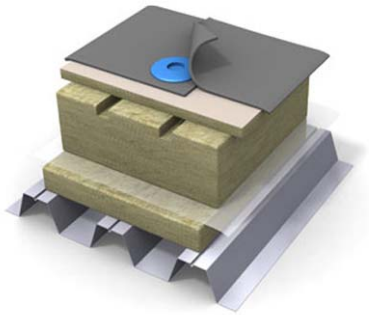
Flat Roofs Insulation

Design and Handling Guideline



Choice of product

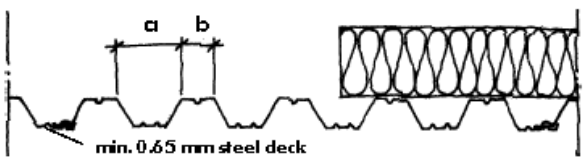
Insulation of flat roofs is to be carried out using Paroc Roof System. PAROC ROS 50t or PAROC ROB 80/PAROC ROB 60t and PAROC ROS 30/PAROC ROS 40.
The choice of product is the same regardless of whether the liner is sealing board or roof canvas. In addition, it is independent of the foundations, which can be made from sheet metal, concrete, light concrete or wood.

The foundation

Sheet metal

Trapezium-profiled steel sheet metal of thickness 0.65 mm and greater as well as aluminium sheet metal with a minimum thickness of 0.9 mm can be used.
The sheet metal must be cleared of snow, wood residues etc.

Roof slabs on pallets are placed above the bearer on underlay so that the sheet metal does not become damaged. The storage of materials on ready-insulated roofs must be avoided as far as possible.



Insulation thickness mm	Standard installation a mm	Joint on top of profile a mm	For every profile b mm
20	120	120	35
50	120	170	35
80	180	220	35
100	200		35
120	220		35

Wood, concrete, light concrete

Water and snow are to be removed before the sheets are laid. The evenness of concrete floor structures must as a minimum be equal to that of planed concrete. There is to be a 1:15 taper between the elements.

Vapour barrier

Vapour barrier must be used for all types of flat roofs. The vapour barrier is to be made of roofing felt or 0.20 mm non-ageing plastic foil. The plastic foil should overlap the joins sufficiently so that it is secured over at least the width of a crest. On foundations other than sheet metal, the plastic foil must overlap by at least 200 mm. Serious damage such as tears and holds will be caused by over covering with new plastic film.

Roof work
Follow the safety regulations carefully. Place passageways on surfaces subject to traffic, for both the roof work and for permanent use. Damaged material must be replaced before final completion. Non-flammable stone wool simplifies the joining of liners for all types of liners and other types of hot work on roofs.

Wind load
The load that dimensions the abutments of the roof is the wind load. Dimensioning is carried out in accordance with local and national regulations. The result of the dimensioned wind load is similar regardless of which country's regulations have been applied.

Mechanical fixings
Mechanical fixings refer mainly to the use of self-boring screws in sheet metal and wood or expanding securing devices of concrete/light concrete. The telescope effect of securing devices is to be at least 20%. Screws for sheet metal are chosen at least 20 mm longer than the thickness of the insulation. The following minimum number of securing points applies:

AREA	Numbers/m²	Max.distance, both directions; mm
Middle zone	1	1000
Edge zone	2	700
Corner zone	3	600

The washer must be at least 75 mm for board coverings and 45 mm for tissue. Refer also to the instructions from the manufacturer of the securing device.

Insulation

Handling, storing and packaging
Boards and slabs are delivered on disposable wooden pallets with or stone wool supports that are intended to be handled using forklift trucks. The design of the pallets requires an even foundation. The packaging consists of stretch film that allows them to be stored out of doors without the need for covering.

