LINITHERM®
insulation systems

LINZMEIER
building elements

Installation

Interior construction

Under-rafter insulation

Polyurethane
for better insulation®

General information and examples regarding the installation of LINITHERM below-rafter insulation systems

Preliminary remark

Delivery

LINITHERM insulating elements are delivered on pallets. Great care must be taken when unloading and transporting the elements on the building site.
During all work (installation of the elements etc.) attention must be paid that no damage is done to the elements. The elements must be protected from moisture penetration during storage, transport and installation.

Safety provision

The safety regulations for building sites must be observed.

Rules of construction technology

LINITHERM insulation systems are high-quality products for the most various insulation solutions. The elements are manufactured on modern production facilities in top-quality, flawless condition. In order to achieve the benefit of an optimal insulation solution, proper installation of the elements is essential. Our installation recommendations serve as schematic information for the buyer/user. They are non-binding and do not claim to be fundamentally valid, nor do they substantiate an entitlement to a guarantee. Each building offers different prerequisites; therefore the general procedure is to follow the rules of construction technology for each specific building.

Accessories

We offer appropriate and suitable accessories for proper installation:
e.g. LINITHERM connection apron, L+D film, L+D adhesive tape, Troko screws, spray foam, etc.

Tools

Only a few tools, which are usually available on any building site, are required for the installation of LINITHERM insulation systems. Suitable tools are, e.g.: hand-held circular saw, hand saw, cordless screwdriver, aligning board with spirit level, stapler.

Principles

The following points must generally be observed during and/or before the installation of the LINITHERM elements.

- The elements must be fully pushed together in longitudinal and transverse direction, in order to achieve a full-surface and consistent thermal insulation layer.
- Any damage must be properly repaired (e.g. by foaming, levelling,...).
- The under-rafter insulation elements are usually installed in formation, with staggered joints lengthwise, parallel to the eaves, row for row from top (ridge) to bottom (eaves).
  Please note: Insert the last panel at an obtuse angle. In individual cases, the elements can also be installed from bottom (eaves) to top (ridge) (e.g. in case of a concealed ridge board or continuous valley beams).
  Accurately aligned installation right from the first row facilitates the installation of the following rows.
- Prior to commencing installation of the LINITHERM insulating elements, all preparatory work should be completed (e.g. plastering of the walls, fitting of the between-rafter insulation, installation of the air-tight membrane, etc.).

Various important detailed points are stated on the following pages.
Our suggestions only represent a limited selection.
The planning requirements and specialised regulations, however, must always be adhered to.

Installation options

LINITHERM insulation systems for interior construction can be installed in various ways:

- Installation of the LINITHERM insulation systems directly under the rafters.
  Due to the high compressive strength and rigidity of the LINITHERM insulation systems, the elements can also be installed directly under the rafters.

- Installation of the LINITHERM insulation systems on existing cladding on the room side (e.g. during renovation):
  The existing thermal insulation must be examined for functional capability. If necessary, the overall structure must be examined in terms of structural physics.
  The attachment of the elements should take place in the rafters, if the existing cladding is not suitable as the load-bearing structure.

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General installation information

Building moisture

The installation of the elements should generally take place in a dry state, after the building moisture has dried out.

Rafter spacing

The maximum rafter spacing is 87 cm.

Loads

The fastening of loads (e.g. lamps) takes place in the rafters.

Creation of the Air tightness of LINITHERM PAL GK

Before the L+D film is applied, it must be checked whether the insulation between the rafters is dry, and dry if necessary (see DIN 4108-7).
The air-tight layer is created using LINITHERM L+D film (see I-LD). The joints of the L+D film are stuck properly using L+D adhesive tape. If the elements have mitred joints, a paper joint tape must be embedded in the filler (see e.g. I-KD, I-FV, I-TW).
If there is an airtight ceiling surface on site (e.g. smoothed gypsum plasterboard, plastered Heraklith ceiling ...), the airtight connection can also take place using the LINITHERM connection apron (see I-AS).

