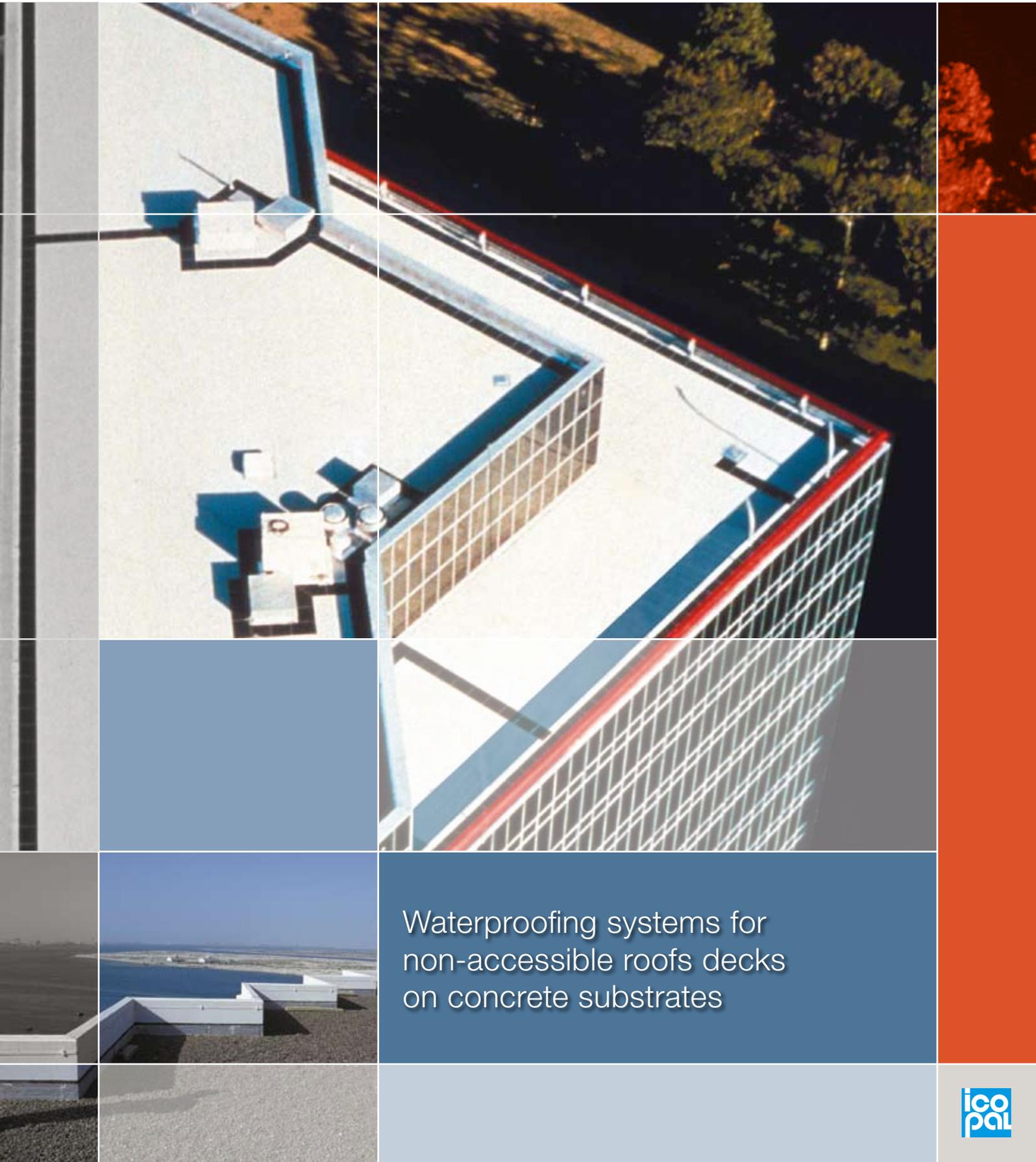


Concrete

Non-accessible roofs

Main area and upstand descriptions



Waterproofing systems for
non-accessible roofs decks
on concrete substrates

Concrete

Non-accessible roofs

Contents

Selected system descriptions	3
Protection by heavy ballast for utility zones	10
Upstand flashings – with granule-surface or metal finishing membrane	11
Upstand flashings – with gravel ballast finishing	12
Siplast product description	15

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

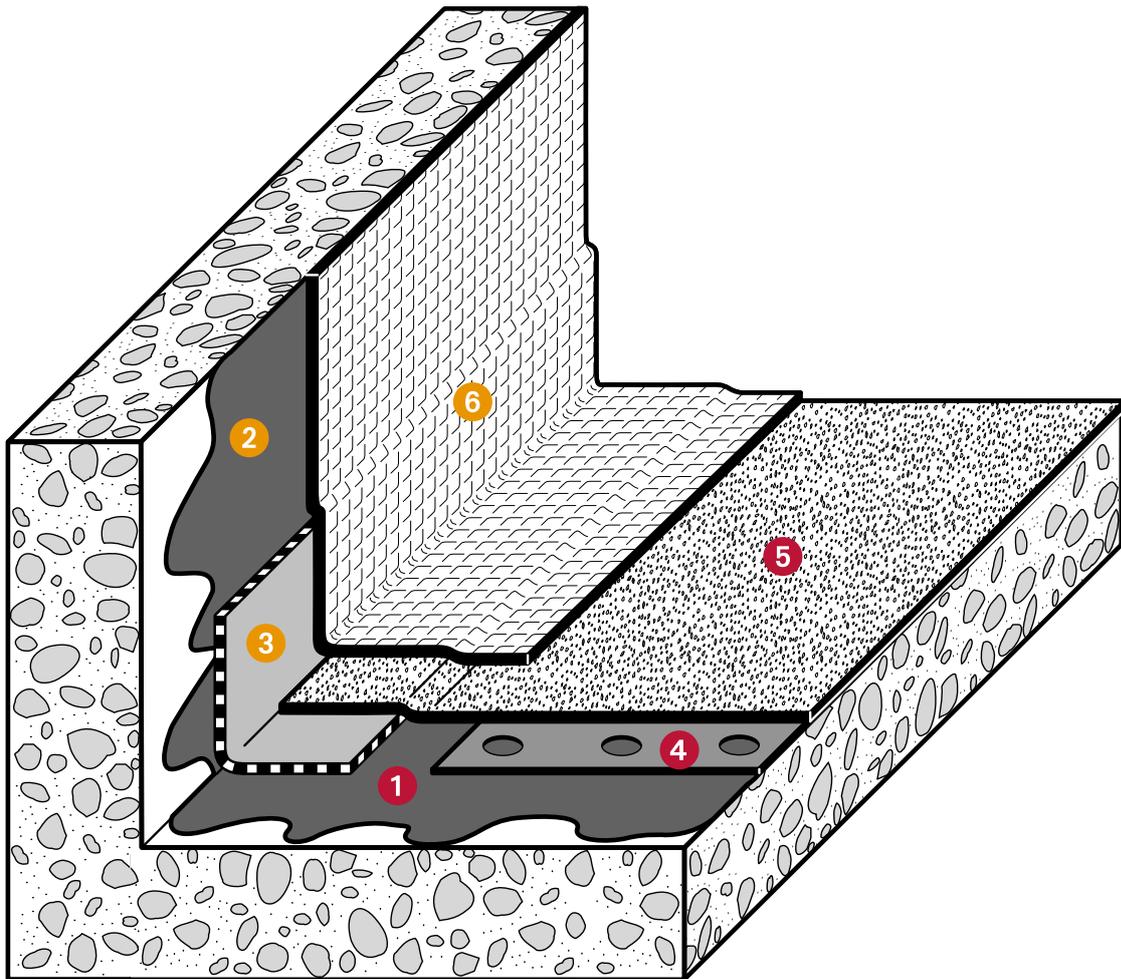
Non-accessible roof with granule surface finishing

