH (adjustable fixing - Timber) / SDM (adjustable fixing - Masonry)
- 9 UdiFOUNDATION COAT®
- 10 UdiREINFORCEMENT® Strengthening Mesh
- 11 UdiPERL® Fine Structured Render

Façade installation terminating mid-wall e.g. boundary to adjacent building

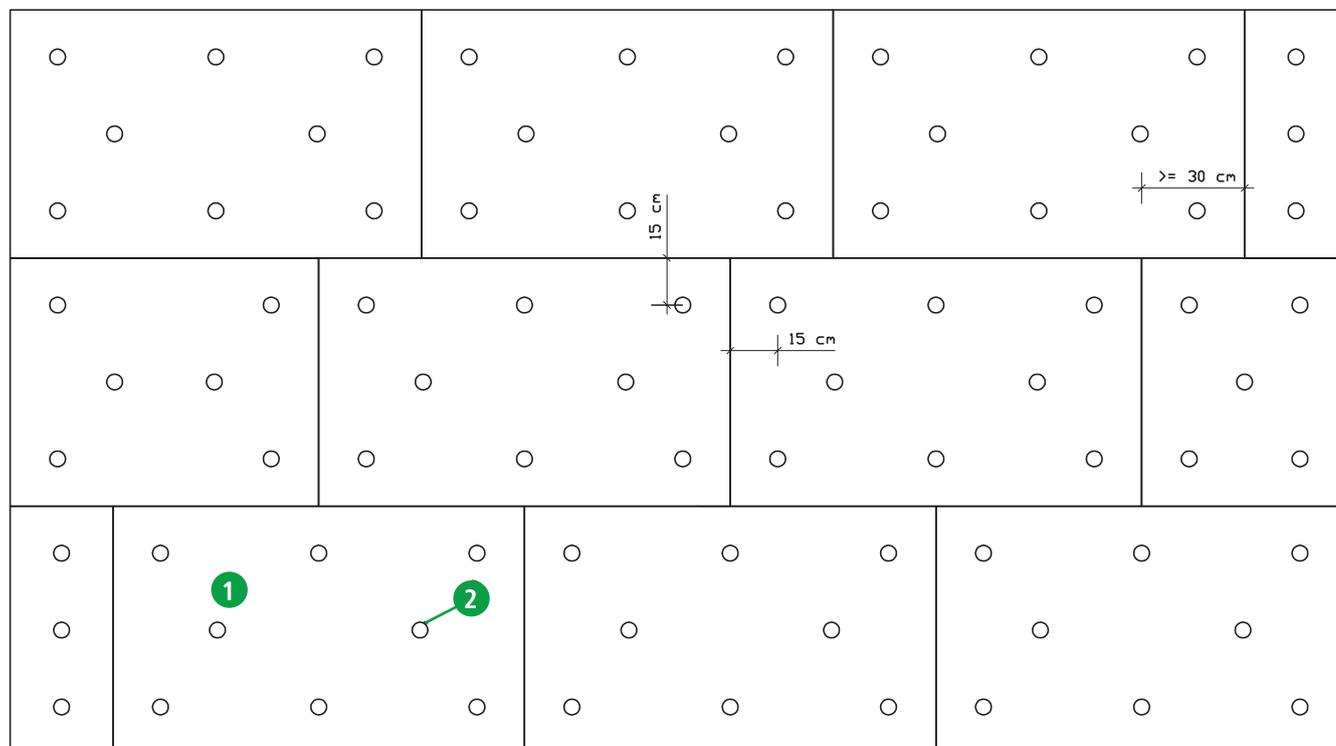


- 1 UdiPERL® Fine Structured Render
- 2 UdiREINFORCEMENT® Strengthening Mesh
- 3 UdiFOUNDATION COAT®
- 4 UdiASSEMBLY® SDH (adjustable fixing - Timber) / SDM (adjustable fixing - Masonry)
- 5 UdiRECO® Insulation element with levelling compensation
- 6 UdiUNGER-DIFFUTHERM® L Reveal Insulation Board
- 7 UdiREINFORCEMENT® Corner Protection Profile
- 8 Bonded with UdiSPECIAL ADHESIVE®
- 9 UdiJOINTING TAPE®
- 10 Chamfer
- 11 Substrate inc. old render