Installation/ Screw fastening of LINITHERM PAL GK

Installation of the elements can take place after inspection of the evenness of the substructure (rafters or existing cladding) and after application of the L+D film.

The first element is adapted and aligned.
Attachment takes place to the middle of each rafter, and 8 cm from the edge of the insulating panel using LINIFIX Troko screws.
The penetration depth of the screws into the rafter is approx. ≥ 40 mm.
In case of direct under-rafter installation, the following screws are usually used:
Troko 5.1x 90 for LINITHERM PAL GK 39.5 mm.
Troko 5.1x 90 for LINITHERM PAL GK 49.5 mm.
Troko 5.1x 110 for LINITHERM PAL GK 69.5 mm.
Troko 5.1x 130 for LINITHERM PAL GK 89.5 mm.
Troko 5.1x 160 for LINITHERM PAL GK 109.5 mm.

After attachment of the first panel, the following ones are adapted, closely fitted in to the transversal joint of the previous element respectively and screwed down. In doing so, attention must be paid that a straight edge (flush) is formed for the connection of the next row.
At the end of the first row the last panel is cut to size, adapted and mounted. The emerging section is used as the first panel for the next row (endless installation).

Please note: The transversal joint must be offset by at least 30 cm.
Several successive transversal joints within one rafter field must be avoided.

After adaptation and attachment of the last row of panels, the cavities of the connecting joints are foamed.
Protruding foam residues can be cut off when the foam has hardened.
The joint should be open for filling in the thickness of the gypsum plasterboard.
The connections, joints and screw heads are subsequently smoothed with filler as is usual for gypsum plasterboard.
Masking tape (paper joint tape) must be integrated if the elements are to be plastered or painted at a later date.
Finally, the protruding L+D film/connection apron is circumferentially cut off and die component connections are jointed (acrylic) so that they are permanently elastic and ready for painting or papering.

Note:
As the roof/wooden structure is exposed to a certain amount of tension due to wind and snow loads and deformation of the rafters/beams, the formation of cracks cannot be totally ruled out.

LINITHERM PAL 2 LINITHERM elements with integrated lathing

When installing LINITHERM PAL 2 elements and LINITHERM elements with integrated lathing, please observe out special installation instructions for these products.

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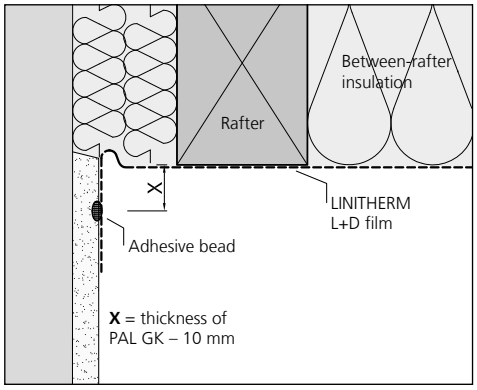
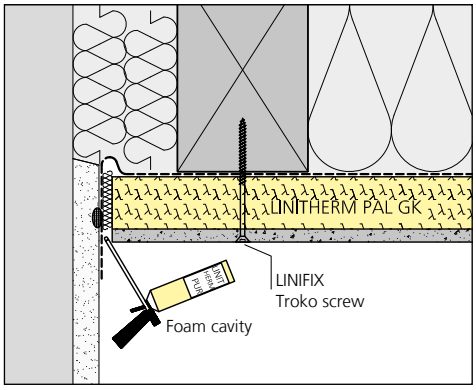
Establishment of air tightness with LINITHERM L+D film

Drawings 1 – 4 show the establishment of air tightness based on the example of a connection of the LINITHERM PAL GK insulation system to a gable wall. Airtight plastered brickwork is assumed.