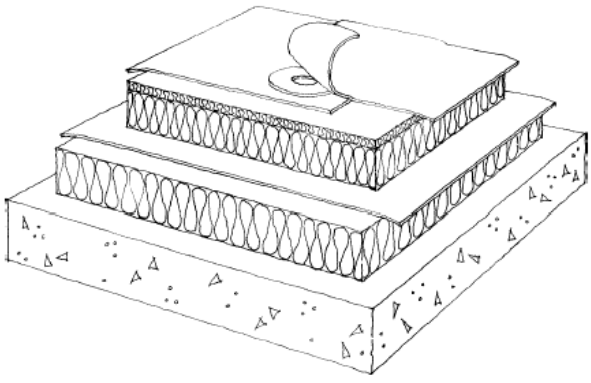
Insulation work
Laying must be carried out carefully and without any gaps between slabs or at connections. The meeting of 4 corners should be avoided. The joints are staggered between the insulation layers. For two layers of insulation, these are to be laid immediately after one another.
Restrict the amount of pedestrian traffic on the insulation during its laying. Where there is frequent pedestrian traffic, gangplanks are to be put down, either permanently or just for the duration of the construction work. Cover the laid insulation and opened pallets at night. A moderate amount of moisture during the laying can be acceptable. The moisture will slowly dry out due to the open structure of the insulation.
Insulation slabs can be transported to the roof using brick carts. Pitch forks can be used to lay the insulation. One man can normally lift and carry the slabs. The insulation is cut using knives along straight edges or sawed using a handsaw. Holes can be gradually made using knives. The roof slope and drainage groove wedges are laid according to the accompanying diagrams or our brochures.

Ventilation
A roof construction using stone wool slabs must be designed so as to enable pressure equalisation to be carried out. For example, through holes in the edge stud Ø 20 mm with C 2000 mm.

Ventilation covers are never used for roofs that do not have tracked insulation
(PAROC Air).

1 pallet of roof board weights approx. 600 kg. Half pallets weigh approx. 300 kg.
1 pallet of under slabs weights approx. 200 kg.
The labelling on the pallet states the optimum distance between pallets when placing on the roof.

Supplementary insulation
The recommendations for the insulation when laying new insulation (from the previous side) apply without exception even for supplementary insulation. Moreover, it is also recommended that any blisters in the old layer are cut out and levelled off. For thin supplementary insulation of 17-20 mm or when finishing off with just the drainage gutter wedges, the old layer must be completely dry (dried out) so that no moisture problems occur with the new layer.
For supplementary insulation, the fastening must always be test drawn when the foundation is of light concrete.



Paroc Air

Air barrier
Air barriers are to be mounted toed-in on top of 50 mm PAROC ROS 30, with a minimum 200 mm overlap.

Installation of grooved insulation
The upper part of the sheet PAROC ROS 40g is fitted with a system of tracks, partly in the form of the tracks that are present upon delivery, partly in the form of transverse channels that are cut into the insulation during laying. The slab is laid with the tracks facing upwards in the direction of fall. During assembly the tracks are visible for easier fitting into the joints. Connecting channels are cut at obstacles such as roof windows or fire hatches. The obstacle breaks the track, but connections in the side allow air to pass. For larger roofs that are in several sections, transverse channels must also be cut into the valley gutters so that the airflow can be balanced over the entire roof surface. During assembly of the layer, ventilation with under pressure is to be assembled above the transverse tracks.

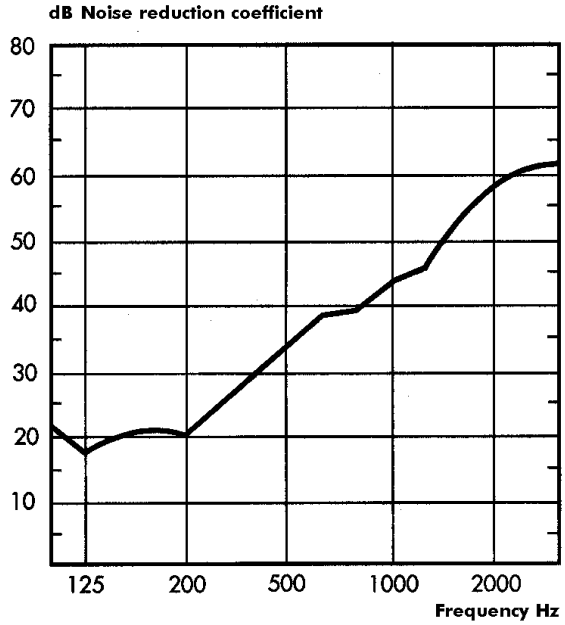
Air in
Air intake is initially arranged into borders. Alternatively, the air can be taken in through hoods that have been placed approx. 1 m from the border. The C distance longitudinally is 10-12 m.

Air out
The ventilation hoods are placed in ridges. A transverse track, 100 mm wide and 20 mm deep, is cut into the insulation along the ridge. The ventilation hoods are placed above this track at every 6-8 m. Under the hoods, holes are made in the roof board with Ø 100 mm, for contact with the tracks.