Fixing position – Solid stone with 2 cm render coat

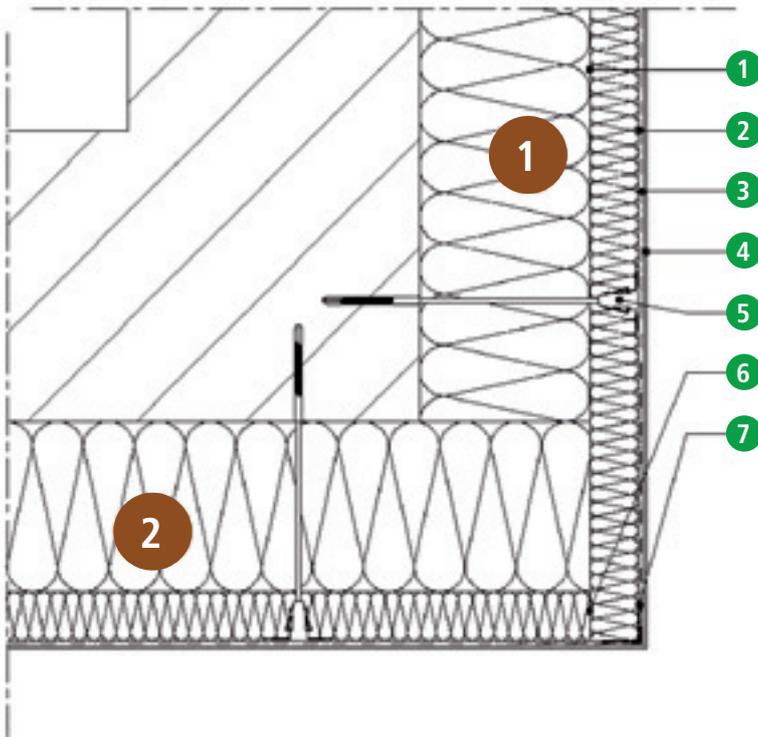


UdiRECO® Fixing diagram



- 1 UdiRECO® Insulation board
- 2 UdiASSEMBLY® SDH (adjustable fixing - Timber)
SDM (adjustable fixing - Masonry)

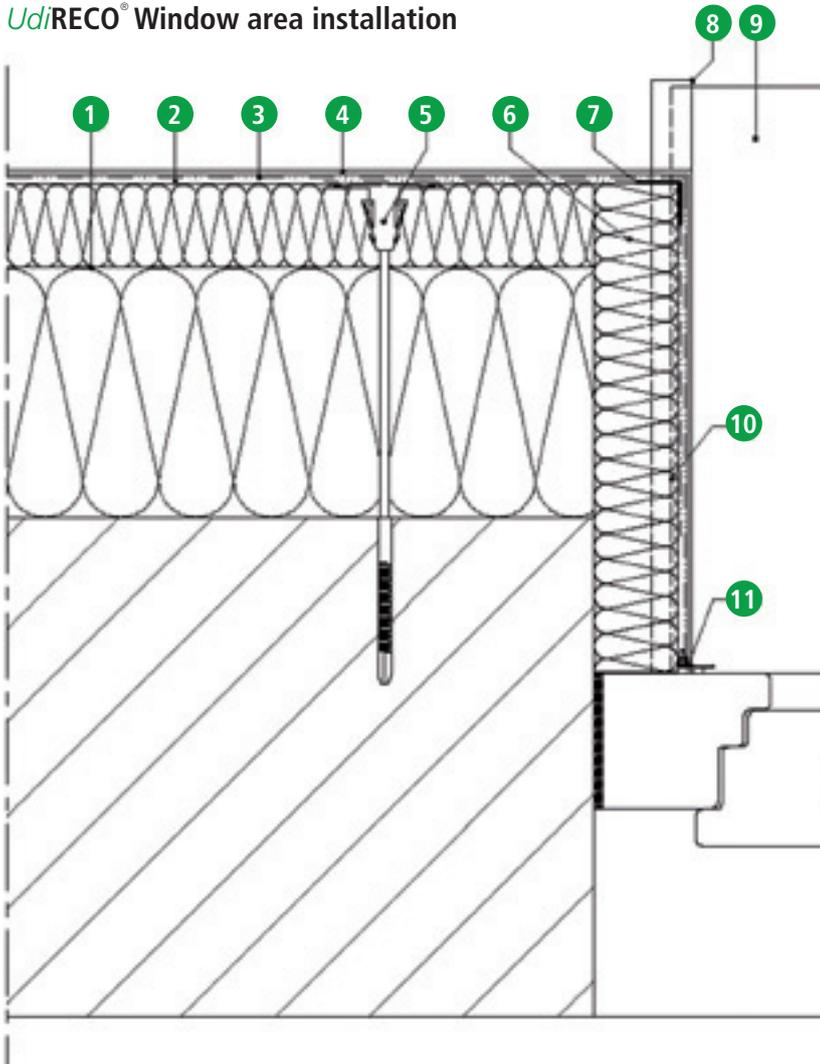
UdiRECO® External corner installation



- 1 UdiRECO® Insulation element with integrated levelling compensation
- 2 UdiFOUNDATION COAT®
- 3 UdiREINFORCEMENT® Strengthening Mesh
- 4 UdiPERL® Fine Structured Render
- 5 UdiASSEMBLY® SDM (adjustable fixing – Masonry)
- 6 Sealing of joints using UdiSPECIAL ADHESIVE®
- 7 UdiREINFORCEMENT® Corner Protection Profile