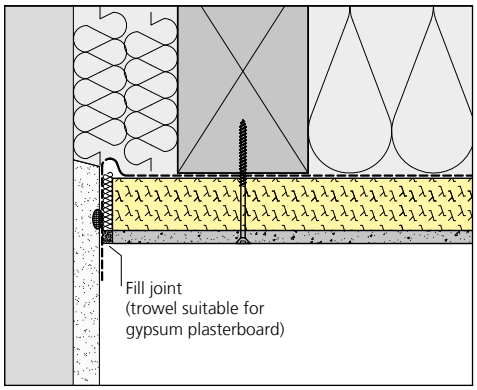
1. Installation and air-tight gluing of the LINITHERM L+D film. Sticking to the plastered wall (e.g. using adhesive compound).
Loop formation can absorb building movements.



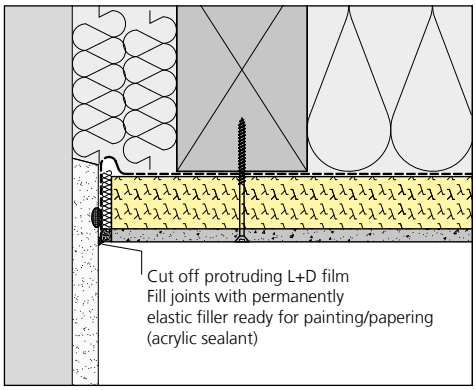
2. The LINITHERM PAL GK elements are fastened in the rafters using Troko screws. The cavity is foamed.



3. Protruding residues can be cut of when the foam has set. The joint should be open in the thickness of the gypsum plasterboard.
The connections are subsequently filled.



4. The protruding L+D film can be cut off as soon as the filler has hardened. The connection is foamed e.g. with acrylic sealants.



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Installation of LINITHERM PAL GK - connection to exposed ridge beam

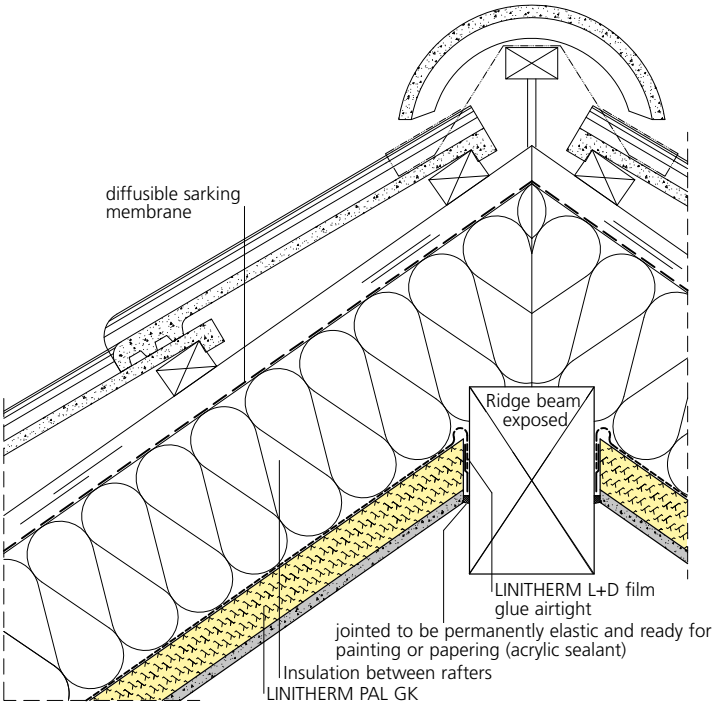
I-F ridge

Connection visible ridge beam

In the case of an exposed ridge beam, the LINITHERM insulating elements are installed longitudinally, parallel to the beam, row by row from top (ridge) to bottom (eaves, see I-T). The last panel is therefore inserted at an obtuse angle. The first row of panels is adapted to the beam in accordance with the roof pitch.

Cavities are foamed.

The connecting joint is closed such that it is permanently elastic.



