Concrete
Non-accessible roofs
Main area and upstand descriptions

Waterproofing systems for non-accessible roofs decks on concrete substrates
Attention: the information herein is a general guideline, but does not take into account restrictions or special instructions related to the bearing element, to certain insulations, to the geographical location, to the structural configuration, etc. This information does not relieve the professionals from obtaining full knowledge of the reference documents (prevailing Local Technical Standards, Technical Assessments, Installation Specifications, etc.) This entails consulting them in their integral textual form. Again this document is only a guide; Siplast-Icopal reserves the right to modify the composition and the installation instructions of its products, depending upon the evolution of knowledge and technology.
Concrete
Non-accessible roofs

2.1 Concrete
Non-accessible roof with granule surface finishing
On substrate (without insulation)

Torch-applied SBS elastomeric bitumen single-layer waterproofing system
Perfader + Parafor Solo GS

<table>
<thead>
<tr>
<th>Torch-applied SBS elastomeric bitumen single-layer waterproofing system</th>
<th>Slope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perfader + Parafor Solo GS</td>
<td>≥ 2%</td>
</tr>
</tbody>
</table>

1. Siplast Primer SBS bitumen primer.
2. Upstands: Siplast Primer SBS bitumen primer.
4. Perfader perforated underlay for partial bonding, loose-laid.
5. Torched single-layer Parafor Solo GS.
Concrete
Non-accessible roofs

2.2 Concrete
Non-accessible roof with granule surface finishing

<table>
<thead>
<tr>
<th>Self-adhesive SBS elastomeric bitumen single-layer waterproofing system</th>
<th>Adesolo G</th>
</tr>
</thead>
<tbody>
<tr>
<td>On substrate (without insulation)</td>
<td>Slope</td>
</tr>
<tr>
<td></td>
<td>≥ 2%</td>
</tr>
</tbody>
</table>

Slope: ≥ 2%

Diagram:

- **1.** Siplast Primer SBS bitumen primer.
- **2.** Upstands: Siplast Primer SBS bitumen primer.
- **3.** Upstands: torched Pareguerre reinforcement angle.
- **4.** Self-adhesive Adesolo G single-layer + torched overlaps.
- **5.** Upstands: torched Paradial S top-layer.
Concrete
Non-accessible roofs

2.3 Concrete
Non-accessible roof with metal surface finishing

Self-adhesive SBS elastomeric bitumen double-layer waterproofing system
Adepar JS + Paradial S/Vercuivre S

Slope ≥ 3%

Concrete Non-accessible roofs

1. Siplast Primer SBS bitumen primer.
2. Upstands: Siplast Primer SBS bitumen primer.
3. Self-adhesive Adepar JS.
5. Torched Paradial S or Vercuivre S top-layer.
6. Upstands: Torched Paradial S or Vercuivre S top-layer.
Concrete
Non-accessible roofs

2.4 Concrete
Non-accessible roof with granule surface finishing
On insulation board

<table>
<thead>
<tr>
<th>Torch-applied SBS elastomeric bitumen double-layer waterproofing system</th>
<th>Paradiene S R4 + Paradiene 30.1 GS</th>
<th>Slope</th>
<th>≥ 2%</th>
</tr>
</thead>
</table>

Siplast Primer SBS bitumen primer.
Upstands: Siplast Primer SBS bitumen primer.
Torched Irex Profil vapour control layer.*
Torched Parequerre reinforcement angle.
Insulation board: mineral wool board with bitumen coating, expanded perlite + fiber board with bitumen coating, composite perlite + resol board with bitumen coating, foamglass board with bitumen coating.**
Torched Paradiene S R4 underlayer.
Upstands: torched Parequerre reinforcement angle.
Torched granule-surfaced Paradiene 30.1 GS cap sheet.
Upstands: torched Paradial S.

* VCL is not necessary in tropical or equatorial regions when buildings are not heated.
** Consult the supplier’s technical documentation and local regulations for compliance with all building and security requirements.
Concrete
Non-accessible roofs

2.5 Concrete
Non-accessible roof with granule surface finishing
On flame sensitive insulation board

Self-adhesive SBS elastomeric bitumen double-layer waterproofing system
Adepar JS + Paradiene 30.1 GS

Slope
\( \geq 2\% \)

1. Siplast Primer SBS bitumen primer.
2. Upstands: Siplast Primer SBS bitumen primer.
3. Torched Irex Profil; or Rampar VCL in conjunction with expanded polystyrene boards.*
4. Torched Parequerre reinforcement angle.
5. Insulation board: expanded polystyrene boards, polyisocyanurate boards with composite reinforced facing.**
8. Torched granule-surfaced Paradiene 30.1 GS cap sheet.
9. Upstands: torched Paradial S.