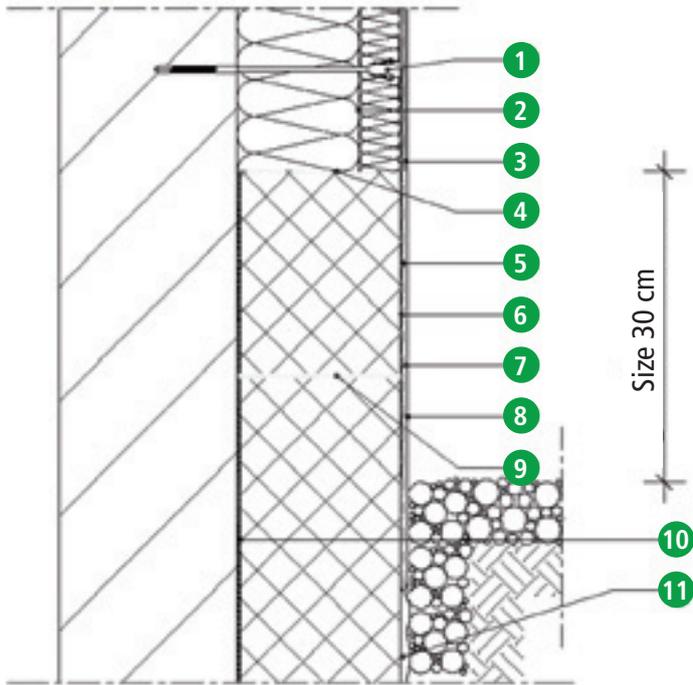
The first step is to mount board 1. The lower, wall-facing layer of the insulation must be removed. After adjusting board 1, Board 2 is then butted flush against board 1.

UdiRECO® Window area installation



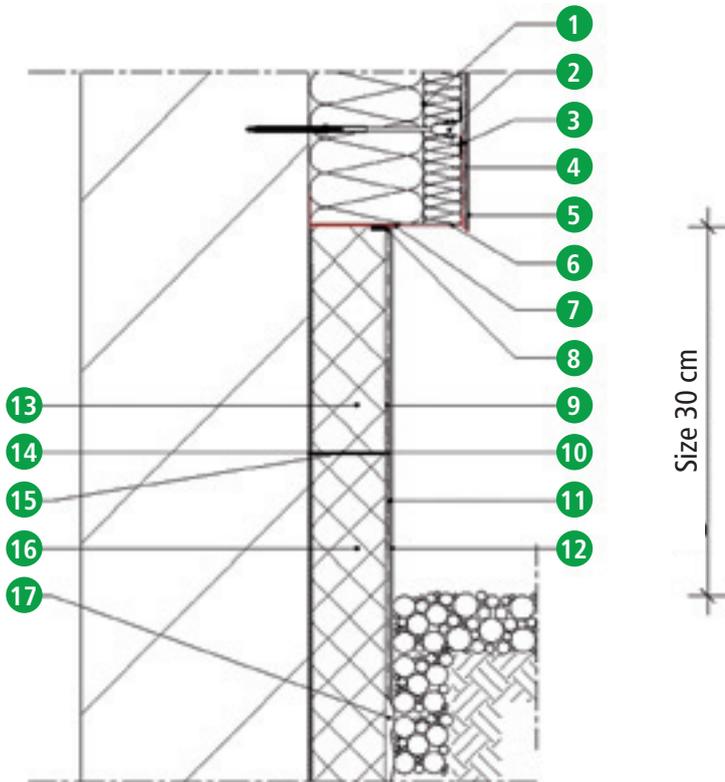
- 1 UdiRECO® Insulation element with integrated levelling compensation
- 2 UdiFOUNDATION COAT®
- 3 UdiREINFORCEMENT® Strengthening Mesh
- 4 UdiPERL® Fine Structured Render
- 5 UdiASSEMBLY® SDM (adjustable fixing – Masonry)
- 6 UdiUNGER-DIFFUTHERM® L Reveal Insulation Board bonded with UdiSPECIAL ADHESIVE®
- 7 UdiREINFORCEMENT® Corner Protection Profile
- 8 UdiALU® Window Sill Side Piece, Expandable
- 9 UdiALU® Window Sill, Aluminium
- 10 UdiJOINTING TAPE®
- 11 UdiREINFORCEMENT® Render Edging Strip

UdiRECO® Plinth installation with a continuous render coat



- 1 UdiASSEMBLY® SDM (adjustable fixing – Masonry)
- 2 UdiRECO® Wood-fibre insulation element with integrated levelling compensation
- 3 UdiFOUNDATION COAT®
- 4 Bonding using UdiSPECIAL ADHESIVE®
- 5 UdiREINFORCEMENT® Strengthening Mesh
- 6 UdiREINFORCEMENT® Strengthening Mesh Strip 30 cm
- 7 UdiBASE® Plinth Slurry
- 8 UdiPERL® Fine Structured Render
- 9 Bonding using UdiSPECIAL ADHESIVE®
- 10 Bonding of the perimeter insulation
- 11 E.g. Drainage element

UdiRECO® Plinth installation with a reveal/recess



- 1 UdiRECO® Insulation element with integrated levelling compensation
- 2 UdiASSEMBLY® SDM (adjustable fixing – Masonry)
- 3 UdiREINFORCEMENT® Strengthening Mesh
- 4 UdiFOUNDATION COAT®
- 5 UdiPERL® Fine Structured Render
- 6 UdiBASE® Variable Slot-in Profile with strengthening mesh
- 7 UdiBASE® Variable Wall Connection Profile
- 8 UdiJOINTING TAPE®
- 9 UdiREINFORCEMENT® Strengthening Mesh Strip 30 cm
- 10 UdiREINFORCEMENT® Strengthening Mesh
- 11 UdiFOUNDATION COAT® - The surface is protected using UdiBASE® Plinth Slurry
- 12 UdiPERL® Fine Structured Render
- 13 Perimeter insulation
- 14 Bonding of the perimeter insulation
- 15 Bonding using UdiSPECIAL ADHESIVE®
- 16 Insulation below ground level
- 17 E.g. Drainage element



Insulate naturally.
The Original.