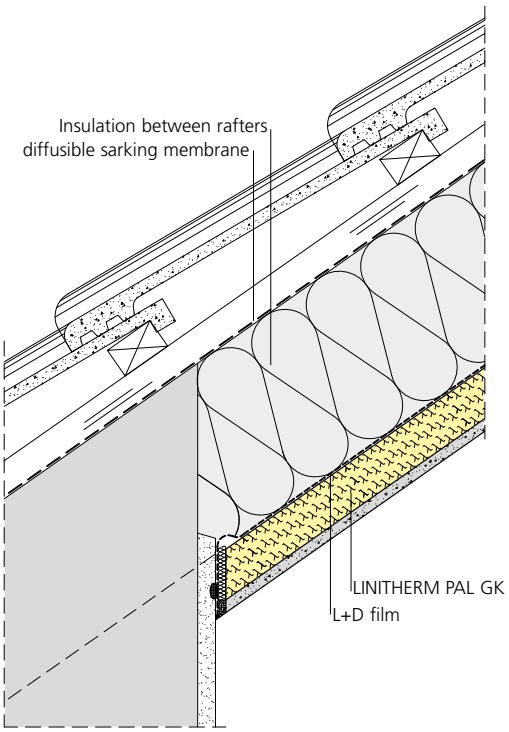
Installation of LINITHERM PAL GK - connection to the eaves area

I-T eaves

In the case of an exposed ridge beam (s. I-F), the LINITHERM insulating elements are installed longitudinally, parallel to the beam, row by row from top (ridge) to bottom (eaves).
In case of a concealed ridge beam or a continuous collar beam roof (see I-KD), the elements can be installed from bottom to top.
The last row of panels is therefore inserted at an obtuse angle.

The bottom-most row of panels is adapted to the wall in accordance with the roof pitch.

Afterwards, waterproofing is performed in accordance with detail sheet I-LD.



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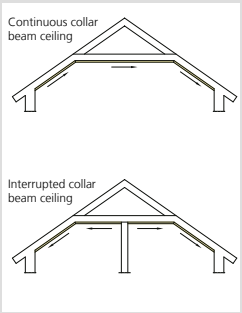
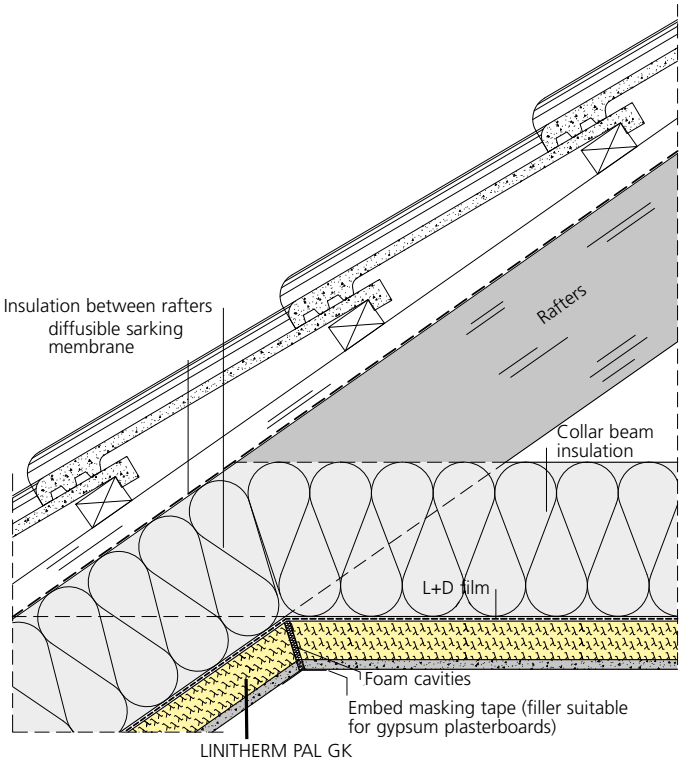
I-KD collar beam ceiling