* VCL is not necessary in tropical or equatorial regions when buildings are not heated
** Consult the supplier’s technical documentation and local regulations for compliance with all building and security requirements.
Concrete
Non-accessible roofs

2.6 Concrete
Non-accessible roof with gravel ballast finishing
On flame sensitive insulation board

Self-adhesive SBS elastomeric bitumen double-layer waterproofing system
Paradiene JS R4 + Paradiene S VV

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Siplast Primer SBS bitumen primer.</td>
</tr>
<tr>
<td>2</td>
<td>Upstands: Siplast Primer SBS bitumen primer.</td>
</tr>
<tr>
<td>3</td>
<td>Torched Irex Profil vapour control layer (VCL).*</td>
</tr>
<tr>
<td>4</td>
<td>Torched Parequerre reinforcement angle.</td>
</tr>
<tr>
<td>5</td>
<td>Insulation board: expanded polystyrene boards, polyisocyanurate boards with fibre reinforced facing.**</td>
</tr>
<tr>
<td>6</td>
<td>Loose-laid Paradiene JS R4 underlayer with self-adhesive overlaps.</td>
</tr>
<tr>
<td>7</td>
<td>Upstands: torched Parequerre reinforcement angle.</td>
</tr>
<tr>
<td>8</td>
<td>Torched Paradiene SVV top layer.</td>
</tr>
<tr>
<td>9</td>
<td>Upstands: torched Paradiol S.</td>
</tr>
<tr>
<td>10</td>
<td>Gravel ballast.</td>
</tr>
</tbody>
</table>

* VCL is not necessary in tropical or equatorial regions when buildings are not heated.
** Consult the supplier’s technical documentation and local regulations for compliance with all building and security requirements.
2.7 Concrete
Non-accessible roof with gravel ballast finishing

<table>
<thead>
<tr>
<th>Free-laid SBS elastomeric bitumen single-layer waterproofing system</th>
<th>Teranap JS</th>
</tr>
</thead>
<tbody>
<tr>
<td>On flame sensitive insulation board</td>
<td>Slope 0-5%</td>
</tr>
</tbody>
</table>

1. Siplast Primer SBS bitumen primer.
2. Upstands: Siplast Primer SBS bitumen primer.
3. Torched Irex Profil vapour control layer (VCL).*
4. Torched Parequerre reinforcement angle.
5. Insulation board: expanded polystyrene boards, polyisocyanurate boards with fibre reinforced facing.**
6. Loose-laid Verecran 100 separating layer.
7. Loose-laid Teranap JS single layer with self-adhesive overlap and torched Couvre Joint covering strip.
9. Upstands: torched Paradial S.
10. Gravel ballast.

* VCL is not necessary in tropical or equatorial regions when buildings are not heated.
** Consult the supplier’s technical documentation and local regulations for compliance with all building and security requirements.
Concrete

Non-accessible roofs

**Protections**

**Heavy ballast for utility zones or utility decks and for walkways**

- Mortar or concrete screed poured on site

**Mortar or concrete screed:**
- Minimal thickness = 0.04 m.
- Proportioned and mixed with plasticiser – water reducing agent.

**Isolating draining layer:**
- Draina G 10 (AT no. 5/06-1867).

**Subdividing the hard ballast:**
- Joints 20mm minimum at reliefs and convex features.
- Joints 10-20mm every 4m maximum (for maximal surfaces of 10m²).
- Packing joints with system that is rot resistant and capable of alternating deformations.
- Any reinforcement of the screed to be interrupted at each joint.

**Prefabricated slabs of concrete, loose-laid, with mortarless joint (usual solution)**

**Prefabricated slabs of concrete:**
- Loose-laid, with mortarless joint.
- Dimensions 0.40 to 0.60m on walkway.

**Draining and separating layer:**
- Draina G 10

**Prefabricated slabs of cement concrete or hard stone, loose-laid, with tight joints or wide packed joints (solution for flat roof for pedestrian use)**

**Slabs:**
- Precast concrete or hard stone (thickness ≧ 0.04m; length/width 0.25 to 0.50m).
- Tight joints or wide joints, 0.02m approximately, filled with mortar.