➔ 14. Substrate analysis

In order that you know which fixing **UdiASSEMBLY**® SDM (adjustable fixing masonry) or **UdiASSEMBLY**® SDH (adjustable fixing timber) is right for your project, we have prepared this datasheet. Just drill a test hole into the wall to be insulated and then fill in the results in the following table. Based on this information we will be able to quickly recommend the correct fixing.

Installer: _____	Owner/Developer / Project: _____
Contact partner: _____	Contact partner: _____
Address: _____	Address: _____
Post Code / City: _____	Post Code / City: _____
Telephone: _____	Telephone: _____
Telefax: _____	Telefax: _____
E-Mail: _____	E-Mail: _____

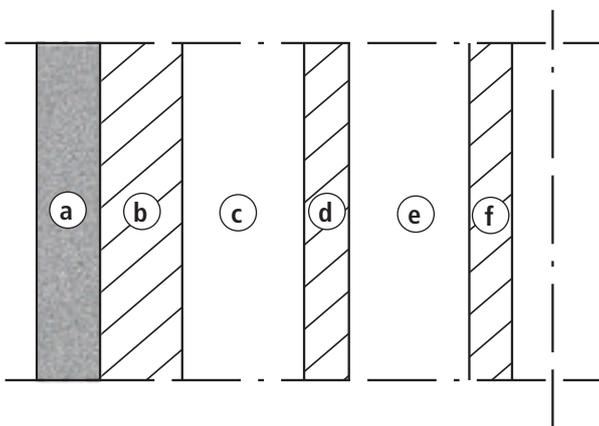
Please send faxes to 0049 (0)371 - 81 564 64

<input type="radio"/> Solid stone	Render/plaster depth: _____ mm
<input type="radio"/> Cinder blocks	Render/plaster depth: _____ mm
<input type="radio"/> Sandstone	Render/plaster depth: _____ mm
<input type="radio"/> Rubble/quarry stone	Render/plaster depth: _____ mm
<input type="radio"/> Perforated brick (cellular)	Render/plaster depth: _____ mm
<input type="radio"/> Lightweight vertically perforated brick (Hollow)	Render/plaster depth: _____ mm

(if necessary send data sheet)

Profile of the perforated/cored brick/block:

Planned Render/plaster depth: _____ mm



(a)	Render depth	... mm
(b)	Depth of the outer wall	... mm
(c)	Depth of the first core	... mm
(d)	Depth of the first web	... mm
(e)	Depth of the second core	... mm
(f)	Depth of the second web	... mm

Screw length: _____

Calculated by Unger-Diffutherm GmbH

Plug: _____

Calculated by Unger-Diffutherm GmbH

Additional information:

➔ 15. Maintenance

This is a recurring and very hot topic: How long does such a system last for?

The answer is simple. The first wood-fibre façade insulation systems were installed over 20 years ago and can be found in the Erzgebirge Mountains near Chemnitz, Germany.

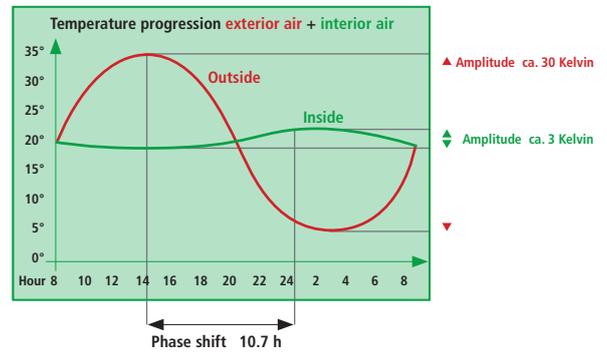
There has been no development of cracks, no warping, no build-up of algae nor any mould development in the interior rooms. The façade insulation systems, using naturally produced **UdiWOOD-FIBRE INSULATION BOARDS®** work very simply because during the manufacturing process they are transformed into 'intelligent' wood. It deals easily with moisture by absorbing the moisture that develops, storing it temporarily and then dissipating it quickly again. Typical wood! This is called a water vapour diffusion-permeable and capillary-active building material which can store the moisture in its fibres and tiny air pockets and then transport it again.

No other type of insulation provides such good results!

As a result of long years of work the first special wood-fibre sandwich board, for use as a render-bearing insulation board for external walls in timber constructions and on masonry, was developed and marketed as a system element by the company Dipl.-Ing. Bernd Unger.

The **UdiWOOD-FIBRE® ETICS**, based on a natural resin bonded, environmentally-friendly, wood-fibre insulation material, enables an optimal level of physical complexity in the insulation of façades. Its air-permeable, open-diffusion properties; the absorption and relief of stresses in the building structure; its excellent thermal protection, heat-shielding and soundproofing properties; outstanding ability to act as a moisture buffer; the uncomplicated disposal and its positive building-biological aspects, means it is an ecologically and structurally excellent solution for the renovation of existing buildings, as an exterior insulation, for the interior insulation of external walls and in timber constructions

Example: **UdiSPEED**-wood-fibre insulation board, depth 60 mm on a timber-frame construction with 160 mm fibre insulation



Façade surfaces are constantly subject to stresses caused by the weather. It can not be ruled out that weather-related aging can occur. This is heavily dependent on the location, position and directional aspect of the building as well as measures to reduce the load on the façade (roof overhang, protection by trees and bushes).

