

Sun-Activ

Two layer reflective waterproofing system for Cool Roofs



Waterproofing of non-accessible roofs

Installation Manual

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1. General background

1.1 General description

The SUN-ACTIV system is a two-layer waterproofing system for exposed roofs, where the top membrane is the Sun-Activ membrane torch applied to the first waterproofing layer. The first waterproofing membrane can be:

- Mechanically fixed
- Adhesive or thermo-adhesive
- Torch applied.

The accepted bearing elements are realized by concrete deck, Autoclaved cellular concrete reinforced slabs, profiled steel deck, timber deck conforming to all relevant local regulations or its specific Technical Application documents.

The Sun-Activ membrane is an SBS bitumen membrane with a composite reinforcement coated together with a white reflecting coating.

1.2 General information for installation

The installation of the Sun-Activ process is done by approved installers.

Each new installer receives before work, theoretical and practical training in the Siplast-Icopal Training Center located in France Mondoubleau or on the installer company premises if the structure allows it. Under installer request, at least 15 days before the start of the work, Siplast-Icopal offers a technical demonstrator that completes the installers training on site and checks the work.

For aesthetic reasons, the installation must be carried out particularly carefully. Tools and equipment must be clean and reserved to the Sun-Activ installation. The site is organized to minimize movement of the Sun-Activ membrane. If it is necessary to walk on the membrane, the cleanliness of shoes or use adequate protection has to be ensured.

It is not allowed to store materials or equipment directly on the Sun-Activ membrane.

1.3 Technical assistance

Siplast-Icopal brings, at the request of the company, its technical assistance for the design (choice of the installation procedure, calculation of mechanical fixations) and for the installation on site (technical demonstrator).

1.4 Maintenance and repairs

Maintenance and repairs are to be conducted according to local regulations. A specific maintenance of the top membrane has to be considered: refers to section 8.

If the waterproofing is damaged or punctured repairs are realized after cleaning the top reflective surface and using a double patch. Using the same material used as first layer, torch apply a patch 6 cm wider than the damaged area in all directions and then apply by torch application the Sun-Activ membrane again 6 cm wider than the first layer in all directions.

1.5 Indication for a safe installation

The Sun-Activ top surface is slippery when wet. Accidents can normally be prevented after training in the laying techniques.

Please refer to the local regulations for Safety and Security on site.

Construction disposals must ensure that all requirements concerning prevention of professional risks are met and, in particular, risks of workers falling from the roof.

2. Intended use and scope of the application

The Sun-Activ process is designed for new roofs or for refurbishment on non-accessible roofs or technical roofs with slope $\geq 2\%$ and altitude $\leq 900\text{m}$ (for higher altitude, please contact our Technical Department).

Table 1 summarizes the general application guidelines. Its application shall take into account the specific rules to bearing elements and/or to insulation boards that might affect the field of application.

Table 1 – Field of application and composition of the waterproofing membrane for non-accessible roofs and technical roofs⁽¹⁾

		Torch applied	Half-independent torch applied	Adhesive	Mechanical fixation
Direct substrates of the waterproofing membrane	Minimal accepted slope	A = Paradiene SR4 + Sun-Activ	B = Perfader + Paradiene SR4 + Sun-Activ	C = Adepar JS + Sun-Activ	D = Paradiene FM R4 + Sun-Activ
Masonry	$\geq 2\%$	EIF + A	EIF + B	EIF + C	D
Autoclaved cellular concrete reinforced slabs	$\geq 2\%$	EIF + A	EIF + B	EIF + C	D
Timber deck and wood derivative panels	cf. DTU 43.4	Pontage ⁽⁹⁾ + EIF + A		EIF + C	D
Thermal insulation:					
- Mineral wool ⁽³⁾		A ⁽⁴⁾			D
- Cellular glass		Hot Melt bitumen + A ⁽⁵⁾			
- Polyurethane surfaced PUR ⁽⁴⁾	⁽²⁾			C	D
- Polyisocyanurate surfaced PIR ⁽⁴⁾				C	D
- Fibrous perlite ⁽⁵⁾		A ⁽⁴⁾			D
- Expanded polystyrene EPS ⁽³⁾				C	Thermal protection sheet + D ⁽⁸⁾
Existing waterproofing::					
- Metal faced existing bituminous waterproofing		A ⁽⁶⁾	B ⁽⁶⁾	C ⁽⁶⁾⁽⁷⁾	D
- Bituminous waterproofing with or without mineral protection	cf. DTU 43.5 et $\geq 2\%$		EIF + B	EIF + C ⁽⁷⁾	D
- PVC TPO or other synthetic membrane					Ceceal + D
- Asphalt		EIF + A	EIF + B	EIF + C	D
- Hot asphalt bituminous concrete					
- Volcanic cement					D

