

ROOF INSULATION UNDER BITUMINOUS CONCRETE:

WITH PEDESTRIAN ACCESS, ROOF GARDENS, CAR PARKS

FESCO SP, FESCO LT, FESCO SP / LT, FESCO DRAIN



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WHY CHOOSE BITUMINOUS CONCRETE PROTECTION?

- Just like for pavements, motorways, car parks etc., bituminous concrete offers attractive finished surfaces that are smooth and joint free, that are more comfortable for car traffic.
- Operator business activities and worksite organisation are made easier by the surface being ready for service 24 hours after the finish coat of bituminous concrete is laid.
- Sizing of slab areas and raised edges are optimised thanks to a reduced total thickness and weight.
- Protection for the waterproofing membrane is provided by the first coat of bituminous concrete which is laid as work progresses; any risk of damaging the membrane through complex superstructures is therefore avoided (granulate layers, plastic sheets, rebars, pouring concrete).
- Bituminous concrete that is “percolated” with cement grout ensures protection against rutting in parking public car park cases (with light vehicles and surfaces of over 1,000m²).
- Maintenance is reduced to a minimum.
- This is an innovative alternative for designers, one that has been successfully tried. The first trials in France’s Rhône-Alpes region are more than twenty years old and are still in fine service condition.

Field of use

- Terrace roofs for public car parks
- Terrace roofs for private car parks
- Terrace roofs for pedestrian areas, living areas of gardens

► **These works can be performed on structural elements with slopes of more than 2% and with thermal insulation:**

- In line with French Thermal Regulations when they cover heated constructions, whether underground or not.
- With a minimum thermal insulation level ($R=1 \text{ m}^2\text{K/W}$) in the case of unheated areas.
- After a vapour barrier has been fitted that is suitable to the hygrometric conditions in the covered areas, in line with their classification: low / average or high hygrometry.

Description of the works

► **The works comprises the following elements (see illustration opposite):**

- Bituminous concrete: Compliant with CPP 07/116 F or its Addenda N°1 depending on the type of traffic envisaged.
- Waterproofing membrane: Compliant with CPP 07/116 F for laying with full adherence or with its Addenda N°2 for laying semi-independently.
- Thermal insulation: In one or more layers and depending on the thermal resistance level required, the type of use, the type of compacting and whether cold or hot gluing is used.
- Vapour barrier: A conventional one compliant with CPP 07/116 F or a liquid one compliant with CPP 07/117 F.
- Reinforced concrete slab: Depending on the load bearing capacity of the reinforced concrete slab.