Due to this fact the façades are subject to regular checks at predefined intervals. The maintenance is largely limited to the regular repainting of the surface. In terms of the maintenance intervals, there is no difference between **UdiWOOD-FIBRE® ETICS** and traditional ETICS or other rendered façades. From the experience of the last twenty years, a lower incidence of algae growth is to be expected with **UdiWOOD-FIBRE® ETICS** than with traditional ETICS as the level of condensation build-up is lower due to the insulation material's large thermal storage capacity. The façades cool more quickly at night with other insulation materials and heat up more intensely in sunshine. As a rule repainting work is only required after 12 to 15 years. We recommend that only approved and system-conform products from the **UdiRANGE®** be used. .

➔ 16. Guideline values / Calculation aid

In order to avoid calculation errors we recommend that you always contact us before beginning your project. We have gained a lot of experience which we will be happy to pass on to you.

We will happily calculate the components you require for your next project and the time you should allow to complete the installation. Please use our free calculation aid in MS Excel or Adobe PDF. Just ask us!

Extract: Example calculation

Mengenaufnahme:

Untergrund*	Mauerwerk	0/102(Mauerwerk)
Untergrundbeschaffenheit**	Wollstein	(Wollstein / Kammstein)
Rückspandung Perimeter*	ja	(ja/nein)
Korngröße des Putzes**	2	(1,5; 2; 3; 4 [mm])
Dämmstärke*	160 mm	
effektive Dämmfläche**	250 m ²	
Umfang des Objektes:	50,00 m	
Höhe bei Traufk:	3,80 m	
Anzahl Hausecken:	4 Stk.	
Anzahl Fenster:	12 Stk.	
Anzahl Türen:	2 Stk.	
Fensterlabungstiefe (inkl. Dämmstärke):	18 cm	
Gesamtlänge Fensterlabung / Sturz:	49,20 m	
Gesamtlänge Türlabung / Sturz:	10,00 m	
Gesamtlänge Fensterbank:	12,00 m	
Gesamtlänge Ort- / Traufbereich:	47,50 m	
Rückspandung Perimeter:	4 cm	

Der Kammstein steht für alle Untergründe welche im Drehgang gebohrt werden müssen.

Liefermengen:

Artikel	Artikelnummer	Liefermengen nach Ihren Vorgaben		Vor-schritt	Eigene Mengenangabe	Listenpreis	Rabatt	Endpreis
UdiRECO 160 mit integrierter Untergrundbohrer	195180	24 Paletten	9 Paletten	295,723 m ²	0 %	47,75 €/m ²		12210,77 €
Udi BASE/DIFFUTHERM 160 mm	193045	23 Paletten		17,940 m ²	0 %	10,75 €/m ²		192,86 €

We have compiled a list for the installation of **UdiRECO®** insulation boards as an orientation aid.

The times are average values in minutes and should be checked on site before starting the installation and/or issuing a quotation. These are recorded times, including extra tasks such as transportation on the building site, set-up times, cleaning etc. Significance of the set-up times 20%.

Insulation thickness in mm	80	100	120	140	160	180	200
Installing Udi/BASE® Plinth End-Cap Profile variable incl. adjustment and trimming per linear metre	15	15	15	15	17	17	18
Pre-installation of UdiRECO® wood-fibre insulation boards onto a supporting masonry substrate per m ²	18	18	18	20	20	25	25
Alignment / adjustment per m ²	5	5	5	5	5	5	5
Installation in the window reveal (cutting and mounting) per m ²	10	10	12	12	15	15	15
Masking of window etc	Building-specific						
Installation in the window reveal: Mounting of the UdiREINFORCEMENT® Render Edging Strips and Corner Strengthening Mesh (trimming) per linear metre	15	15	15	18	18	18	18
Coating of the window/door reveal with UdiFOUNDATION COAT® per linear metre	15	15	18	18	18	18	18
Application of reinforcement coat using UdiFOUNDATION COAT® with a bedded-in layer of strengthening mesh (Coverage guide 7.0 kg/m ²) per m ²	20	20	20	20	20	20	20
Plaster finishing coat applied by hand and given a structured finish	18	18	18	18	18	18	18
Total time Ø with plaster coat	116	116	124	124	126	126	127
<i>Times in minutes</i>							



➔ 17. Construction suggestions according to ENEV*

Solid bricks. Rendered both sides. Thermal conductivity $\lambda = 0,81$ [W/mK]								
Wall depth cm	17,5	24,0	36,5	Interior	Exterior	Installation	Prior substrate survey required	Avoid use of hammer drill
Insulation depth	2,38	2,00	1,53					
80 mm	0,44	0,43	0,40					
100 mm	0,36	0,35	0,33					
120 mm	0,30	0,30	0,28	X	X	EASY	NO	NO
140 mm	0,26	0,26	0,25				(Correct fixing lengths are listed in our Data sheet)	
160 mm	0,23	0,23	0,22					
180 mm	0,21	0,20	0,20					
200 mm	0,19	0,18	0,18					