Installation direction



Installation of LINITHERM PAL GK - connection to the collar beam ceiling

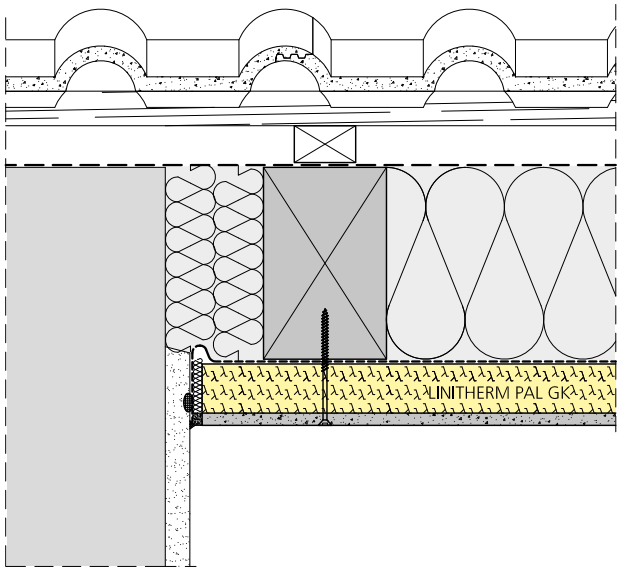


The LINITHERM insulation elements are installed from bottom (see I-T) to top on one side of the roof in the case of a continuous collar beam roof, then attached in the ceiling area, and subsequently installed on the opposite roof inclination from the ceiling transition in downward direction (see I-T).

If the collar beam ceiling is interrupted by the wall, installation takes place beginning at the wall, first towards the roof inclination, then in the direction of the eaves (see I-T).
The last row of panels is therefore inserted at an obtuse angle.
The elements are cut at a bisecting angle at the transition between the roof and the collar beam ceiling.
The cavity is foamed with LINITHERM spray foam.
The joint is smoothed with filler after setting.
For this purpose paper joint tape is embedded. It must be ensured that sufficient filler is applied to the joint.

I-O wall

Installation of LINITHERM PAL GK - connection to interior/gable wall/verge area



Waterproofing and installation of the LINITHERM insulation elements takes place acc. to detail sheet I-LD and I-A.

In the case of walls with potential vertical penetration (e.g. perforate brickwork, lightweight walls etc), the upper wall connection must be established such that it is airtight.
As an alternative, the L+D film can be pulled though for installation on intermediate walls in such a way that the interior walls end there.

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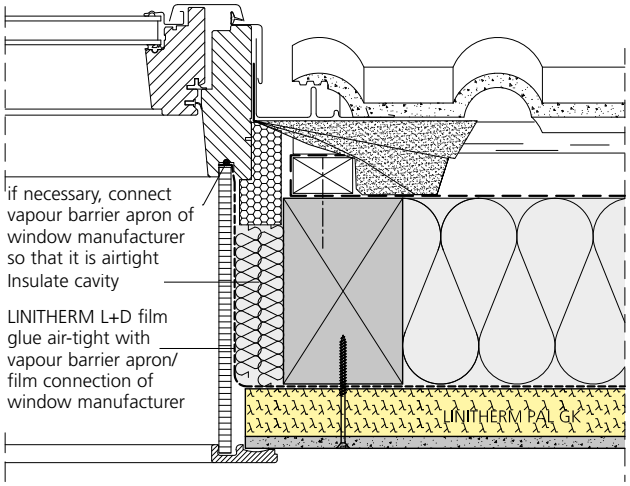
Installation of LINITHERM PAL GK - connection to roof surface windows

I-DFF

The cavity between the skylight liner and the rafters/ transition is insulated.
The airtight connection between LINITHERM L+D film and the vapour barrier apron or film connection must be established prior to the installation of the LINITHERM L+D elements.
Overlaps must be stuck so that they are air-tight.
Depending on the brand, the vapour barrier apron or film connection must be joined to the window frame so that it is air-tight.
The insulating elements are cut to size, attached and filled in accordance with the skylight liner.
The skylight liner is subsequently installed.
An absolutely correctly attached vapour barrier and supplementary thermal insulation is necessary and must be precisely applied.
The specifications of the skylight manufacturer must be additionally observed.