On substrate (without insulation)

Torch-applied SBS elastomeric bitumen single-layer waterproofing system

Slope
≥ 2%

Perfader + Parafor Solo GS



- 1 Siplast Primer SBS bitumen primer.
- 2 Upstands: Siplast Primer SBS bitumen primer.
- 3 Upstands: torched Parequerre reinforcement angle.
- 4 Perfader perforated underlay for partial bonding, loose-laid.
- 5 Torched single-layer Parafor Solo GS.
- 6 Upstands: torched Paradiat S top-layer.

Concrete

Non-accessible roofs

2.2

Concrete

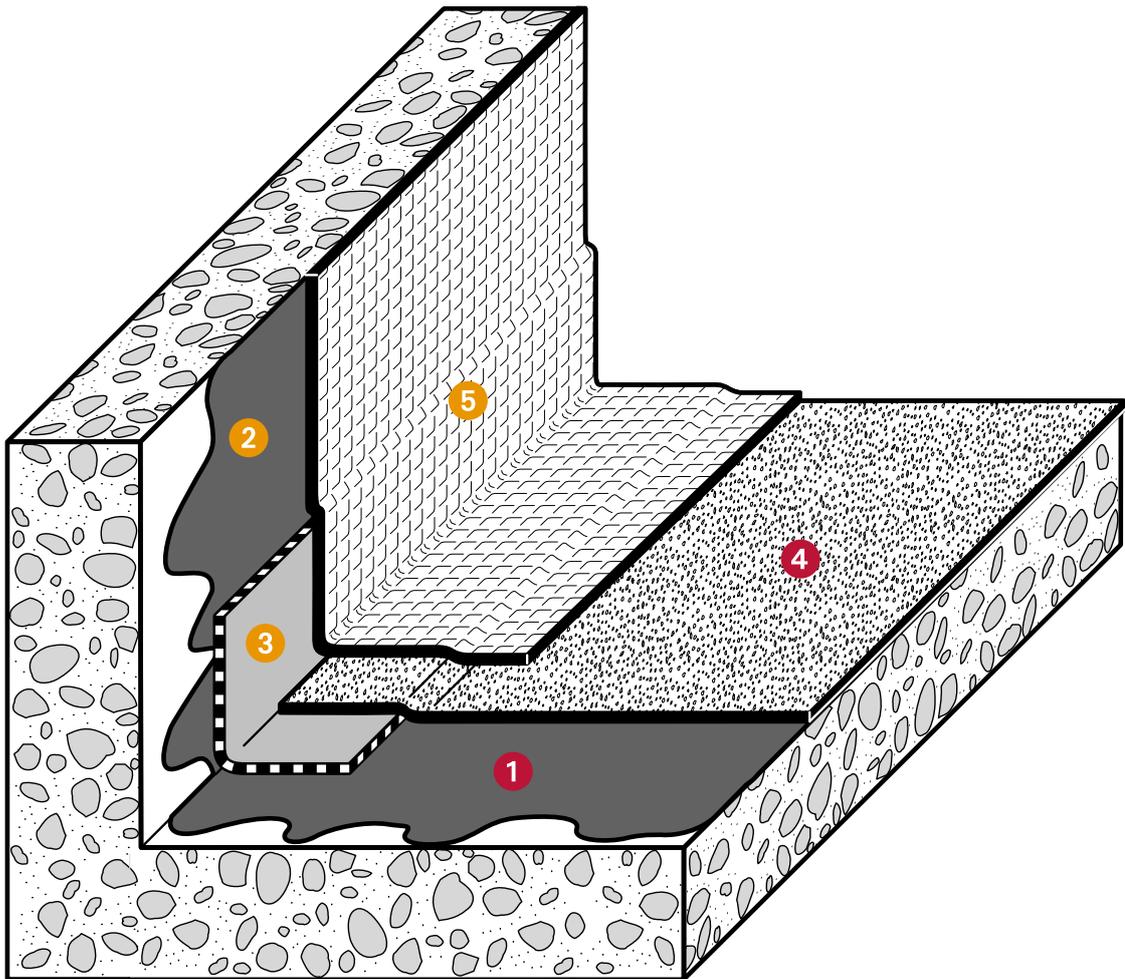
Non-accessible roof with granule surface finishing

On substrate (without insulation)

Self-adhesive SBS elastomeric bitumen single-layer waterproofing system

Slope
≥ 2%

Adesolo G



- 1 Siplast Primer SBS bitumen primer.
- 2 Upstands: Siplast Primer SBS bitumen primer.
- 3 Upstands: torched Parequerre reinforcement angle.
- 4 Self-adhesive Adesolo G single-layer + torched overlaps.
- 5 Upstands: torched Paradiel S top-layer.