(1) DALLE PARCOURS are used for walkways, see section 5.5

(2) Minimal slope $\geq 2\%$. In case of steel deck bearing element minimal slope is 3%.

(3) Used also for Technical areas in case the relevant thermal insulation technical documents allow it.

(4) Thermal insulation designed for receiving bituminous torch applied or heat-activated membrane.

(5) HM hot melt bitumen is used to bond the Cellular glass onto the support and to cover the top insulation surface. The first layer is torch applied.

(6) The metal facing is removed. It is not necessary to use bituminous primers before the first layer application.

(7) Except old bituminous waterproofing half-independent membranes applied with mechanical fixing more than 0,50 m spaced.

(8) Over Expanded polystyrene EPS the thermal protection sheet can be avoid by using Parastyrene FM JS instead of Paradiene FM.

(9) Paradiene SVV 250 mm strip mechanically fixed with nails (150mm minimum distance between each fixations) along wooden board joint.

3. Bearing elements and substrates

3.1 General background

The bearing elements and substrates must comply with local standards specifications. The substrates intended to receive the waterproofing system shall be stable and flat, with a clean surface, free of any material, oil, plaster, hydrocarbons, etc.

3.2 Masonry bearing elements and substrates

Masonry bearing elements and substrates are accepted and must comply with the local regulations and must have a minimum slope of 2%.

Not accepted are sloped screeds of ordinary or lightweight concrete, of pre-stressed shell, of thin precast shells, of hollow bodies with or without load distribution screed, floors with in floor heating and floors containing embedded electricity cables. Specifically for re-roofing jobs, slope screeds of ordinary or lightweight concrete substrates can be accepted after validation by in situ tests.

3.3 Autoclaved cellular concrete reinforced slabs

The bearing elements and substrates of reinforced concrete slabs complying with local technical standards and slope $\geq 2\%$ are accepted.

3.4 Profiled steel deck

Bearing elements of profiled steel deck, in compliance with local standards specifications are accepted. Minimum slope is 3%.

3.5 Timber and wood fibre panels

The bearing elements and substrates of timber boarding, Plywood, OSB3 and wood fibre panels in compliance with local standards are accepted.

Whenever the bearing element of timber boarding is also the substrate of the waterproofing membrane, a separating underlay mechanically fixed, such as SCR Alliance (polyester mat bitumen faced) is applied between the substrate and the waterproofing membrane (see Table 1). It is mechanically fixed, without overlaps.

In case a Vapour Barrier or Vapour Control Layer (VCL) has to be installed to a Plywood or OSB3 deck it must be to be prepared as follow:

- A bituminous reinforced strip band 0,20 m wide protected by metal aluminum faced (Paradial S or Paradial SFM), or protected by mineral granules or slates (Paradiene), with protection applied facing the timber support, is mechanically fixed in correspondence to the timber deck joints;
- And the timber deck surface is primed avoiding the strip band installed.

In case an adhesive vapour barrier is installed, the timber deck surface is primed avoiding the joints.

In case a Vapour Control Layer free from the wooden support is installed, the timber deck surface does not need any primer or strip band across the joints.

