

**LINITHERM®**

insulation systems

**LINZMEIER**

building elements

Lightweight industrial roofs

■ PAL FD

■ PGV FD



# LINITHERM - thin, light, safe - the high performance insulation for roofs with a lightweight metal construction

LINITHERM PAL FD and LINITHERM PGV FD provide maximum thermal insulation with a minimum panel thickness and are therefore ideal insulation for lightweight industrial roofs.



For new buildings and old-building renovation

Beneficial fire protection properties

Thin insulation, maximum effect

Low weight

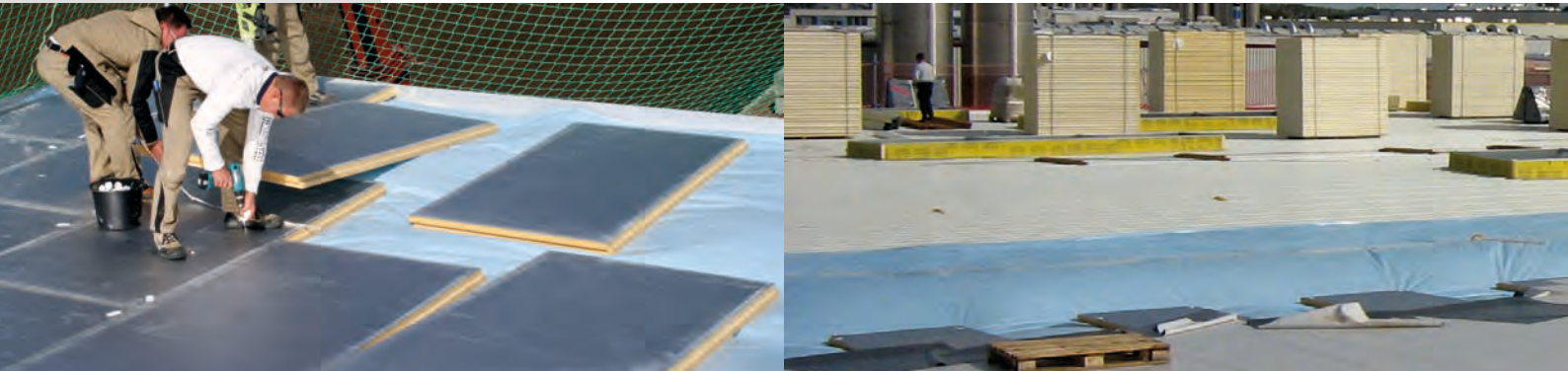
Quick and easy to lay

**The safe insulation...**  
Excellent insulation values for decades to come  
Does not decompose  
Beneficial fire protection properties

**...for new buildings and old-building renovation...**  
Existing connections do not need to be changed  
Low weight - old substructures are usually sufficient

**...in perfect professional quality...**  
Light and manageable  
Inherently stable  
High pressure resistance

**... for PUR(e) saving energy**  
Thermal protection in the winter, protection from heat in the summer  
Insulation core made of PUR/PIR rigid foam  
Environmentally friendly building material:  
Free of fibres



## LINITHERM - the high performance insulation for lightweight industrial roofs

- 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
- Good pressure resistance
- Good structural physical properties

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

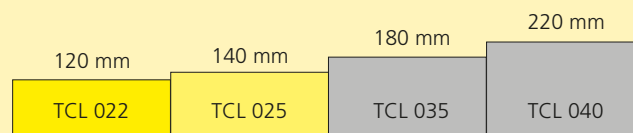
When constructing industrial buildings and warehouses, sports and exhibition centres as well as office and administration buildings, lightweight steel construction techniques are being used more and more often. A decision with an economical aspect: Steel profile roofs are easy and cheap to implement. 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 PIR 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, PIR is particularly effective with low material thicknesses. Therefore it is easy to adhere to the legal limits or to insulate future-oriented.

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

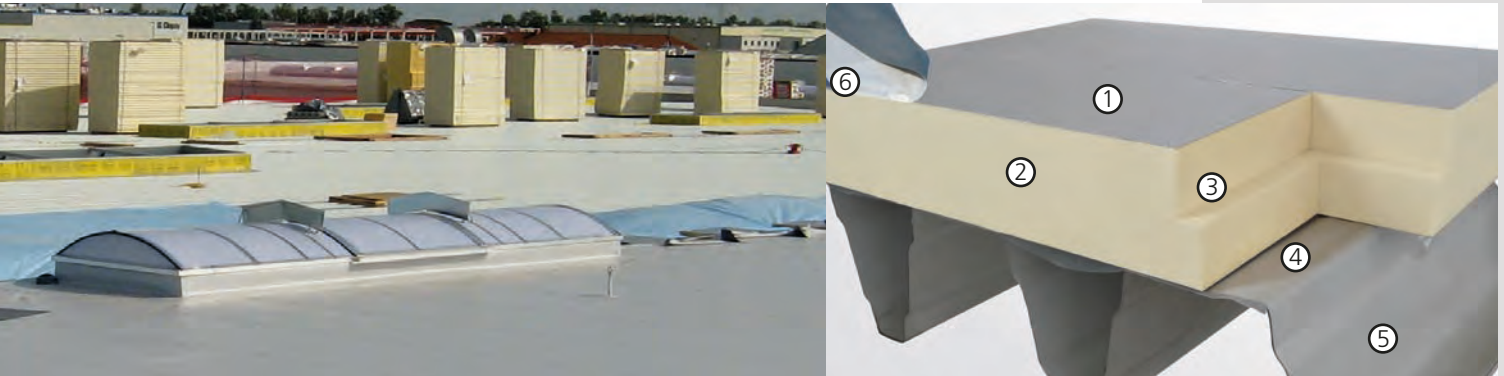
U-value = 0.18 W/(m<sup>2</sup>K)



Already 120 mm PIR 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 PIR rigid foam a leaner roof construction is achieved.