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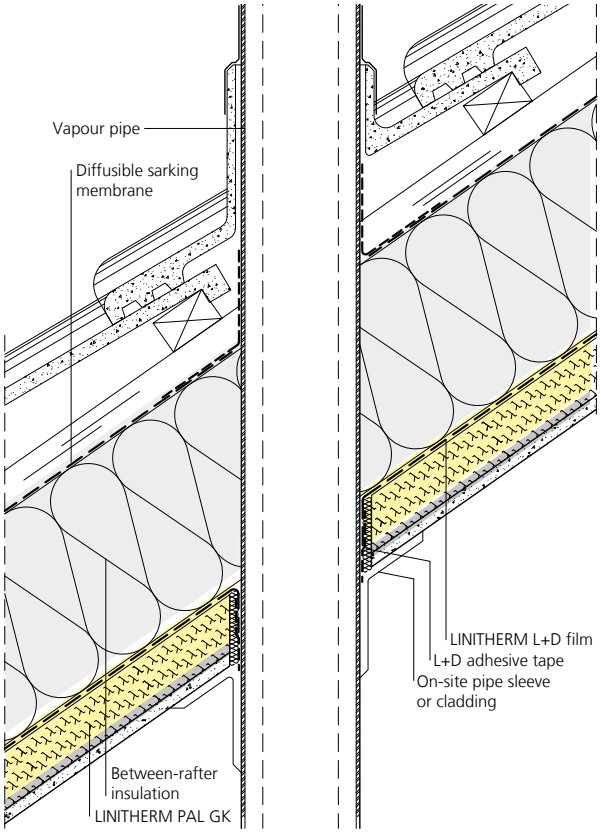
I-DR

Installation of LINITHERM PAL GK - connection to vapour pipe

The LINITHERM L+D film is stuck to the vapour pipe with L+D adhesive tape so that it is airtight.
Depending on requirements, the insulating elements are cut out slightly larger than the diameter of the pipe.
The cavity is foamed with LINITHERM spray foam.
Cut off any overflowed foam after setting.

A pipe collar or on-site cladding is used as a cover.



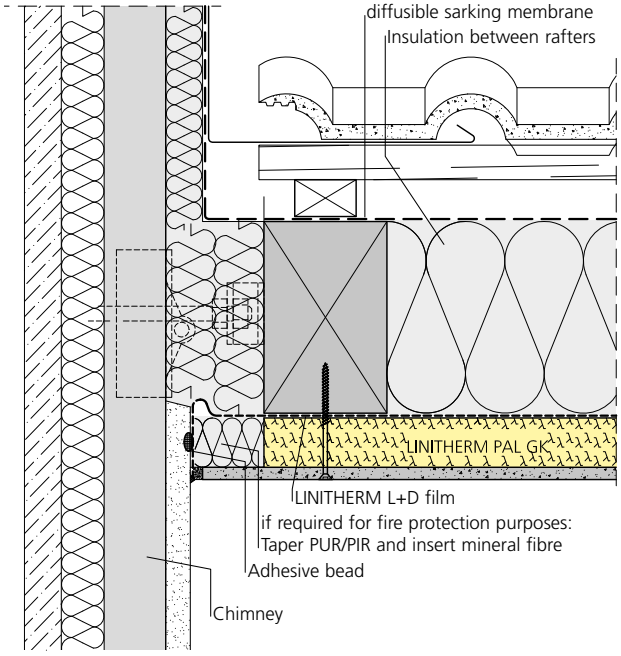
I-K chimney

Installation of LINITHERM PAL GK - connection to chimnney

If required for fire protection reasons, the PUR/PIR insulation of the LINITHERM elements at the chimney connection are tapered accordingly and non-flammable insulating material must be inserted in this area.