3.6 Thermal insulation (non-bearing) substrates

There is no thermal resistance limitation for Sun-Activ system. The thermal insulation consisting of one or two (staggered) layers of insulation boards in compliance with locals standards are accepted. For the thermal insulation installation refer to the relevant technical documents from the manufacturer. The Vapour Control Layer is laid before the insulation boards as described in Table 2.

3.6.1 Composition and installation of the Vapour Control Layer

Tabel 2 – Installation of the Vapour Control Layer

Bearing element	Humidity and heating in the premises	Vapour barrier ⁽²⁾
Masonry ⁽¹⁾	Low or medium	Siplast Primer + Irex Profil or Paradiene BDS or Paradiene SVV or Parevapo SBS torch applied
	High	Siplast Primer + Paradiene S or Parevapo SBS torch applied
Autoclaved cellular concrete ⁽¹⁾	Voir DTA	Siplast Primer + Perfader ⁽⁴⁾ + Paradiene S VV ⁽³⁾ torch applied ⁽⁷⁾ or Perfader ⁽⁴⁾ + Parevapo SBS torch applied
Steel deck	Low or medium	If required, Ceceal or Adevapo ⁽³⁾
	Low or medium	Adevapo adhesive ⁽⁵⁾
	High and Very high ⁽⁶⁾	Adevapo collé ⁽⁶⁾
Timber deck ⁽¹⁾	Low or medium	Parevapo SBS, welded ⁽²⁾ , or Sarvapo or Adevapo adhesive or heat activated.

(1) Bearing element preparation as for components described in 3.2, 3.3 & 3.5.

(2) Vapour barrier joints are welded with 6 cm minimum overlaps.

(3) Paradiene S VV by Parabase.

(4) Perfader is unrolled with 5 -10 cm overlaps.

(5) The adhesive vapour barrier Adevapo is unrolled along the steel deck profiles with 6 cm overlaps minimum.

(6) Parasteel 42 TFH steel deck bearing system

When a bituminous Vapour barrier is installed over masonry bearing elements the upstand angles have to be reinforced using a bituminous polyester reinforced membrane such as Parequerre or Paradiene 35SR4 with a minimum of 10 cm horizontal welding into the support and a vertical elevation according to the insulation panel thickness plus a minimum of 6cm.

This reinforcing upstand angle membrane is also installed with autoclaved cellular armed concrete bearing support when upstands are not monolithic with the bearing slab armed concrete.

3.6.2 Composition and installation of the insulation board

See Table 1 for accepted thermal insulation boards. Fixing method should be according to the specifications given by the insulation board manufacturer and Icopal.

3.7 Existing waterproofing covering substrates

In the case of re-roofing, note that it is up to the developer or its representative to carry out a preliminary study of the structure's stability. It is up to the waterproofing contracting company to evaluate the whole existing roof in order to define, before the works begin, structural solutions related to the new waterproofing works.

The accepted substrates are old asphalt type waterproofing systems, traditional built-up (multi-ply) or single-ply, modified bitumen based. These existing waterproofing systems may be laid on various substrates (timber, masonry, cellular concrete and insulation on the three above mentioned bearing elements and on steel).

For the key-factors for keeping and preparing these existing waterproofing for their re-use as substrates or as VCL as well as the other roof elements (bearing elements, VCL, heat insulation, protection), follow the instructions in the local standards. Mechanical fixings are always tested by in situ measurements for each bearing element type (timber, wood derivative panels, cellular concrete and masonry). The anchoring strength of the mechanical fixings (Pk) chosen for re-roofing must be in accordance with our specifications.

4. Installation of the waterproofing membrane

4.1 General guidelines

The system composition is indicated at Cap 2 (cf. table 1). Membranes must be applied in the sequence they are specified; changing the application sequence is no permitted.

4.2 Installation of the first waterproofing layer

To avoid any standing water on the roof the membrane overlapping follows the roof slope.

