



**LINZMEIER**

Insulate with system

Thin, light, safe – the high performance insulation for roofs with a lightweight metal construction

Lightweight industrial roofs

**LINITHERM®**

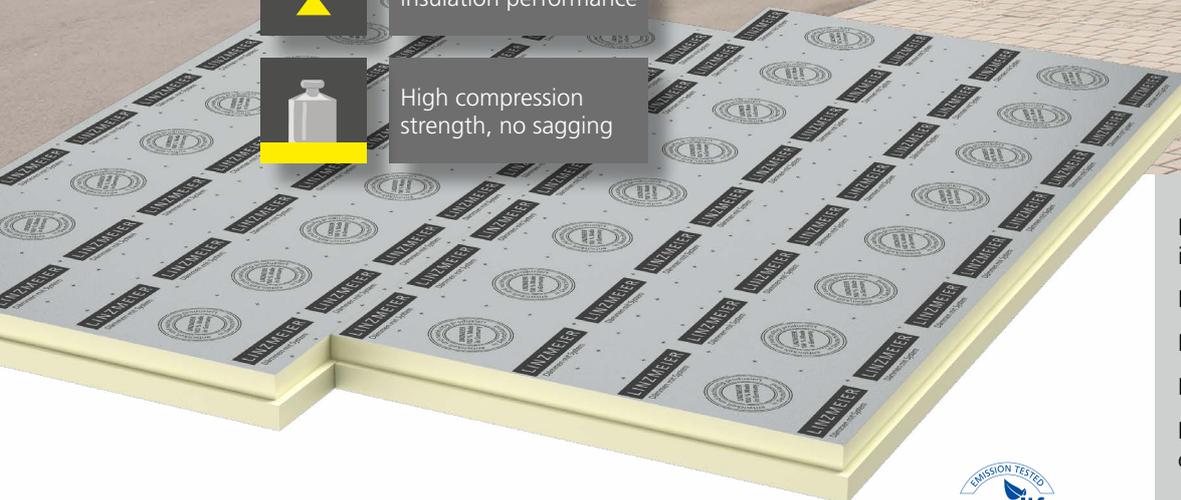
PAL FD



Thin insulation, high insulation performance



High compression strength, no sagging



LINITHERM, the high-performance insulation material –  $\lambda_D$  0.022 W/(mK)

Beneficial fire protection properties

Dimensionally precise and stable

Low weight

For new buildings and renovation of old buildings



Meets the QNG requirements for prevention of hazardous substances in insulants. "pure life" is a seal of approval issued by the UGPU association.

[www.Linzmeier.de](http://www.Linzmeier.de)

# LINITHERM – the high performance insulation for lightweight industrial roofs



LINITHERM insulation systems combine maximum thermal insulation performance with a minimum panel thickness, high pressure-resistance, low weight and good fire protection properties

When constructing industrial buildings and warehouses, sports and exhibition centres as well as office and administration buildings, lightweight steel construction techniques are being used more and more often. A decision with an economical aspect: Steel profile roofs are easy and cheap to implement. At the same time the choice of insulation material plays an important role. From an economical point of view, it is not only the price of the insulation material but the overall costs which are decisive.

## Economic and future-proof insulation

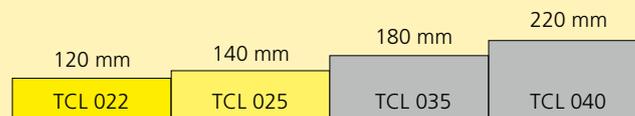
LINITHERM is made of PU rigid foam, a polyurethane synthetic material with all the advantages for energy efficient building. Its innumerable, tiny cells ensure that heat and cold can only penetrate extremely slowly. Thanks to its low thermal conductivity and thus its high insulation performance, PU is particularly effective with low material thicknesses. Therefore it is easy to adhere to the legal limits or to insulate future-oriented.

## The advantages for builders and renovaters

- Low thermal conductivity and thus a high insulation performance
- Reduced heating costs in winter
- Less energy used on air conditioning in the summer
- Quick and easy to handle
- Low weight
- Pressure resistant
- Good structural physical properties
- A long life span which generally corresponds to the life of the building
- An excellent energy balance as the energy expenditure for the manufacture is usually amortised within one heating period.
- 100% recyclable – both production waste and waste from disassembly

### Insulation material thickness in direct comparison at the same level of performance

U-value = 0.18 W/(m<sup>2</sup>K)



\* Thermal conductivity coefficient U takes the thermal resistance (  $R_{sj} = 0.1 \text{ m}^2\text{K}/\text{W}$  und  $R_{se} = 0.04 \text{ m}^2\text{K}/\text{W}$  ) into account.

Already 120 mm PU rigid foam with a TCL of 022 achieves an U-value of 0.18 W/(m<sup>2</sup>K). Insulation material of TCL 035 must be 180 mm to achieve the same performance. Due to the extremely high insulation effect of PU rigid foam a leaner roof construction is achieved.

Thin insulation layers have many constructive advantages: e.g. the connection heights on the roof edges are lower, rooflight dome flanges can be implemented in a thinner design. Above all PU rigid foam demonstrates its supremacy in the refurbishment of existing buildings.



## Fire protection - tested and approved

Fire protection properties play an important role when it comes to planning and designing industrial roofs. The roof construction is to be seen as a system. Only vague conclusions regarding the fire behavior of the entire roof can be drawn from the fire protection properties of the individual function layers. In the event of fire it comes down to the interaction of the various building materials. In a test carried out at the University of Karlsruhe, PU insulation material displayed very advantageous fire behaviour. PU is of low flammability, can withstand high temperatures for a long time and at the same time retains its thermal insulation properties. It does not drip as it burns and does not smoulder or melt. This means the dangers of burn through and thus the spread of fire is greatly reduced.