Solid timber wall. Thermal conductivity $\lambda = 0,13$ [W/mK]								
Wall depth cm	10,0	14,0	18,0	Interior	Exterior	Installation	Prior substrate survey required	Avoid use of hammer drill
Insulation depth	1,07	0,80	0,64					
80 mm	0,35	0,32	0,29					
100 mm	0,30	0,27	0,25					
120 mm	0,26	0,24	0,22	X	X	EASY	NO	N/A
140 mm	0,23	0,21	0,20				(Correct fixing lengths are listed in our Data sheet)	
160 mm	0,20	0,19	0,18					
180 mm	0,18	0,17	0,17					
200 mm	0,17	0,16	0,15					



Hollow concrete blocks. Rendered both sides. $\lambda = 0,60$ [W/mK]								
Wall depth cm	17,5	24,0	36,5	Interior	Exterior	Installation	Prior substrate survey required	Avoid use of hammer drill
Insulation depth	2,02	1,65	1,23					
80 mm	0,43	0,41	0,38					
100 mm	0,35	0,34	0,32					
120 mm	0,30	0,29	0,27	X	X	MEDIUM	YES	YES
140 mm	0,26	0,25	0,24					
160 mm	0,23	0,22	0,21					
180 mm	0,20	0,20	0,19					
200 mm	0,18	0,18	0,17					



Porous concrete. Rendered both sides. $\lambda = 0,10$ [W/mK]								
Wall depth cm	17,5	24,0	36,5	Interior	Exterior	Installation	Prior substrate survey required	Avoid use of hammer drill
Insulation depth	0,51	0,38	0,26					
80 mm	0,26	0,23	0,18					
100 mm	0,23	0,20	0,16					
120 mm	0,21	0,18	0,15	X	X	MEDIUM	NO	YES
140 mm	0,19	0,17	0,14				(Correct fixing lengths are listed in our Data sheet)	
160 mm	0,17	0,15	0,13					
180 mm	0,16	0,14	0,12					
200 mm	0,15	0,13	0,11					



Sand-lime blocks. Rendered both sides. $\lambda = 1,0$ [W/mK]								
Wall depth cm	17,5	24,0	36,5	Interior	Exterior	Installation	Prior substrate survey required	Avoid use of hammer drill
Insulation depth	2,64	2,25	1,76					
80 mm	0,45	0,44	0,42					
100 mm	0,37	0,36	0,34					
120 mm	0,31	0,30	0,29	X	X	MEDIUM	YES	YES
140 mm	0,27	0,26	0,25					
160 mm	0,23	0,23	0,22					
180 mm	0,21	0,21	0,20					
200 mm	0,19	0,19	0,18					



VPB. Rendered both sides. Thermal conductivity $\lambda = 0,25$ [W/mK]								
Wall depth cm	17,5	24,0	36,5	Interior	Exterior	Installation	Prior substrate survey required	Avoid use of hammer drill
Insulation depth	1,11	0,86	0,60					
80 mm	0,36	0,33	0,29					
100 mm	0,31	0,28	0,25					
120 mm	0,27	0,25	0,22	X	X	MEDIUM	YES	YES
140 mm	0,23	0,22	0,20					
160 mm	0,21	0,20	0,18					
180 mm	0,19	0,18	0,16					
200 mm	0,17	0,16	0,15					



U-Values as per ENEV 2009 Renovations
*(German energy efficiency regulations)

Not achieved
Achieved



Insulate naturally.
The Original.

➔ 18. Tests / Approvals / Fire protection



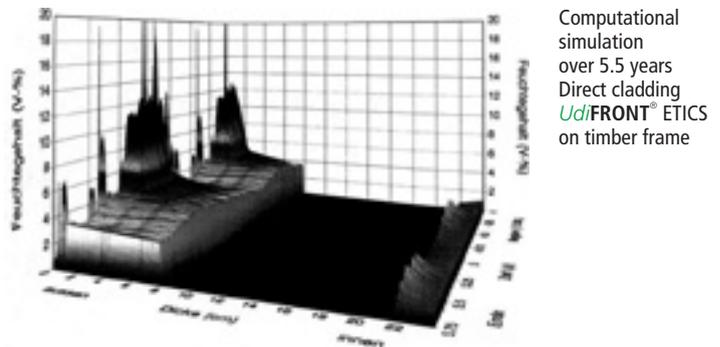
➔ Thermal imaging test

The thermal imaging analysis of buildings provides useful information on the thermal condition of the building. Building elements with different wall temperatures are clearly visible. The pictures of a house in the Ruhr region in Germany show image sections that are characteristic for the thermal condition of the building. The thermal images after the renovation did not show any significant thermal losses.

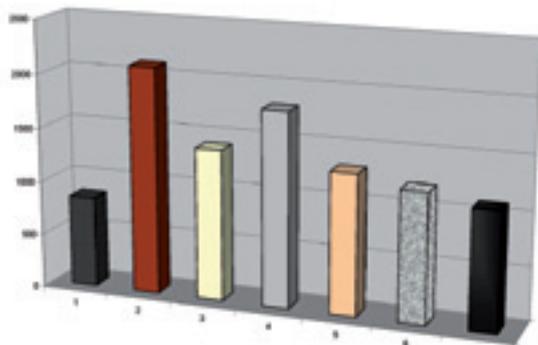
Explanation of the thermal imaging method

The temperature of all areas of a building's skin are measured and displayed optically as coloured regions e.g. red, green, yellow, blue. The lighter the colour e.g. yellow, red, the greater the heat loss.