**Isolating layer:**
- 0.03m of aggregate 3/15 (or of sand in case of laying with wide joints).
- If S ≤ 30m²: non-woven Gravifiltre + synthetic film 100.

**Subdividing the hard ballast:**
- Joints minimum 20mm every 6m maximum, and at reliefs and convex features.
- Joints to be packed with rot resistant system, capable of alternating deformations.

**Protection with gravel ballast for non accessible concrete deck**

**Gravel ballast**

Usual rolled or crushed gravel, with granulometry between 5mm and maxi 2/3 of the protection thickness.
- Thickness: 0.04m minimum.
- If there is possibility of strong wind uplift (roof hight over 28m, or windswept areas: sea-shore, mountains): gravels with the highest possible granulometry, clustered on surface or ballasted by slabs on a 2m width along the roof perimeter and around penetrations.

**Information for calculation of permanent load**

- **Gravel layer:** 0.80 kN/m² for a 0.04m thickness
- **Ballast 3mm/15mm:** 0.60 kN/m² for a 0.03m thickness

Note: 1kN ≈ 100kg
Upstand flashings – with granule-surface or metal finishing membrane

Technical specifications as described hereafter are suitable only for jobsi- 
etes in plain climates.

Upstands and parapets

Upstands in masonry

Their heights shall enable the upstand flashings to extend upward to a minimal “h” distance above the main area’s self- 
protected waterproofing as follows:

- No slope: $h \geq 0.15m$
- General case: $h \geq 0.10m$
- Roof bottom side with slope from 5 to 20%: $h \geq 0.15m$
- Roof bottom side with slope $> 20%$: $h \geq 0.25m$

Particular case of a built-up metal upstand

Made of a galvanized steel sheet, either galvanized or with anti-corrosion treat-
ment, and fitted with a horizontal edge of a minimal 0.10m width.
Its height shall enable the upstand flashings to extend upward to a minimal “h” distance above the main area’s self-
protected waterproofing as follows:

- Upstand without thermal insulation: $0.15m \leq h \leq 0.20m$
- Upstand with thermal insulation: $0.15m \leq h \leq 0.35m$

Description of the upstand flashing

<table>
<thead>
<tr>
<th>Preparation of the upstand</th>
<th>Waterproofing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Upstand not thermally insulated</strong></td>
<td>Top layer, welded:</td>
</tr>
<tr>
<td>Siplast Primer</td>
<td>Paradial S (aluminium surface)</td>
</tr>
<tr>
<td><em>Upstand thermally insulated</em></td>
<td>or Supradial GS (surface of granules/chips)</td>
</tr>
<tr>
<td>Vapour control layer (optional): Irex Profil torched to Siplast Primer</td>
<td>Possible variants:</td>
</tr>
<tr>
<td>Allowable insulations (contingent upon their Technical Assessments):</td>
<td>- Vercuivre S</td>
</tr>
<tr>
<td>- Weldable mineral wool or bitumen surfaced fibrous perlite, fixed mechanically</td>
<td>- Verinox S</td>
</tr>
<tr>
<td>- Cellular glass, bitumen surfaced, bonded with hot bitumen</td>
<td>- Parafor Solo GS</td>
</tr>
<tr>
<td></td>
<td>- Parafor Solo FE GS</td>
</tr>
<tr>
<td></td>
<td>Torched reinforcement angle: Parequerre</td>
</tr>
</tbody>
</table>
Concrete
Non-accessible roofs

Upstand flashings – with gravel ballast finishing

Upstands and parapets
Technical specifications as described hereafter are suitable only for job-ites in plain climates.

Bearing elements in masonry
The height of parapet or upstand shall enable the upstand flashings to extend upward to a minimal “h” distance of 0.15m above the main area’s self-protected waterproofing as follows:

- General case (fig.1):
  - no slope: h > 0.15m;
  - slope > 1%: h > 0.10m.

Upstand fully protected with waterproofing membrane:
- for all slope gradients: h > 0.05m.

Particular case of a built-up metal upstand (fig.2):
Made of a galvanized steel sheet, either galvanized or with anti-corrosion treatment, and fitted with a horizontal edge of a minimal 0.10m width.
Its height shall enable the upstand flashings to extend upward to a minimal “h” distance above the main area’s self-protected waterproofing as follows:
- upstand without thermal insulation: 0.15m < h < 0.20m;
- upstand with thermal insulation: 0.15m < h < 0.35m.