Waterproofing and installation of the LINITHERM insulation elements takes place acc. to detail sheet I-LD and I-A.

The respective Landesbauordnung (German regional building law) and the specifications/information of the chimney manufacturer and the responsible sweep must be observed.



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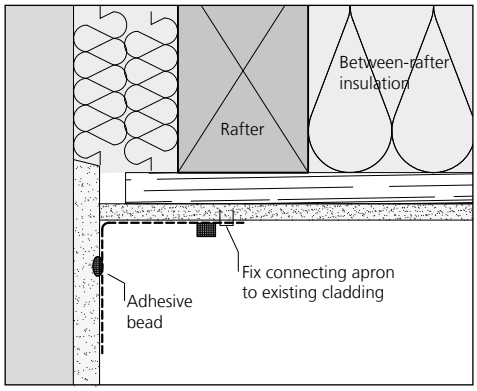
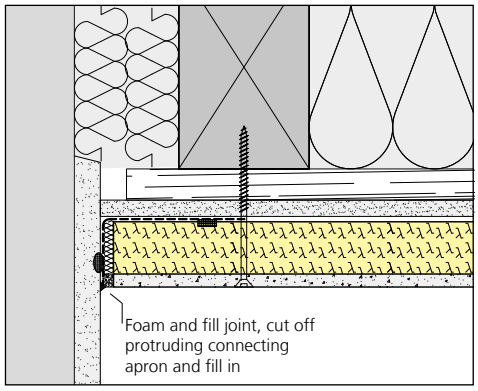
I-AS

Establishment of air tightness with the LINITHERM connection apron in old buildings with existing gypsum plasterboard or wood-wool building board cladding.

Drawings 1 – 2 show the establishment of air tightness based on the example of a connection of the LINITHERM PAL GK insulation system to a gable wall. It is assumed that air-tight plastered brickwork is available and airtight ceiling surface construction (e.g. smoothed gypsum plasterboard, plastered Heraklith ceiling...).

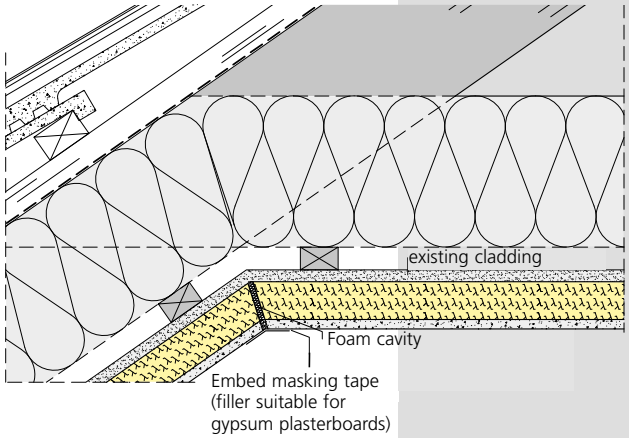


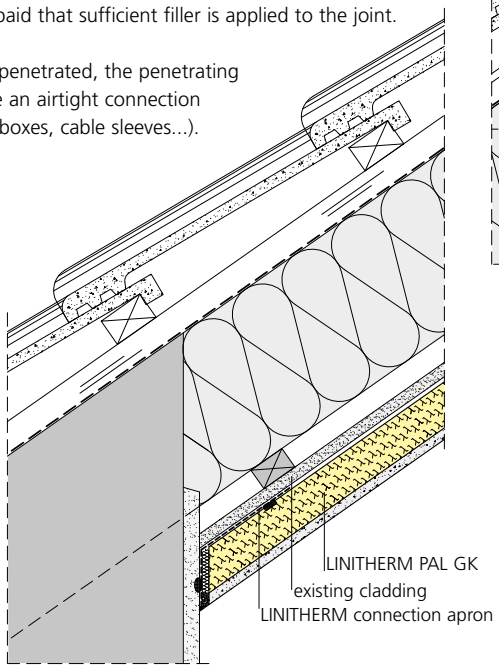


The airtight connection to rising components (gable wall, jamb wall, chimney...) must be established prior to the installation of the elements in accordance with the following procedure:
Fixation of the LINITHERM connection apron to the protruding lobe. The Compriband faces towards the room.
Application of an adhesive bead to the plastered brickwork. Pressing of the LINITHERM connection apron to the adhesive bead.
The connection aprons are glued together airtight in room corners and at joints.