The **UdiFRONT® ETIC system** was evaluated in a research project on effective physical moisture protection measures conducted by the Technical University, Dresden. The simulation, over a 5.5 year period, on the behaviour of moisture in timber constructions with directly cladded, timber frames, for a west facing wall subjected to the climate in Essen, Germany, provided the following results: No moisture in the insulation; all processes confirm the capillary effect of the wood-fibre ETICS.



Computational simulation over 5.5 years
 Direct cladding UdiFRONT® ETICS on timber frame



Selected insulation materials and the various thermal storage capacities (UdiRECO® is shown in brown).

Thermal insulation values

The graph on the left shows how various selected insulation materials provide protection against the winter cold. A 10cm layer of UdiRECO® wood-fibre insulation system insulates as well as 102 cm of concrete! When comparing insulation materials not only the U- and λ -values but also the thermal storage capacities should be considered. UdiRECO® wood-fibre insulation boards exhibit excellent values.



Summary

- General Building Inspectorate approvals
- Z-33.47-1026 (Render-bearer element)
 - Z-23.15-1625 (Flexible insulation element)
- Proof of stability
- UU V/00-003 from 10.03.2000
- Fire protection tests
- Test record No. PP IV/96-018 from 25.03.1996
 - Test report No. Pb IV/97.08 from 04.02.1997
 - Test certificate No. PZ IV/98-059 from 25.05.1998

- Acoustic insulation tests
- Test report 980316.T 7 Unger-Diffutherm® 60 mm with Isofloc (16.03.1998)
 - Test report 980316.T 4 Unger-Diffutherm® 60 mm with wood-fibre board (16.03.1998)
 - Test report 980316.T 8 Unger-Diffutherm® 60 mm with mineral wool (16.03.1998)
 - Test report 980316.T 6 Unger-Diffutherm® 100 mm with wood-fibre (16.03.1998)

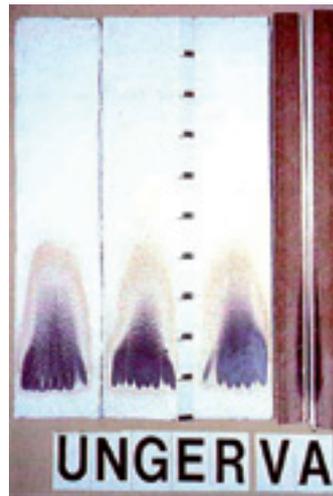




Fire protection

Based on a series of fire tests and scientific analyses, the **UdiFRONT® ETICS system** was classified in the building materials class B1 (flame resistant) and received the German Building Inspectorate official approval for load-bearing, external walls in timber constructions F 30-B, F 60-B and F 90-B.

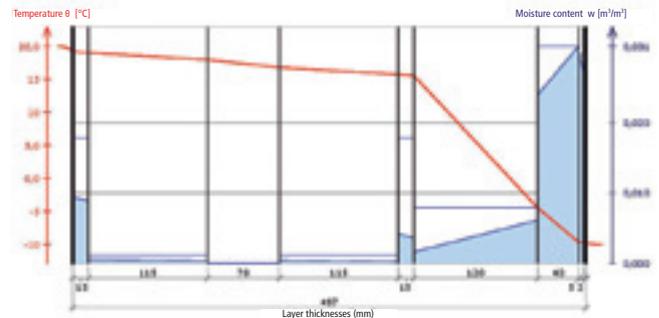
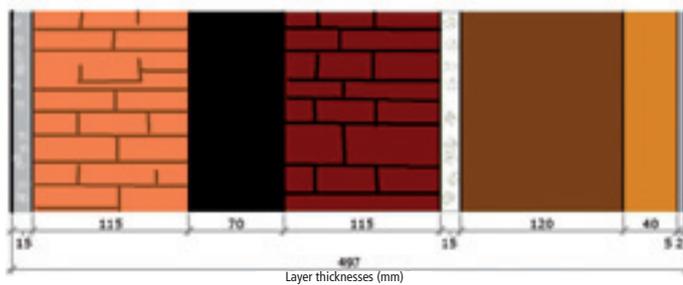
- ➔ No toxic gas emissions
- ➔ No undefined spreading of fire
- ➔ Extinguishes flames itself
- ➔ No spalling of the plaster



KfW-Award



The first building to receive the KfW-Award "Efficiency with charm" is in Lübeck, Germany. From over 200 participants, the 19th century villa was awarded the 1st prize. The specialist jury selected those projects in which the energy consumption of the private houses was significantly reduced by the renovation measures or replacement new buildings. The optical aspect of the renovations also played an important role.



Structural analysis

In order to support the efficient planning of ecological energy-saving concepts using **UdiINSULATION SYSTEMS®** we offer for every project the option of a comprehensive analysis of the structural conditions, if requested. Our calculations are based on Glaser and we also consider the problems associated with moisture.

At the end of the 90's ÖKO-TEST compared 17 insulation systems

In the issue 04/99 the acclaimed ecological, consumer magazine ÖKO-TEST published the results of the evaluation of 17 different ETICS systems.

Only three systems were awarded the **best mark "Recommended"**

One of them was from **UNGER-DIFFUTHERM**.