## Sustainable insulation

Additionally PU rigid foam is characterised by its durability, dimensional stability and temperature resistance. Its positive properties always remain constant for as long as the buildings stands (50 years and more). No maintenance and consequent costs.

Insulation with PU also ensures an excellent energy balance as the energy expenditure for the manufacture is usually amortised within one heating period. Production waste and clean waste created by deconstruction can be 100 % recycled

## Homogenous thermal insulation layer

The PU rigid foam core is clad on both sides with aluminum foil. It acts as both an outer surface and electrosmog protection. The edges of the LINITHERM insulation elements for lightweight industrial roofs are designed all the way round as graded notches. This makes laying easy and safe and a perfectly homogenous insulation layer is guaranteed.

## Good pressure resistance

LINITHERM insulation materials are very pressure resistant. Even under repeated pressure, no dents or grooves arise which could be filled with water when its raining. Damage to the sealant is thus also avoided.

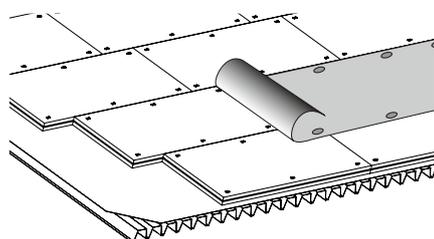
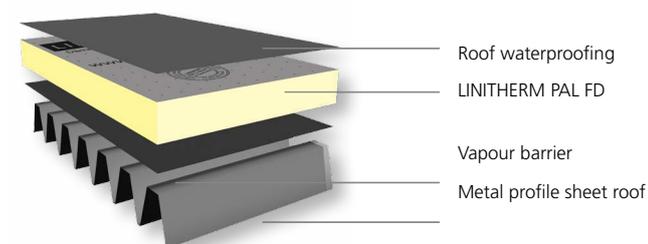
**LINITHERM PAL FD**  
fulfils the requirements of the fire protection regulations for lightweight industrial roofs according to DIN 18234 part 1



# LINITHERM® PAL FD – lightweight insulation for lightweight roofs

With a density of approx. 33 kg/m<sup>3</sup> these insulation elements are extremely light. Due to this low weight the substructures of old buildings are usually sufficient. When it comes to new buildings, the load carrying system can be more leanly designed. Even large insulation panels (2400 × 1200 mm) can be laid with little effort. They can be precisely cut and screwed using standard woodworking tools. This reduces installation costs.

## Construction sketch lightweight industrial roof



**Installation instructions:**  
Place the insulation board with the labelled side facing upwards and attach them with 6 or more fixing elements per board. The plastic membrane is attached mechanically according to the manufacturer's instructions for the respective sealing system.

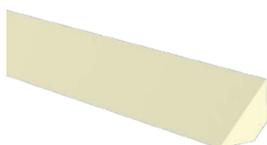
### LINITHERM PAL FD

Insulation core	PU rigid foam acc. to EN 13165, fire behavior class E acc. to EN 13501-1, coated with aluminum film on both sides, low-glare on one side
Edge joints	Round about rebated joint
Overall dimension	2440 × 1200 mm (= calculation measurement) (coverage with rebated joint is 2 cm smaller)

Thickness mm total	Quantity per pallet Piece	m <sup>2</sup>	λ <sub>D</sub> W/(mK)	U-value** [W/(m <sup>2</sup> K)]
80	30	87.8	0.022	0.26
100	24	70.3	0.022	0.21
120	20	58.6	0.022	0.18
140	17	49.8	0.022	0.15
160	15	43.9	0.022	0.13
*180	13	38.1	0.022	0.12
*200	12	35.1	0.022	0.11

Other thicknesses upon request.

## Accessories



### LINITHERM PUR wedge Attica-wedge (trapezoidal)

Insulation core	PU rigid foam acc. to EN 13165, fire behavior class E acc. to EN 13501-1
Length	1200 mm

Measurement mm	Quantity per package	λ <sub>D</sub> W/(mK)
50 × 50	100	0.028
80 × 80	72	0.028
100 × 100	50	0.028

Full wedge or other thicknesses upon request/Delivery only in full packages.

### LINITHERM PE vapour control layer 220

PE vapour control layer according to EN 13984, suitable for new buildings and restoration, s<sub>d</sub>-value 220 m ± 10, of low fire load, fire behavior class E, weight 210 g/m<sup>2</sup> ± 10, colour grey

Width / m	Length/m	Size/Roll m <sup>2</sup>	Unit of quantity/UQ
4	25	100	m <sup>2</sup>

\* Might have longer delivery times.  
\*\* U-value calculation takes the thermal resistances R<sub>si</sub> = 0.1 [m<sup>2</sup>K/W] and R<sub>se</sub> = 0.04 [m<sup>2</sup>K/W] into account. Building-specific characteristics for example as per DIN EN ISO 6946 are not taken into account.

Optimal cold protection

Optimal heat protection

Moisture resistant

Thin & maximum insulation

Easy & pressure resistant

Odorless & physiologically safe

Recyclable

Positive building biology.

Cuts costs, ensures excellent ROI

Protection against electric smog.

Beneficial fire protection properties – meets the fire safety requirements according to DIN 18234-1

## LINZMEIER

Insulate with system

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