Concrete

Non-accessible roofs

2.3 Concrete

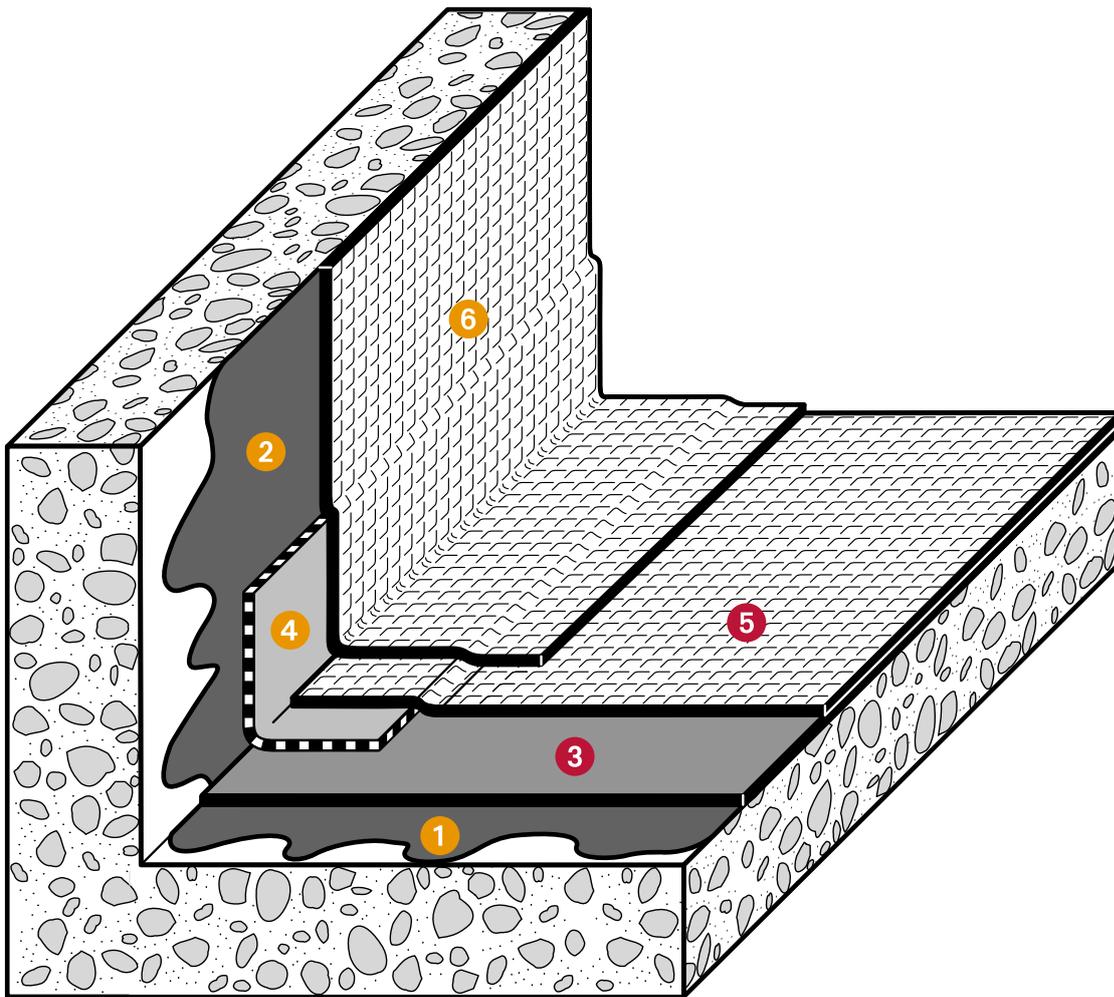
Non-accessible roof with metal surface finishing

On substrate (without insulation)

Self-adhesive SBS elastomeric bitumen double-layer waterproofing system

Slope
≥ 3%

Adepar JS + Paradiat S/Vercuivre S



- 1 Siplast Primer SBS bitumen primer.
- 2 Upstands: Siplast Primer SBS bitumen primer.
- 3 Self-adhesive Adepar JS.
- 4 Upstands: torched Parequerre reinforcement angle.
- 5 Torched Paradiat S or Vercuivre S top-layer.
- 6 Upstands: Torched Paradiat S or Vercuivre S top-layer.