► **Bituminous concretes can be compacted using a non-vibrating compactor:**



- manually operated with a linear loading of no more than 5 kg/cm



- self-driven with a linear loading of no more than 8.5kg/cm

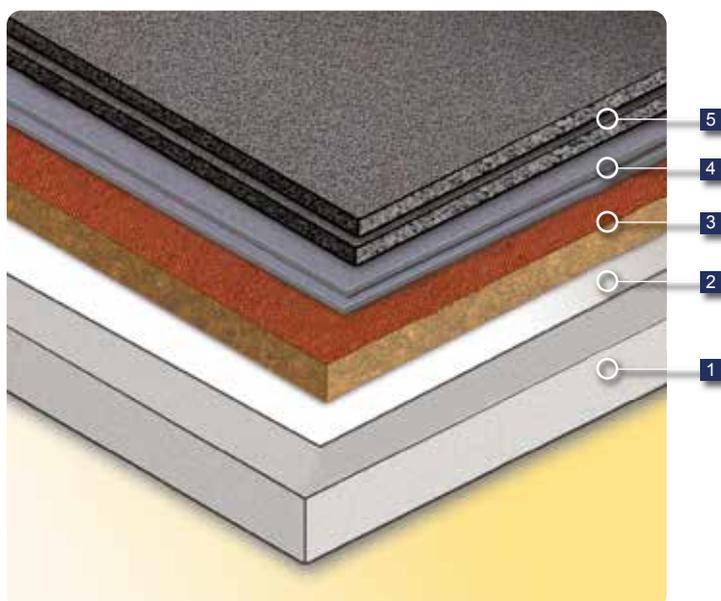
TYPICAL SOLUTIONS THAT DO NOT REQUIRE ADDING HOT BITUMEN

Useage	Public car park light vehicles $S > 1000m^2$	Public car park light vehicles $S \leq 1000m^2$	Private car park light vehicles	Pedestrian terrace roof, living area, garden, sports area			
Bit. concrete 2 nd . coat Bit. concrete 1 st . coat	5 cm "percolated" 5 cm BCSC 0/10	5 cm BCSC 0/10 5 cm BCSC 0/10	5 cm BCSC 0/10 4 cm BCSC 0/6	4 cm BCSC 0/6 4 cm BCSC 0/6			
Compacting mode for the first layer of bituminous concrete							
Waterproofing membrane (1) semi-independent	Welded upper layer Lower layer, 1/2 independent e.g. integrated with Elastophene 25 RSI or Soprastick SI						
Insulation as per Thermal Regulations (2)	Second layer	Fesco SP 4 cm	Fesco SP 4 cm	SP 4 cm	SP 2 cm	SP 4 cm	LT
	Lower layers	Fesco LT	Fesco LT	LT	LT	LT	LT
	INSULATION to protect slabs	Fesco SP/LT	Fesco SP/LT	SP/LT	SP/LT	SP/LT	LT
		4 + 2 cm	4 + 2 cm	4 + 2 cm	2+3,5 cm	4 + 2 cm	5 cm
Affixing insulation	SOPRAVAP 3/1 (also providing a vapour barrier function) for the first or single bed or SOPRAVAP 3/1 in the case of a welded vapour barrier or for upper beds						
Vapour barrier	SOPRAVAP 3/1 (only for areas with low to medium hygrometry) or Welded vapour barrier on EIF primer						

(1) Alternative when laying the insulation with hot bitumen:

- The insulating panels are glued using hot bitumen onto the welded or hot bonded vapour barrier when a number of layers are used
- The first layer of the waterproofing membrane Elastophene 70-25 or 180-25 or Sopralene 250 is glued using hot bitumen

(2) The Fesco Drain panels may be used as lower or intermediate beds in place of Fesco LT



- 1 Reinforced concrete slab
- 2 Vapour barrier
- 3 Insulating panels
- 4 Waterproofing membrane
- 5 Two layer bituminous concretes

IMPLEMENTATION

▶ The process is implemented in line with its Book of Application Stipulations CPP 07/116 F and its Addenda.

The following general principles apply:

- The insulation panel, in one or more parts is bonded to the vapour barrier using hot bitumen or using a process that does not require hot bitumen, like SOPRAVAP 3/1, which performs three functions (impregnating, vapour barrier and bonding) in line with CPP 07/117 F.
- The waterproofing membrane is a two layer reinforced bituminous elastomere Sopralene Antirock, adhering to the base material or on a first Elastophene 25 RSI or Soprastick SI coat laid semi-independently.
- Thin bituminous concrete (BCT) (without joins) is a type with 0/6 granularity or bituminous concrete, semi-coarse (BCSC) with 0/10 granularity.
- The “percolated” bituminous concrete (with joins) is made from an open bituminous concrete and a suitable concrete grouting.
- Singular points are handles in line with the principles set out in each national rules for concrete structure elements for waterproofed roofs.

The roof may enter service 24 hours after a finish bituminous concrete is laid (BCT or BCSC) or five days after applying a concrete grouting in the case of “percolated” bituminous concrete.

Installation at the worksite

- The insulating panels must be sorted away from damp and kept dry during installation.
- The panels are laid edge to edge and covered with glue.
- Waterproofing must be completed by the end of the day, all around the insulation laid.
- The first layer of bituminous concrete must be laid manually and directly.
- Using any “mini fishing” type tool is only possible for the second layer of bituminous concrete.
- Non vibrating compactors with a loading of up to 8.5kg/cm are only allowed for compacting the second layer of the coating.

For an optimal finished result, we recommend laying the first layer of bituminous concrete as soon as possible so as to effectively protect the waterproofing membrane during the works.

Product Information

The expanded perlite panels are made using natural or recycled raw materials.

The manufacturing process has been awarded the “Clean Technology” prize by the French Ministry of the Environment.

Fesco SP, FescoSP/LT, Fesco LT and FescoDrain product data sheets are available on request.

Other solutions

- *Built-up roofing solutions with rigid insulation boards on profiled-metal decks for new-build and refurbishment*
- *Fire protection layer under expanded polystyrene insulation boards, on profiled-metal roof decks*
- *Built-up roofing solutions with rigid insulation boards on concrete decks for new-build and refurbishment*