Bearing elements in steel deck
The height H of upstands (fig. 2) shall enable the flashings to extend upward to a minimal “h” distance above the main area’s self-protected waterproofing.
The upstands are made of galvanized steel sheet, either galvanized or with anti-corrosion treatment, and with a thickness depending of a possible back cladding fixed to the upstand, the type of upstand: self-supporting or not, incorporated in the bearing structure or added, rooflight kerb, etc.

Bearing elements in timber or wooden fiber boards
The height of upstand shall enable the flashings to extend upward to a minimal “h” distance above the main area’s self-protected waterproofing as follows:
- h > 0.10m generally;
- h > 0.10m along the bottom side of inclined roof.

Upstands in wooden board (fig.3)
- 0.15m < H < 0.30 m: timber boarding of thickness > 22mm or wooden particle board of thickness > 19mm;
- H > 0.30m: particular specifications; ask our Technical Department.

Upstands in galvanized steel (fig.2)
They need to be set against a rigid and continuous element and fixed to the bearing structure by a horizontal edge of a minimum 0.10m width.
Description of the upstand flashing

**Preparation of the upstand**

**Upstand not thermally insulated**
- Masonry or steel deck: Siplast Primer.
- Wooden board: nailed Paradiene VV.

**Upstand thermally insulated**
- Vapour control layer (optional): Irex Profil torched to Siplast Primer

Allowable insulations (contingent upon their Technical Assessments):
- Weldable mineral wool or bitumen surfaced fibrous perlite, fixed mechanically;
- Cellular glass, bitumen surfaced, bonded with hot bitumen.

**Waterproofing**

- Top layer, welded: Paradial S (aluminium surface) or Supradiel GS (surface of granules/chips)
- Possible variants:
  - Vercuivre S
  - Verinox S
  - Parafor Solo GS
  - Parafor Solo FE GS
- Torched reinforcement angle: Parequerre

**Particular case of measures for rainwater temporary storage**

The upstands, only in reinforced concrete, need to have a minimal "h" distance of 0.25m above the main area's gravel layer.

The waterproofing upstand is made of a two-layer system on its full height, with Paradiene 35 S R4 underlayer.

**Special case of utility roof decks**

According to the mechanical stresses to which they may be subjected, upstand flashings, two-ply all the way up, may receive a screed protection, 0.03m thick, consisting of a wire netting reinforced cement coating, forming a slope or a batter at the foot. In this case:
- The first coat is then made using Paradiene 35 S R4.
- If height $\geq 0.20$m: the coating is to be fixed at the head, above the upstand flashing.
- If height $\geq 0.40$m: the coating thickness is 0.05m and the reinforcement is of expanded metal or welded wire mesh to the exclusion of chicken wire netting.
- Separation of the protections on the regular parts: joint 0.02m minimum, filled with a rot-resistant liner, capable of alternating deformations.
- Subdivision: every 2m with mortarless joint.
Concrete
Non-accessible roofs

Methods for the tops of upstands

In case the upstands are not fully protected by a waterproofing membrane, their upper parts need to include a watertight structure, to prevent run-off water from penetrating in back of the upstand flashing. The diagrams hereunder describe a number of possibilities, shown without thermal insulation. The width of the projection of the above-mentioned watertight structure will take into account the thickness of any thermal insulation board.

### Specifications

- The kerbs are of …, with a thickness of …mm and height of …mm, coated with Siplast Primer.
  - **For upstand thermally insulated:**
    - Irex Profil vapour control layer torched onto substrate coated with Siplast Primer.
    - Insulating board …, complying with their Technical Assessments … and fixed by …, thickness of …mm with a thermal resistance performance of: …m².°C/W.
- The waterproofing upstand is made of:
  - A reinforcement angle: torched Parequerre elastomeric bitumen membrane
  - A torched granule or aluminium protected capsheet: (colour …).
- The top of the the upstand will be protected by …

<table>
<thead>
<tr>
<th>d (mm)</th>
<th>h (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upstand with granule surface membrane</td>
<td>40 + i</td>
</tr>
<tr>
<td>Upstand ≤ 0.40m with heavy balast finishing (3cm thickness)</td>
<td>70 + i</td>
</tr>
<tr>
<td>Upstand &gt; 0.40m with heavy balast finishing (5cm thickness)</td>
<td>90 + i</td>
</tr>
</tbody>
</table>