Concrete

Non-accessible roofs

2.4

Concrete

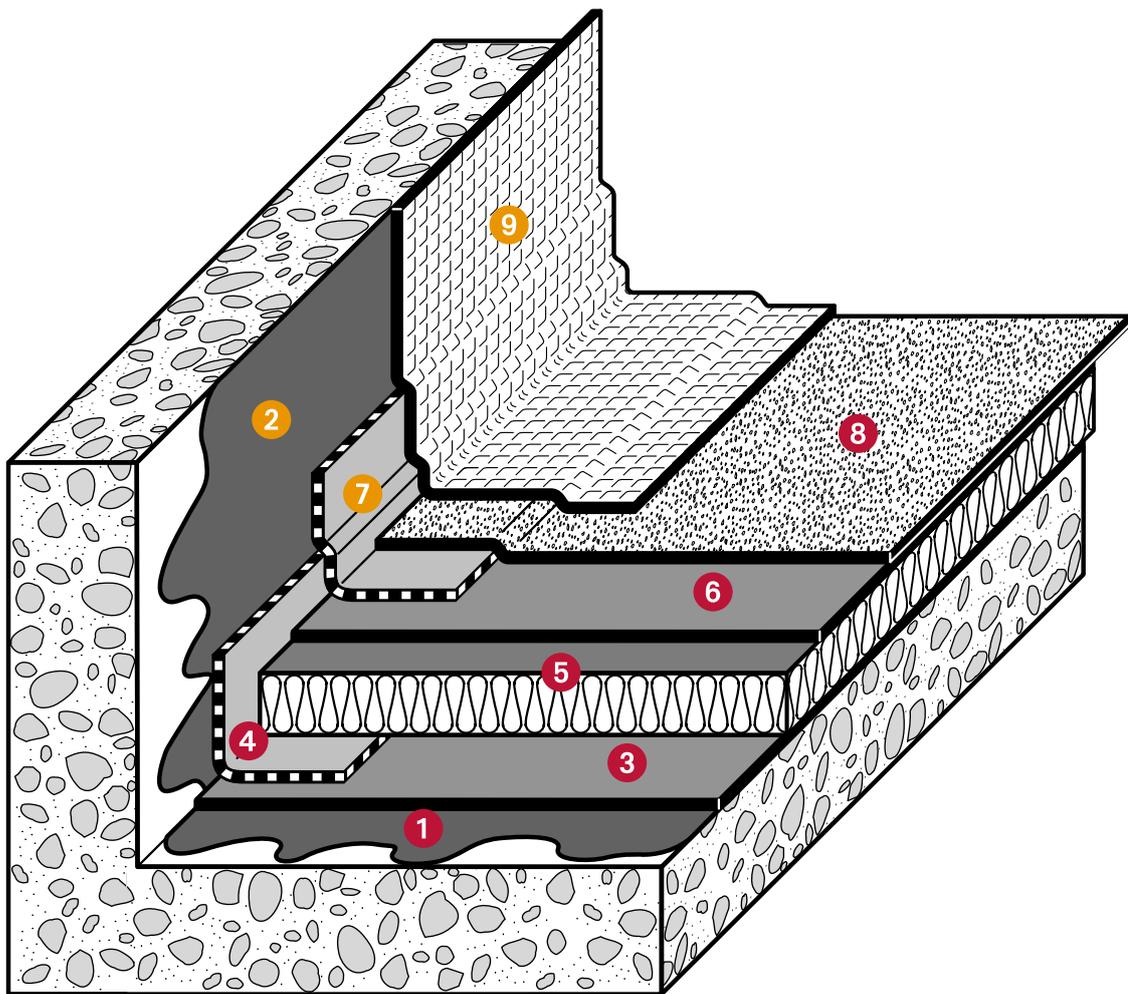
Non-accessible roof with granule surface finishing

On insulation board

Torch-applied SBS elastomeric bitumen double-layer waterproofing system

Paradiene S R4 + Paradiene 30.1 GS

Slope
≥ 2%



1 Siplast Primer SBS bitumen primer.

2 Upstands: Siplast Primer SBS bitumen primer.

3 Torched Irex Profil vapour control layer.*

4 Torched Parequerre reinforcement angle.

5 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.**

6 Torched Paradiene S R4 underlayer.

7 Upstands: torched Parequerre reinforcement angle.

8 Torched granule-surfaced Paradiene 30.1 GS cap sheet.

9 Upstands: torched Paradiene 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

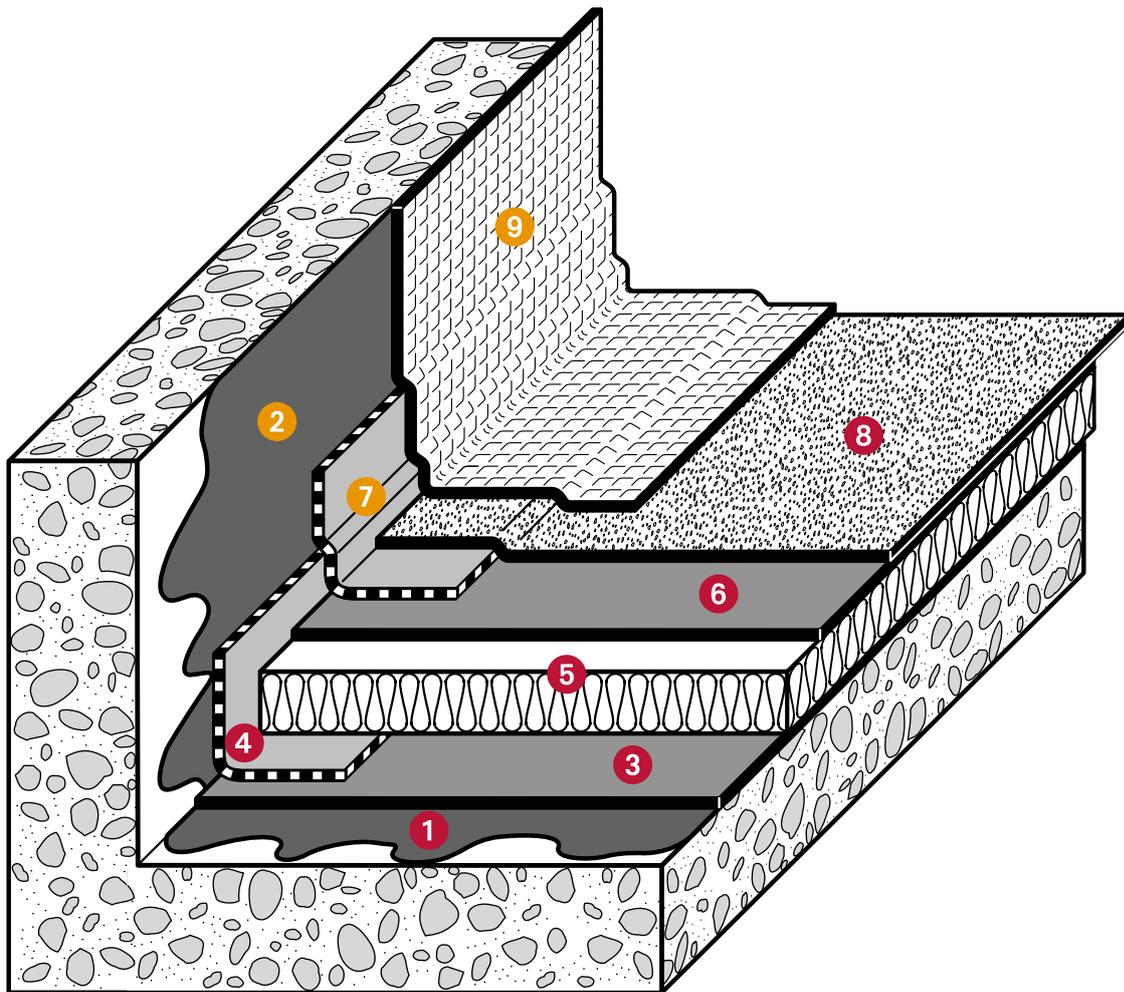
Non-accessible roof with granule surface finishing