The first waterproofing layer is installed according to its relevant technical documents.

4.3 Installation of the Sun-Activ membrane

To avoid any water stagnation on the roof, the membrane overlapping follows the roof slope. Sun-activ and first layer overlapping joints must be staggered to avoid a build up of membranes at overlaps.

Is not possible to install fist layer and Sun-Activ using a cross design. Layers have to be laid in the same direction.

The minimum longitudinal (side lap) is 8 cm.

Joints are torch welded always directing the torch flame towards the bottom surface and not the white reflective surface. A small bitumen cord of around 2mm should be visible aside the overlapping joints.

End/Head lap joints are minimum 10 cm wide. End/Head lap joints are torch welded and staggered. To obtain a correct welding it is necessary to destroy the white reflective coating on top of the Sun-Activ membrane using a small torch flame gently applied. The joints are cooled down using a clean rag.

It is recommended to use a torch with a small nozzle to realize the welding along the lap joints.

The work on site is to be prepared in order to avoid any further access over the membrane. In case this would be necessary the membrane has to be protected with suitable wooden boards without causing any damage to the Sun-Activ membrane.

All work items and tools have to be clean and reserved to the Sun-Activ installation.

Do not store any material over the Sun-Activ membrane.

4.4 Rain shelter at the end of the day

At the end of the day, or in the case of an unexpected stop because of bad weather, the work and the insulation boards are to be protected from rain as follows:

- Thermal insulation is protected by extending and welding the first waterproofing layer 6cm over the bearing element or the vapour barrier.
- Thermal insulation is protected in correspondence of all penetrations and upstands with a bituminous reinforced membrane welded to avoid standing water.

4.5 Upstands

4.5.1 General information

The upstands and heights of parapets are those described in the local standards. These standards should also describe the rules for using metal flashings.

The upstand waterproofing is normally realized as follow:

- A bituminous polyester reinforced membrane with a minimum of 10 cm horizontal and vertical welding is torch applied.
- The Sun-Activ top layer with a minimum on 15 cm horizontal and vertical covering is torch applied

Timber deck upstands are treated by providing a bituminous SBS underlay minimum 2mm thick polyester reinforced or with SCR Alliance nailed into the timber deck support.

All masonry and concrete upstands are primed with around 300gr/sqm.

4.5.2 Composition

The upstand waterproofing is realized by:

- Parequerre 0,25 m or Paradiene 35SR4 as first protection layer torch applied.
- Sun-Activ or Paradiadial S, Parafor Solo GS.

5. Details

5.1 Roof valleys

Roof valleys are waterproofed as main horizontal parts.

5.2 Rainwater outlets, penetrations, overflows

All these details are made in compliance with the local standard. A polyester reinforced bituminous SBS membrane at least 2.5 mm thick such as Paradiene is welded onto the rainwater outlets, penetrations and overflows plate edges and at least 5 cm over the first layer waterproofing membrane (on the main area).

5.3 Gutters

All gutters are waterproofed in compliance with the local standard.

- A polyester reinforced bituminous SBS membrane Paradiene 35 SR4 is torch applied as first layer;
- A top self-protected layer of Paradiene S, or Parafor Solo GS is torch applied. Overlapping joints are displaced 10 cm away from the first layer overlapping joints.

All masonry and concrete upstands are primed with around 300gr/sqm.

Timber boarded decks supports are treated by providing a bituminous SBS underlay minimum 2 mm thick polyester reinforced or with SCR Alliance nailed into the timber boards.

5.4 Expansion Joints

Expansion joints with Neodyl elastomeric SBS non-reinforced membrane according to Neodyl technical documents and local regulations.

5.5 Walkways and technical areas

Walkways are realized as follow:

- Installing Dalle Parcours bitumen paving slabs 45x50 cm using Colle PAR to bond it into the top Sun-Activ surface (5 spots of glue corresponding to around 400 gr/sqm). Slope is to be $\leq 20\%$

Small Technical areas are treated as for walkways as well. Slope is $\leq 5\%$.