\* Thermal conductivity coefficient U takes the thermal resistance (R<sub>si</sub> = 0.10 m<sup>2</sup>K/W and R<sub>se</sub> = 0.04 m<sup>2</sup>K/W) into account.

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 PIR rigid foam demonstrates its supremacy in the refurbishment of existing buildings.



1. Aluminium outer surface, 2. PIR insulation material, 3. Graded notches, 4. Vapour barrier, 5. Steel profile sheet, 6. Roof waterproofing

### Sustainable insulation

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

Insulation with PIR 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.

### 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 (2440 x 1200 mm) can be laid with little effort.

They can be precisely cut and screwed using standard woodworking tools. This reduces installation costs.

### Homogenous thermal insulation layer

The PIR rigid foam core is clad on both sides with aluminium foil. It acts as both an outer surface and electro-smog 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.

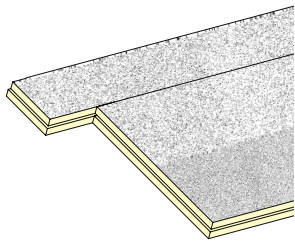
### Good pressure resistance

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.

### 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 behaviour 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, PIR insulation material displayed very advantageous fire behaviour. PIR 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.

- Good fire protection properties - fulfil the requirements of fire protection according to DIN 18234-1
- 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

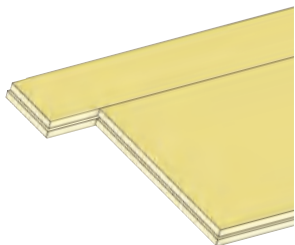


### LINITHERM PAL FD

**Insulation core:** PIR rigid foam according to DIN EN 13165, class E, with aluminum foil on both sides  
**Edge joints:** round about graded notches  
**Please note:** vapour barrier to be fitted on site  
**Overall dimension:** 2440 x 1200 mm (= calculation measurement) (covered measurement with graded notches 2cm smaller)

Thickness mm PUR/PIR	Package Qty.	Package contents m <sup>2</sup>	TCL PUR/PIR	U value * [W/(m <sup>2</sup> K)]
80	30	87.8	022	0.27
100	24	70.3	022	0.21
120	20	58.6	022	0.18
140	17	49.8	022	0.15
160	15	43.9	022	0.14
180	13	38.1	022	0.12
200	12	35.1	022	0.11

other thicknesses on request



### LINITHERM PGV FD

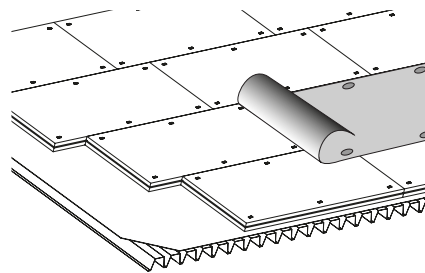
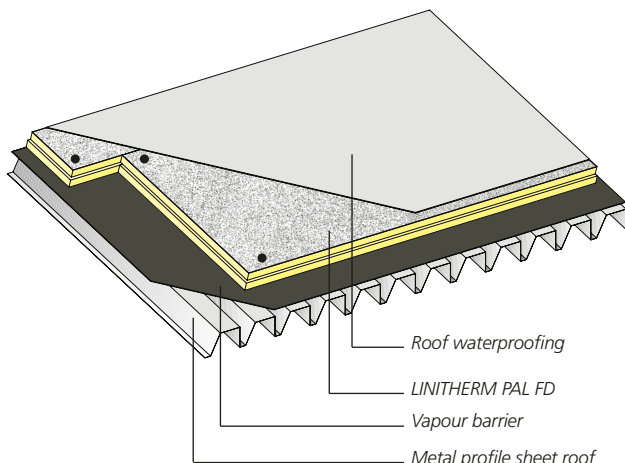
**Insulation core:** PIR rigid foam according to DIN EN 13165, class E, with mineral fleece on both sides  
**Edge joints:** round about graded notches  
**Please note:** vapour barrier to be fitted on site  
**Overall dimension:** 2440 x 1200 mm (= calculation measurement) (covered measurement with graded notches 2cm smaller)

Thickness mm PUR/PIR	Package Qty.	Package contents m <sup>2</sup>	TCL PUR/PIR	U value * [W/(m <sup>2</sup> K)]
80	30	87.8	026	0.31
100	24	70.3	026	0.25
120	20	58.6	025	0.20
140	17	49.8	025	0.17
160	15	43.9	025	0.15
180	13	38.1	025	0.14
200	12	35.1	025	0.12

other thicknesses on request

Construction sketch lightweight industrial roof

\* Thermal conductivity coefficient U takes the thermal resistance (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). Object-specific features according to DIN EN ISO 6946 are not taken into account.



LINITHERM PAL FD and LINITHERM PGV FD fulfil the requirements of the fire protection regulations for lightweight industrial roofs according to DIN 18234 part 1



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