On flame sensitive insulation board

Self-adhesive SBS elastomeric bitumen double-layer waterproofing system

Slope
≥ 2%

Adepar JS + Paradiene 30.1 GS



- 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.**
- 6 Self-adhesive Adepar JS underlayer.
- 7 Upstands: torched Parequerre reinforcement angle.
- 8 Torched granule-surfaced Paradiene 30.1 GS cap sheet.
- 9 Upstands: torched Paradiel 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

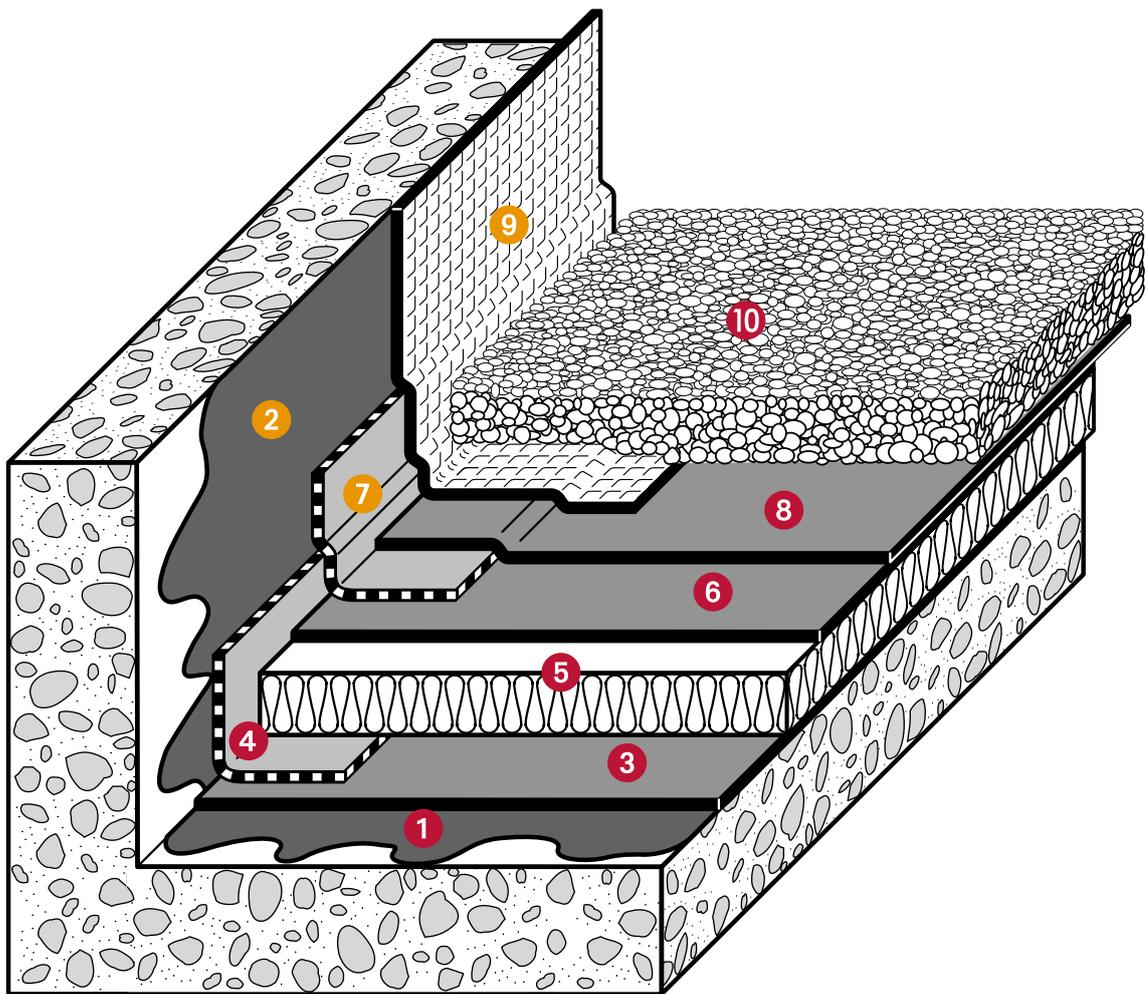
Non-accessible roof with gravel ballast finishing

On flame sensitive insulation board

Self-adhesive SBS elastomeric bitumen double-layer waterproofing system

Paradiene JS R4 + Paradiene S VV

Slope
0-5%



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 Paradiene JS R4 underlayer with self-adhesive overlaps.