6. Materials

6.1 Sun-Activ Membrane

Sun-Activ membrane is a modified SBS bitumen membrane conforming to UEAtc. The reinforcement is coated with a reflecting coating on top surface of the membrane.

The membrane composition is described in table 3:

Table 3 – Composition of Sun-Activ membrane

	Sun-Activ
Top Surface	white reflecting coating 310 g/m ² (±5%)
Bottom surface	thermo-fusible film
Side selvedge	8 cm
Reinforcement	Composite 170g/m ² (±10%)
Blend	3,4 kg/m ² (±5%)
Weight	3,9 kg/m ² (± 5%)
Thickness on side laps	3,4 mm (±7%)
Dimension	1 m x 7 m
Roll weight	27 kg (±7%)

Table 4 – Characteristics of Sun-Activ membrane

Average values	Unit	Norms	Sun-Activ
Tensile strength at max	N/50 mm	EN 12311-1	1200 (±10%) x 1000 (±10%)
Elongation at max	%	EN 12311-1	4,5 (±5%) x 4,5 (±5%)
Nail tearing resistance	N	EN 12310-1	460±10% (longitudinal direction) 540±10% (transverse direction)
Cold temperature flexibility	°C	EN 1109	-20
Heat flow test	°C	EN 1110	105
Puncture Resistance (static)	kg	EN 12730 method B	15
Puncture Resistance (dynamic)	mm	EN 12691	1400
Solar Reflexion Index (SRI)	-	ASTM E 1980	98 (±2)
Fire resistance		EN 13501-5	Broof(t3) over mineral wool

6.2 Other materials

See all Paradiene S, Parafor Solo, Adepar, Paracier FM, Neodyl, Parevapo relevant Technical documents.

7. Manufacture

7.1 Manufacture and quality assurance operation

Membranes are produced by Icopal SAS in Mondoubleau and Loriol Plants.
The quality control system is conforming to the ISO 9001 – Bureau Veritas Certification.

Table 5 gives the quality control plan for the membranes.

Table 5 – Quality control plan

Proprieties	Control frequency
Row material	
Bitumen: R&B – penetration index at 25 °C	Certified by supplier + 1 / 15 days
Filler: grading	1 every month
Reinforcement: weight - mechanical resistance	1 / 10 production
Modified bitumen	
R&B – penetration index at 25 °C	1 every day
Density at 25 °C – flexibility at - 20 °C	1 every day
Elasticity (internal test)	1 every day
Products	
Thickness – length – width – weight	Permanently during production
Heat resistance	1 every production
Dimensional stability	1 every production
Cold flexibility – fresh state	1 every production
Cold flexibility after ageing (EN 1296)	1 every year
Traction and elongation	1 every month

7.2 Labeling

All membranes are labeled with the following information: product name, dimension, storage information, safety and security information.

Sun-Activ is CE Marked accordance with EN 13707.

All MSDS documents are available on:

www.siplast-international.com

7.3 Storage

Rolls are stored vertically in upright position in a sheltered zone, not directly under the sun heat.

8. Maintenance

Maintenance is required. Durability conditions can be achieved only if the roof is regularly inspected, maintained and if its use conforms to the original project and to this document.

Rainwater outlets, penetrations and overflows must be regularly checked and kept clean. Their function must be ensured.

Maintenance has to be carried out according to local regulations.

In addition it is strongly recommended that Sun-activ, in order to preserve its reflective characteristic, is inspected every 6 or 12 months minimum, depending on surrounding conditions, and, if required, a low water pressure washing using soft non corrosive or abrasive chemicals can be used.

High water pressure washing is not allowed.
The low water pressure washing may be necessary along gutters or valleys due to dust accumulation which cannot be avoided.

The use of shoes with a smooth surface is required in order to preserve the reflecting Sun-Activ surface.

The use of walkways is strongly recommended.



Vous avez l'art, nous avons la matière.

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