The LINITHERM PAL GK elements are fastened in the rafters using Troko screws. The cavity is foamed. Protruding foam residues can be cut off after the foam has set. The joint should be open in the thickness of the gypsum plasterboard. The connections are subsequently filled.
The protruding connection apron can be cut off as soon as the filler has hardened.
The connection is foamed e.g. with acrylic sealant.
The elements are cut at a bisecting angle at the transition between the roof and the collar beam ceiling. The cavity is foamed with LINITHERM spray foam. The joint is smoothed with filler after setting. For this purpose, paper joint tape is embedded.
Attention must be paid that sufficient filler is applied to the joint.

If the elements are penetrated, the penetrating elements must have an airtight connection (airtight cavity wall boxes, cable sleeves...).





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Special installation instructions for element type LINITHERM PAL GKL with integrated lathing

I-IL

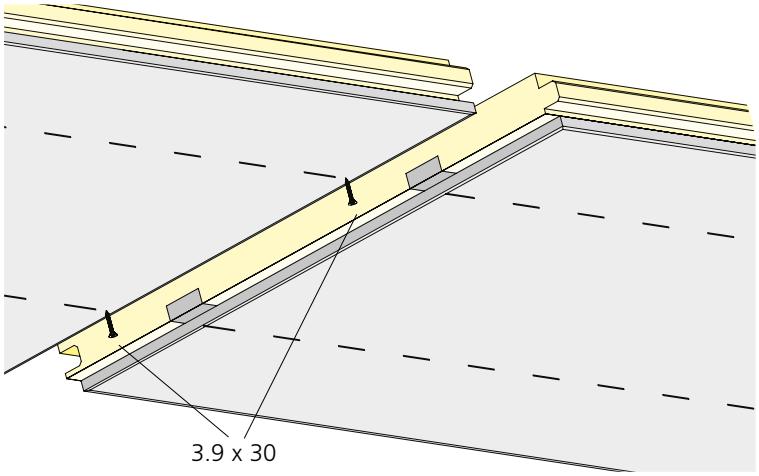
Screw fastening of the elements

Fastening and alignment of the elements takes place to each rafter, in the area of the integrated slat respectively (marked on the surface) with LINIFIX adjustment screws for PAL GKL with integrated lathing. The penetration depth of the screws into the rafter is approx. ≥ 40 mm. The screw length depends on the evenness of the rafters. Tolerances up to approx. 30 mm can be compensated.

The adjustment screws are screwed into the elements so that they are slightly recessed. For alignment purposes, the screws are unscrewed until the surface of the elements is level. In case of large unevenness, screws positioned next to one another must be unscrewed alternately.
As an alternative, the use of spacer screws is possible. The specifications of the Linzmeier Company must be observed here.

Screw fastening Transversal joint

At the transversal joint, the elements are screwed to the integrated lathing through the panel overhang with gypsum plasterboard using 2 dry wall screws (3.9 x 30).



Installation

Installation takes place as described for LINITHERM PAL GK.
LINITHERM L+D film is installed and stuck in advance to provide air tightness.

smoothing with filler

Smoothing of the connections, joints and screw heads with filler takes place using a suitable trowel as is usual for gypsum plasterboard.
Masking tape must be integrated at the panel joint if the elements are to be plastered or painted at a later date.

Note:
As the roof/wooden structure is exposed to a certain amount of tension due to wind and snow loads and deformation of the rafters/beams, the formation of cracks cannot be totally ruled out.

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