7 Upstands: torched Parequerre reinforcement angle.

8 Torched Paradiene SVV top layer.

9 Upstands: torched Paradiene 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

2.7

Concrete

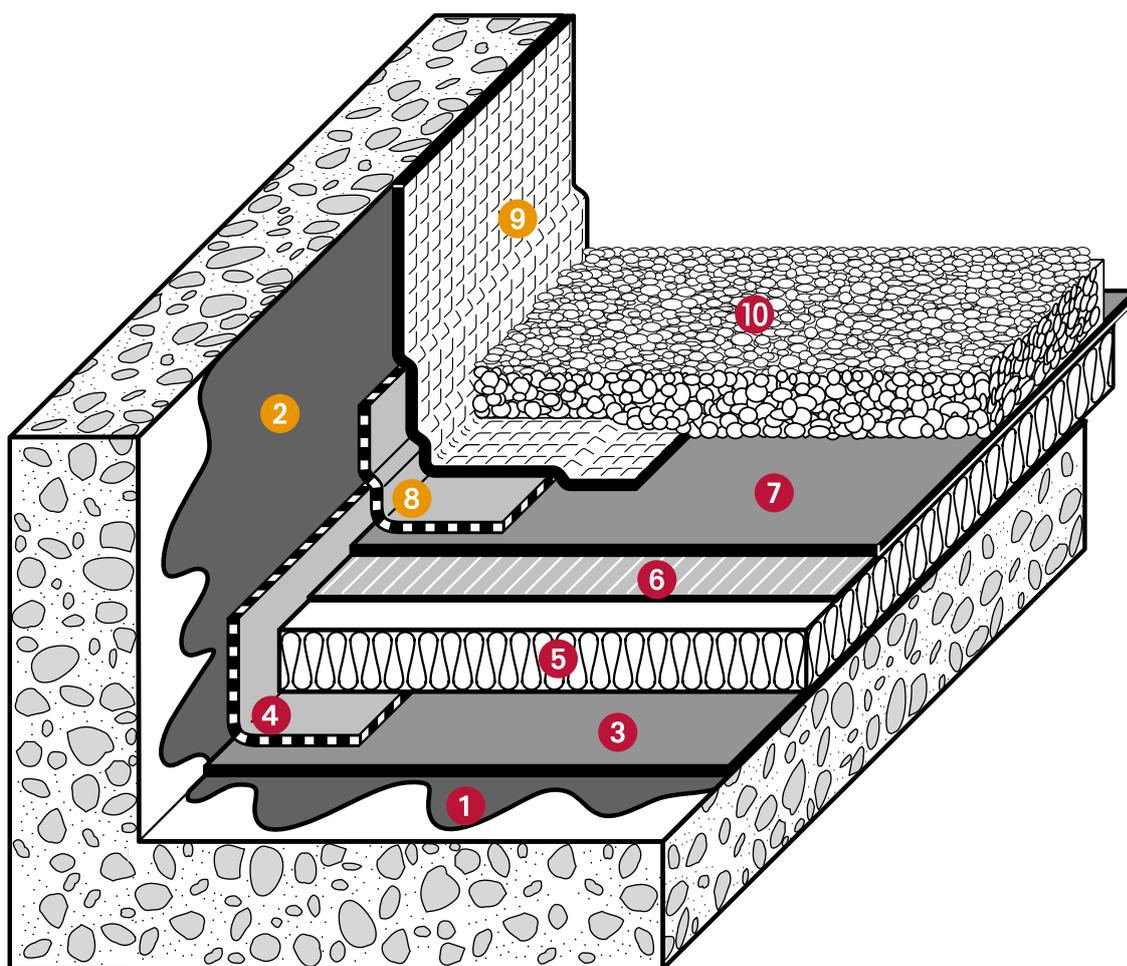
Non-accessible roof with gravel ballast finishing

On flame sensitive insulation board

Free-laid SBS elastomeric bitumen single-layer waterproofing system

Slope
0-5%

Teranap JS



- | | |
|--|---|
| <ul style="list-style-type: none"> 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. | <ul style="list-style-type: none"> ⑦ Loose-laid Teranap JS single layer with self-adhesive overlap and torched Couvre Joint covering strip. ⑧ Upstands: torched Parequerre reinforcement angle. ⑨ Upstands: torched Paradiat 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.

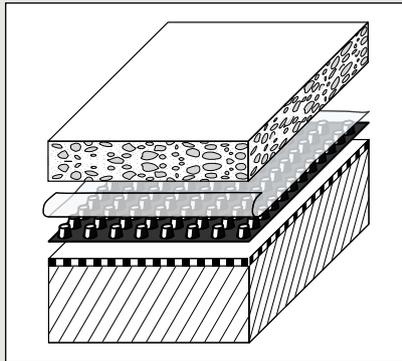
Concrete

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.

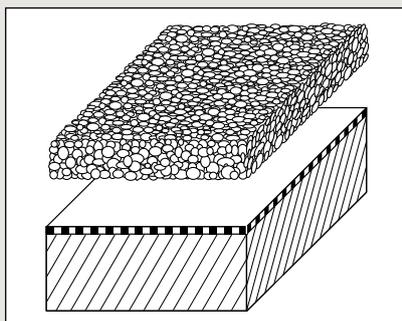
Isolating draining layer:

- ▶ Draina G 10 (AT no. 5/06-1867).

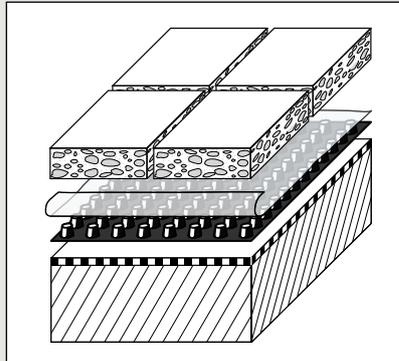
Subdividing the hard ballast:

- ▶ 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.

Protection with gravel ballast for non accessible concrete deck



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



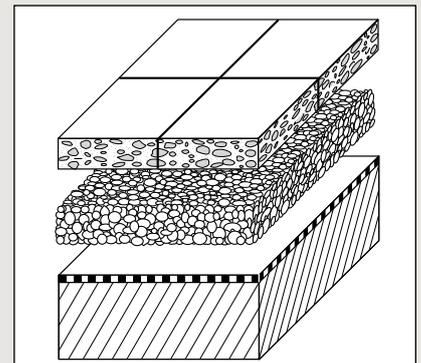
Prefabricated slabs of concrete:

- ▶ 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 \geq 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 $S \leq 30\text{m}^2$: 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.

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 height 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/m ² for a 0.04m thickness
Ballast 3mm/15mm:	0,60 kN/m ² for a 0.03m thickness

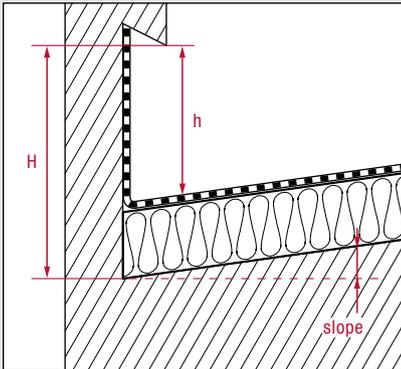
Note: 1kN \approx 100kg

Upstand flashings – with granule-surface or metal finishing membrane

Technical specifications as described hereafter are suitable only for jobsites in plain climates.