Note: i = eventual thickness of insulation board

### Complementary Information

- Product data sheets: Irex Profil, Paradial S, Paradiene, Parafor Solo GS, Parasolin, Parequerre, Siplast Primer, Supradial GS, Vercuivre S, Verinox S.
Siplast product description


**Adesolo G**: self-adhesive, partially-bonded, glass/polyester composite-reinforced, SBS-modified elastomeric bitumen waterproofing, with slate flake or coloured granule surface finish, colour .............., and nominal 120mm wide selvedge. Underside sanded between self-adhesive strips and protected with siliconised peel-off film.

**Biecran**: composite separating layer with a 100g/m² glass fleece and a 70g/m² kraft paper sheet.

**Colle Par**: bituminous cold adhesive.

**Dalle Parcours**: semi-rigid, double glass-reinforced bitumen walkway tiles with Brown or Slate Grey granule surface finish.

**Draina G10**: drainage and separating layer to apply under heavy ballast made of concrete screed, prefabricated slabs of concrete or hard stone.

**Gravifiltre**: polyester filter layer for roof gardens.

**Icopal Pur Glue**: polyurethan monocomponent ready for use.

**Irex Profil**: elastomeric bitumen, glass fibre reinforced vapour control layer.

**Paradiene S R3**: glass/polyester composite-reinforced, torch-applied SBS-modified elastomeric bitumen underlayer, film-faced with perforated thermofusible film on the underside.

**Parafol 30 G**: polyester-reinforced SBS-modified elastomeric bitumen cap sheet, with slate flake or coloured granule surface finish, colour .........., sanded on the underside, nominal 90mm selvedge.

**Parafol Solo GS**: polyester-reinforced elastomeric bitumen cap sheet, with slate flake or coloured granule surface finish, colour .........., with continuous thermofusible film on grooved underside, nominal 90mm selvedge with scarified film.

**Parafor Solo FE GS**: polyester-reinforced SBS-modified elastomeric bitumen cap sheet fitted with fire retardant additive, with slate flake or coloured granule surface finish, colour ....., with continuous thermofusible film on grooved underside, nominal 90mm selvedge with scarified film.

**Parafor Solo GS**: polyester-reinforced elastomeric bitumen cap sheet, with slate flake or coloured granule surface finish, colour .........., with continuous thermofusible film on grooved underside, nominal 90mm selvedge with scarified film.

**Parafor Solo GS**: polyester-reinforced, torch-applied SBS-modified elastomeric bitumen cap sheet, 4mm thick, designed for single-layer systems. Surfaced with coloured granules benefiting of a large colour range. Grooved underside (patented system) surfaced with thermofusible film.

**Parequerrer**: polyester-reinforced SBS-modified elastomeric bitumen underlayer. Cut in 0,25m wide strip for use as reinforcement angle on upstands.

**Rampar**: polymeric bitumen vapour control layer with high temperature softening point; glass-fleece reinforcement, surfacing with sand, underfacing with thermofusible film, 2mm thick.

**Siplast Primer**: cold-applied, quick drying, universal elastomeric bitumen primer. Approx. coverage from 0.10 litre/m² on steel to 0.40 litre/m² on concrete.

**Supradial GS**: plain aluminium-faced + overprotected with mineral granules, glass-reinforced elastomeric bitumen cap sheet with fusible film on the underside and nominal 70mm selvedge

**Teranap JS**: SBS elastomeric bitumen, 2m wide membrane of 4mm nominal thickness, fitted with a self adhesive overlap protected by siliconised release paper, secured by covering strip (Bande Couvre Joint) torched onto the side-lap.

**Vercuivre**: copper-faced, glass-reinforced elastomeric bitumen cap sheet, fusible film on the underside, nominal 70mm selvedge.

**Vercuivre S**: copper-faced, composite-reinforced elastomeric bitumen cap sheet, fusible film on the underside, nominal.

**Verecran 100**: Glass fleece separating layer free-laid.

**Verinox**: stainless steel-faced, glass-reinforced elastomeric bitumen cap sheet, fusible film on the underside, nominal 70mm selvedge.

**Verinox S**: stainless steel-faced, composite-reinforced elastomeric bitumen cap sheet, fusible film on the underside.