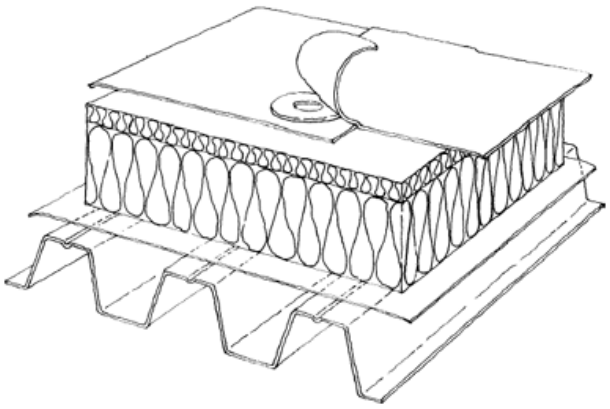
Passing the obstacles
Transverse tracks are also made below the obstacles so that the air can pass at the side. These tracks are also made 100 mm wide and 20 mm deep.

Ventilation hoods
Ø 100, height 400 mm.

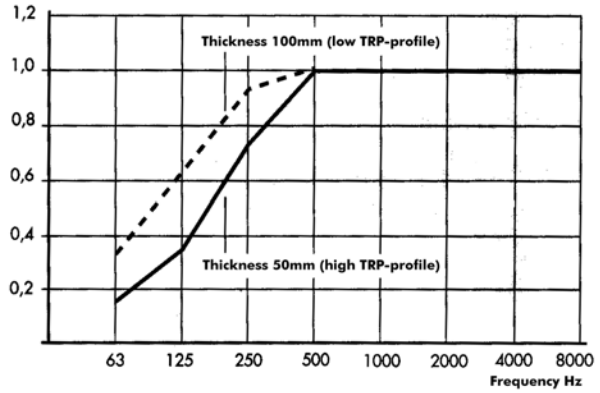
Paroc roof system, general properties



Noise reduction for 20mm PAROC 80 t + 130 mm PAROC ROS 30 on Plannja TRP 200.



Sound absorption
In order to satisfy the demands placed on noise attenuation, all premises that contain noisy activities must in practice be fitted with sound-absorbing material in the roof. Stone wool has an absorption factor close to 1.0 for medium and high frequencies. For low frequencies, thicknesses greater than 50 mm are required for good absorption. For extremely low frequency noise, large air gaps are required above the absorbers. These are mounted in a countersunk, visible supporting structure.



Practically useful absorption factor.

Diffusion figures, moisture

Sheets of PAROC stone wool have such an open structure that diffusion resistance often lacks significance. If very accurate calculations are required, the value for PAROC ROB and PAROC ROS 50 or higher can be set at 0.25 mg m/h N.
All stone wool products are capillary breaking and water repellent, which is important not least in the building stage. Rocky products can be assembled even when raining and the open structure allows for fast drying of the building moisture. However, please note that all insulation must be covered if the site is left unattended, at night for example.

Asphalt adhesion

PAROC ROB 80 and PAROC ROS 50 both have a relatively low splitting strength. Energy transferring mounting using warm asphalt must ageing and model approved. Air/vapour blocks can also be constructed using roofing membrane.

Double-insulated roofs

In order for the roof to function properly it is important that the upper side is airtight. This also applies to double-insulated roofs. The following applies to double-insulated roofs to prevent condensation on the plate.

A) For premises where the vapour pressure is <1, 15 kPa, the thickness of the rumble plate must not exceed 50 % of the total thickness.
B) Where vapour blocks are used, the corresponding percentage must not exceed 30%. The upper side of the roof is then to be constructed to allow for pressure equalisation.
The principles of double-insulated roofs can also be applied to concrete and light weight concrete. Note that the thickness that can be used is limited due to risk of condensation.

Fire

External insulated roofs on industrial buildings on just one level are not covered by the requirements for fireproof or fire-retardant buildings. Please note, however, that in certain circumstances a non-flammable foundation is required for board. For outer roofs of light construction, i.e. externally insulated trapezium-profiled steel sheet metal, local building regulations apply.

Concrete and gas concrete roofs

For roofs using concrete or gas concrete, the fire class is determined by the fire class of the bearing material. For concrete, 80 mm construction concrete – insulated with PAROC ROS 50 on the upper side – is to have fire class R 60 and 120 mm concrete fire class R 120.

Spreading fires

PAROC ROB 60 is to be used in order to prevent the spread of spreading fires; a migration block is also to be used between the PVC canvas and the old board covering.

Hot work

The regulations that apply to high-temperature work on roofs are always easier to comply with when incombustible stone wool is used.

PAROC

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