Upstands and parapets

Upstands in masonry

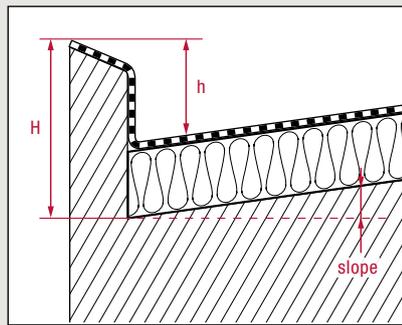


Their heights shall enable the upstand flashings to extend upward to a minimal “h” distance above the main area’s self-protected waterproofing as follows:

- ▶ No slope: $h \geq 0.15\text{m}$

- ▶ Slope $\geq 1\%$: $h \geq 0.10\text{m}$
- ▶ Roof bottom side with slope from 5 to 20%: $h \geq 0.15\text{m}$
- ▶ Roof bottom side with slope $> 20\%$: $h \geq 0.25\text{m}$

Upstand fully protected with waterproofing membrane



- ▶ General case: $h \geq 0.10\text{m}$
- ▶ Roof bottom side with slope from 5 to 20%: $h \geq 0.15\text{m}$
- ▶ Roof bottom side with slope $> 20\%$: $h \geq 0.25\text{m}$

Particular case of a built-up metal upstand

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: $0.15\text{m} \leq h \leq 0.20\text{m}$
- ▶ Upstand with thermal insulation: $0.15\text{m} \leq h \leq 0.35\text{m}$

Description of the upstand flashing

Preparation of the upstand

Upstand not thermally insulated

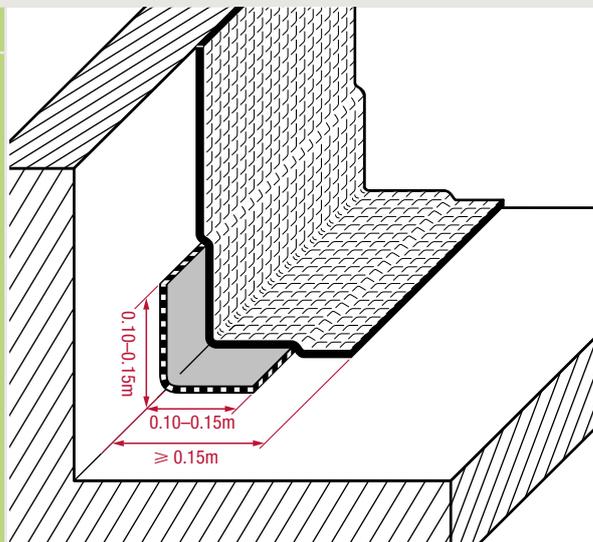
Siplast Primer

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 Supradial GS (surface of granules/chips)

Possible variants:

- ▶ Vercuire S
- ▶ Verinox S
- ▶ Parafor Solo GS
- ▶ Parafor Solo FE GS

Torched reinforcement angle:
Parequerre

Concrete

Non-accessible roofs

Upstand flashings – with gravel ballast finishing

Upstands and parapets

Technical specifications as described hereafter are suitable only for jobsites 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: $h > 0.15\text{m}$;
- slope $> 1\%$: $h > 0.10\text{m}$.

Upstand fully protected with waterproofing membrane:

- for all slope gradients: $h > 0.05\text{m}$.

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: $0.15\text{m} < h < 0.20\text{m}$;
- upstand with thermal insulation: $0.15\text{m} < h < 0,35\text{m}$.

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:

- $h > 0.10\text{m}$ generally;
- $h > 0.10\text{m}$ along the bottom side of inclined roof.

Upstands in wooden board (fig.3)

- $0.15\text{m} < H < 0,30\text{m}$: timber boarding of thickness $> 22\text{mm}$ or wooden particle board of thickness $> 19\text{mm}$;
- $H > 0.30\text{m}$: 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.

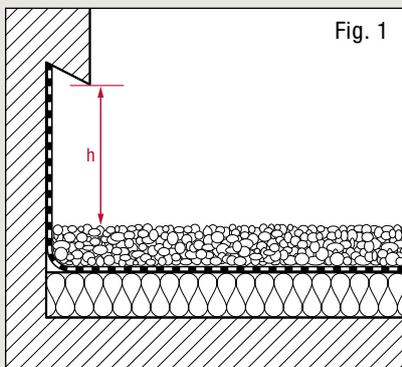


Fig. 1

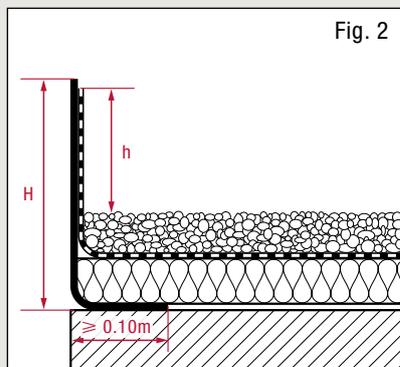


Fig. 2

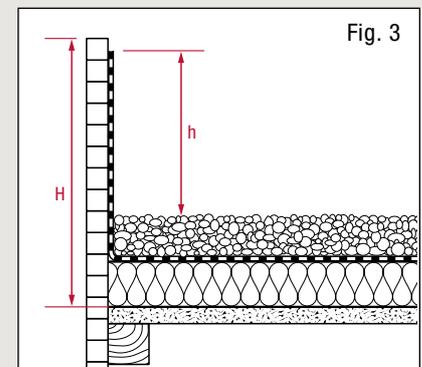


Fig. 3

Description of the upstand flashing

Preparation of the upstand

Upstand not thermally insulated

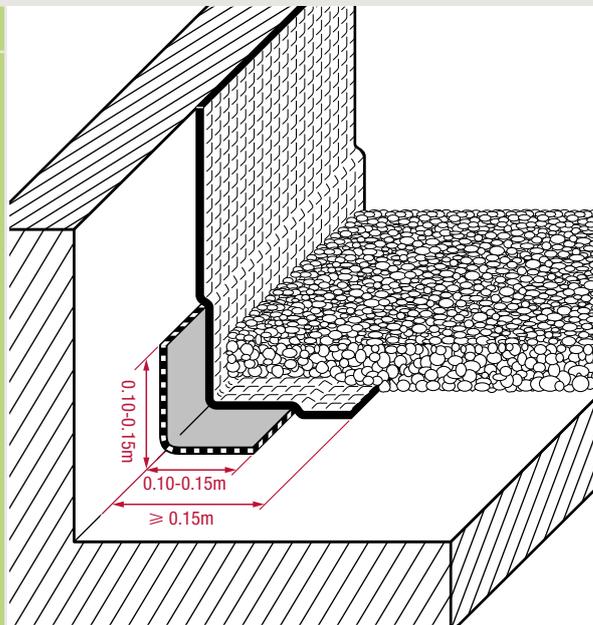
- Masonry or steeldeck: Siplast Primer.
- Wooden board: nailed Paradiene VV.