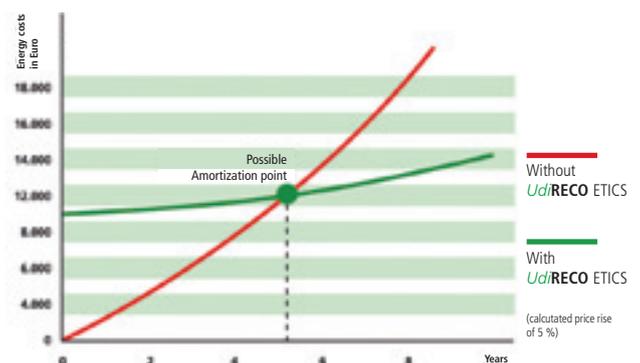


natureplus tests UNGER-DIFFUTHERM

The wood-fibre insulation board **UdiUNGER-DIFFUTHERM NF** was certified, **under the number 0104-0307-111-1**, by the international environmental organisation. This organisation promotes sustainable developments in the building sector. This confirms **UNGER-DIFFUTHERM's** orientation towards sustainability. Products which are awarded this label exhibit especially high levels of quality in terms of environmental-friendliness, functionality and health benefits.

Getting a grip on heating costs

It's clear to everyone that insulation helps to save energy but many people are also interested in how long it will take before it pays for itself. Using our own specially developed simulation program we can determine the likely amortization point when savings pay for your investment. In most cases this is only a few years.



Example of an old, brick-built building with 100 mm UdiRECO ETICS.



**Insulate naturally.
The Original.**

➔ 19. A SELECTION OF REFERENCE BUILDINGS



➔ Lübeck

Schleswig Holstein , Germany

Winner of the KfW-Award ((Reconstruction loan Corporation)

Insulated with 160 mm *Udi*RECO



➔ Altusried/ Allgäu

Bavaria, Germany

Barn conversion

Façade insulated with 160 mm *Udi*RECO



➔ Bad Hindelang

Bavaria, Germany

Hotel renovation

Façade insulated with 160 mm *Udi*RECO



➔ Henstedt-Ulzburg

North of Hamburg /

Schleswig Holstein , Germany

Efficiency house 85

Façade insulated with 200 mm *Udi*RECO



Bagnols en Forêt



France
Passive house in the South
Façade insulated with 200 mm *UdiRECO*



Prague



Czech Republic
Renovation of residential block
Façade insulated with 200 mm *UdiRECO*



Piacenza



Italy
Private house
Façade insulated with 100 mm *UdiRECO*



Rotherham



Great Britain
Ecological, residential estate
Façade insulated with 200 mm *UdiRECO*



*Insulate naturally.
The Original.*

OUR SYSTEM RANGE:

For roof and interior construction:

UdiCLIMATE® SYSTEM

The interior insulation system with integrated climate chambers

UdiSTONE® SYSTEM

Ecological insulation blocks for partition wall construction

UdiFLEX® SYSTEM

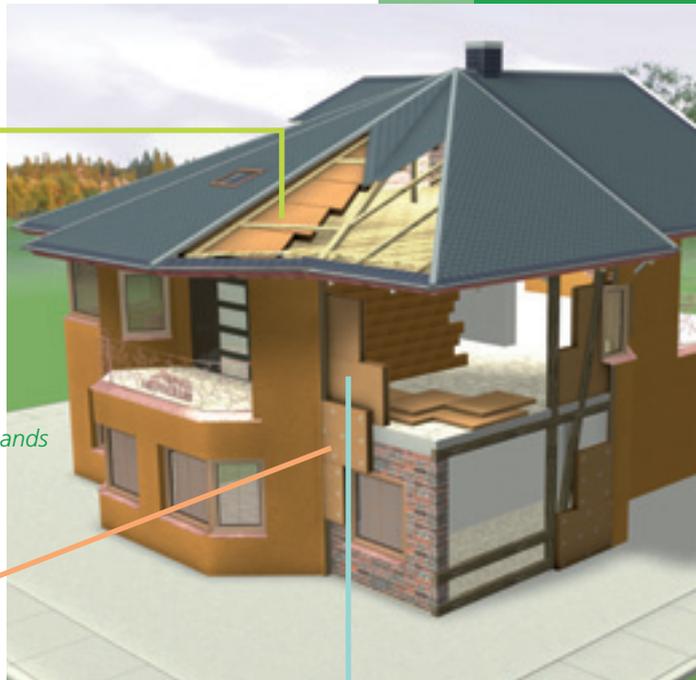
Flexible planning with a flexible insulation to meet the highest of demands

UdiTOP® SYSTEM

The complete program for your roof

UdiSTEP® SYSTEM

Wood-fibre, floor insulation



For external walls:

UdiRECO® SYSTEM

External thermal insulation composite system with intelligent levelling compensation

UdiFRONT® SYSTEM

External thermal insulation composite system with a 15 year guarantee

UdiSPEED® SYSTEM

The efficient insulation system for pre-fabricated, timber-frame buildings

For interior insulation:

UdiIN® SYSTEM

Interior insulation system with a 15 year guarantee

UdiIN RECO® SYSTEM

The interior insulation system – specially designed for uneven surfaces

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Environmentally-friendly, innovative,
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