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

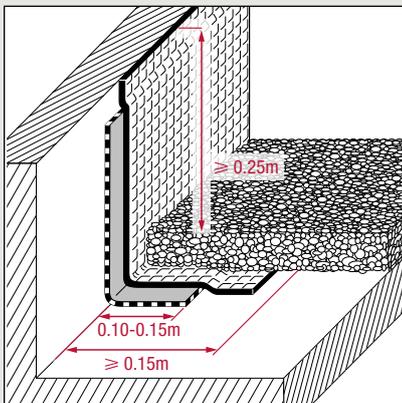
Top layer, welded:
Paradiel S (aluminium surface) or Supradial GS (surface of granules/chips)

Possible variants:

- ▶ Vercuire S
- ▶ Verinox S
- ▶ Parafor Solo GS
- ▶ Parafor Solo FE GS

Torched reinforcement angle:
Parequerre

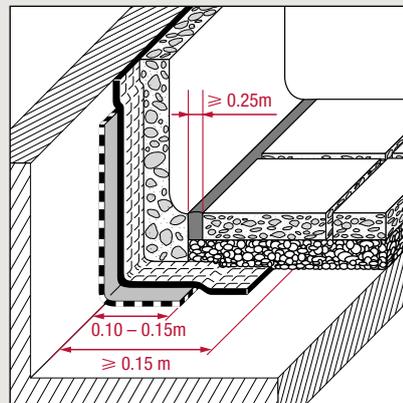
Particular case of measures for rainwater temporary storage



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 rein-

forced 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 $\geq 0.20\text{m}$: the coating is to be fixed at the head, above the upstand flashing.
- ▶ If height $\geq 0.40\text{m}$: the coating thickness is 0.05m and the reinforcement is of expanded metal or of 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

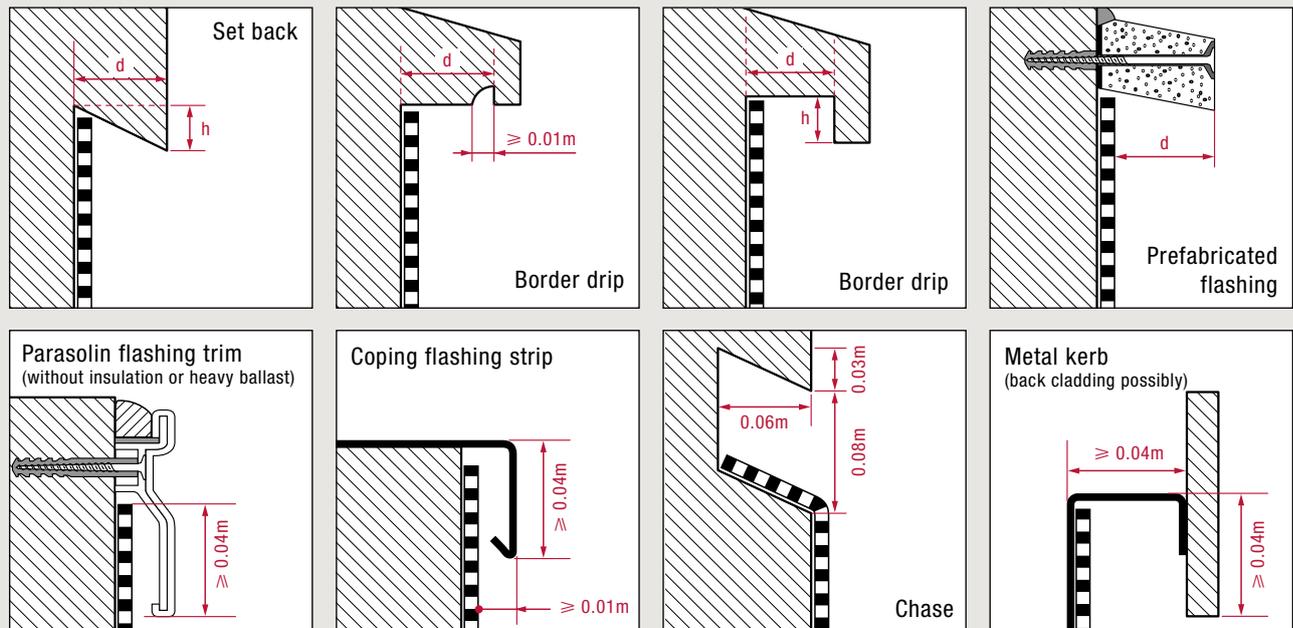
Methods for the tops of upstands

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.



	d (mm)	h (mm)
Upstand with granule surface membrane	40 + i	20
Upstand $\leq 0.40m$ with heavy balast finishing (3cm thicknes)	70 + i	30
Upstand $> 0.40m$ with heavy balast finishing (5cm thicknes)	90 + i	30

Note : i = eventual thickness of 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 ...

Complementary Information

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

Siplast product description

Adepar JS: self-adhesive, partially-bonded, glass/polyester composite-reinforced, SBS-modified, elastomeric bitumen under-layer. Surfaced with thermofusible film with siliconised peel-off film over self-adhesive selvedge. Underside sanded between self-adhesive strips and protected with siliconised peel-off film.

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.

Gravifltre: polyester filter layer for roof gardens.

Icopal Pur Glue: polyurethan monocomponent ready for use.

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

Paradial S: plain aluminium-faced, glass-reinforced elastomeric bitumen cap sheet, fusible film on the underside, nominal 70mm selvedge.

Paradiene 30.1 GS: glass fibre-based SBS-modified elastomeric bitumen cap sheet, with slate flake or coloured granule

surface finish, colour, sanded on the underside, nominal 70mm selvedge.

Paradiene JSR4: SBS elastomeric bitumen membrane with self-adhesive side laps as underlayer of a loose-laid two ply system under heavy protection.

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

Parafor 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.

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 SBS-modified 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 capsheet, 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.

Parequerre: 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.

